**Sunday, September 25, 2016 • AFTERNOON**

**ESA Opening Plenary Session and Founders’ Memorial Lecture**

***Valencia Room (Convention Center)***

**Moderators and Organizers:** C. David Gammel1 and May R. Berenbaum2, 1Entomological Society of America, Annapolis, MD, 2Univ. of Illinois, Champaign, IL

4:00 **Welcoming Remarks**  
4:05 **Presidential Address**  
4:15 **ESA Executive Director Report**  
4:20 **Entomological Foundation Report**  
4:25 **ESA and Entomological Foundation Awards** 4:45 **Introduction of Founders’ Memorial Lecture**

4:47 **0001** Lecture Honoring Dr. Edward F. Knipling. **Anthony James** (aajames@uci.edu), Univ. of California, Irvine, CA

5:28 **Concluding Remarks**  
**Sunday, September 25, 2016 • EVENING**

**ICE Opening Plenary Session**

***Valencia Room (Convention Center)***

**Moderators and Organizers:** Walter S. Leal1 and Alvin M. Simmons2, 1Univ. of California, Davis, CA, 2USDA - ARS, Charleston, SC

6:00 **0002** Welcome Address, ICE 2016 Co-Chair. **Alvin M. Simmons** (alvin.simmons@ars.usda.gov), USDA - ARS, Charleston, SC

6:05 **0003** Welcome Address, ICE 2016 Co-Chair. **Walter S. Leal** (wsleal@ucdavis.edu), Univ. of California, Davis, CA

6:10 **0004** Welcome Address, President of the Entomological Society of America. **May R. Berenbaum** (maybe@illinois.edu), Univ. of Illinois, Champaign, IL

6:15 **0005** Welcome Address, Chairman of the ICE Council. **Hari Sharma** (vcuhf@yahoo.com), Dr. YS Parmar Univ. of Horticulture & Forestry, Nauni, Solan, India

6:20 **0006** ICE Council - Certificates of Distinction. **James Ridsdill-Smith** (james.ridsdill-smith@csiro.au), CSIRO, Wembley, Australia

6:30 **0007** Entomology Without Borders from USDA - ARS’s Perspective. **Chavonda Jacobs-Young** (administrator@ ars.usda.gov), USDA - ARS, Washington, DC

6:35 **0008** Introduction of the Keynote Speaker. **Marcelo Jacobs-Lorena** (mlorena@jhsph.edu), Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

6:40 **0009** Opening Doors Worldwide through Medical Science. **Peter Agre** (pagre@jhu.edu), Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

**Monday, September 26, 2016 • MORNING**

**Plenary Presentation Featuring Dr. James R. Carey**

***Valencia Room (Convention Center)***

**Moderators and Organizers:** Walter S. Leal1, Alvin M. Simmons2, and Frank Zalom1, 1Univ. of California, Davis, CA, 2USDA - ARS, Charleston, SC

8:00 **0010** Introduction of the Plenary Speaker.  
**Frank Zalom** (fgzalom@ucdavis.edu), Univ. of California, Davis, CA

8:05 **0011** Insect biodemography: A 21st century guided tour. **James R. Carey** (jrcarey@ucdavis.edu), Univ. of California, Davis, CA

**Plenary Presentation Featuring Dr. José Roberto Postali Parra**

***Chapin Theater (Convention Center)***

**Moderators and Organizers:** Walter S. Leal1, Alvin M. Simmons2, and Marcos Kogan3, 1Univ. of California, Davis, CA, 2USDA - ARS, Charleston, SC, 3Oregon State Univ., Corvallis, OR

8:00 **0012** Introduction of the Plenary Speaker. **Marcos Kogan** (koganm@science.oregonstate.edu), Oregon State Univ., Corvallis, OR

8:05 **0013** The egg parasitoid *Trichogramma* as a tool for IPM in Brazil. **José R. P. Parra** (jrpparra@esalq.usp.br), Univ. of São Paulo, Piracicaba, Brazil

**Undergraduate Student Poster Competition: Ecology and Population Dynamics**

***West Hall C (Convention Center)***

**D3002** Will the leaf beetle *Lilioceris egena* burrow to find plant storage organs? **Scott Goldstein** (scott.goldstein@ars. usda.gov)1,2 and F. Allen Dray2, 1Hispanic Association  
of Colleges and Universities, Washington, DC, 2USDA - ARS, Davie, FL

**D3003** Development of sequential sampling plan for twospotted spider mite in strawberry greenhouses under consideration of spatial location. **Ye Jin Im** (yjin419@gmail.com), Ho Jeong Choe, Ju Wan Kang, and Jung-Joon Park, Gyeongsang National Univ., Jinju, South Korea

**D3004** Spatial distribution analysis of twospotted spider mite in strawberry greenhouses using geostatistics. **Ho Jeong Choe** (hojeong921@gmail.com), Ye Jin Im, Ju Wan Kang, and Jung-Joon Park, Gyeongsang National Univ., Jinju, South Korea

**D3005** Non-preference of the catalpa sphinx, *Ceratomia catalpae* (Lepidoptera: Sphingidae), to invertebrate predators. **Stephanie Brandys** (sfbran2872@ung.edu), Leah Orange, Evan Lampert, and Diana Porras, Univ. of North Georgia, Oakwood, GA

**D3006** The effect of border habitats on predation of a key pest. **Lidia Komondy** (lkomondy@msu.edu)1, Adam Ingrao1, Jason M. Schmidt1,2, and Zsofia Szendrei1, 1Michigan State Univ., East Lansing, MI, 2Univ. of Georgia, Tifton, GA

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**SUNDAY & MONDAY**

**Monday, September 26 • MORNING •**

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* **D3007**Arthropod abundance and richness at occupied and unoccupied nesting sites of olive-sided flycatchers (*Contopus cooperi*) in Alaska. **Megan McHugh** (mcmchugh@alaska.edu)1, Adam Haberski1, Julie Hagelin2, and Derek S. Sikes1, 1Univ. of Alaska, Fairbanks, AK, 2Alaska Dept. of Fish and Game, Fairbanks, AK
* **D3008**A survey of pest management practices in crucifers of Florida. **Sage Thompson** (sagemthompson@ufl.edu)1, Amanda C. Hodges1, and Eric Leveen2, 1Univ. of Florida, Gainesville, FL, 2Florida Dept. of Agriculture and Consumer Services, Gainesville, FL
* **D3009**Suitability of twenty North America tree species as secondary hosts of the invasive spotted lanternfly, *Lycorma delicatula* (White) (Hemiptera: Fulgoridae). **Cathryn Pugh** (cpugh853@live.kutztown.edu), Chelsea Johnson, Michael Toolan, and Gregory Setliff, Kutztown Univ., Kutztown, PA
* **D3010**Japanese beetle composting: Converting pests to soil fertilizer using common farm materials. **Traron Shivers** (traron.shivers006@my.lincolnu.edu), Hwei-Yiing Johnson, and Jaime Pinero, Lincoln Univ., Jefferson City, MO

**Undergraduate Student Poster Competition: Frontiers in Entomology**

***West Hall C (Convention Center)***

* **D3011**Evaluating bee diversity and abundance in fields of genetically-modified herbicide-tolerant canola. **Colton O’Brien** (coltobrien@gmail.com)1, Mark Vandever2, and Arathi Seshadri1, 1Colorado State Univ., Fort Collins, CO, 2U.S. Geological Survey, Fort Collins, CO
* **D3012**Are “eu” social? Evaluation of sociality in a  
  Caribbean halictid bee. **Emilio Grau-Cruz** (egrau7266@ gmail.com)1 and Bert Rivera-Marchand2, 1InterAmerican Univ. of Puerto Rico, Toa Alta, PR, 2InterAmerican Univ. of Puerto Rico, Bayamon, PR
* **D3013**The development of a motion detector that monitors and records bees entering and exiting a nest during the day. **Catherine Schlueter** (cschlueter@gatech.edu)1, Krystal LaFlora2, Eric Butler2, and Mark Schlueter3, 1Georgia Institute of Technology, Atlanta, GA, 2Shaw Univ., Raleigh, NC, 3Georgia Gwinnett College, Lawrenceville, GA
* **D3014**Carbohydrate-biased diets may improve locust performance in arid environments. **Ruth Farington** (rfaringt@asu.edu)1 and Arianne Cease2, 1Arizona State Univ., Jonesboro, AZ, 2Arizona State Univ., Tempe, AZ
* **D3015**Temporal variation in the apple bloom from year-to- year (2010-16) significantly affect diversity and abundance of native bee species in north Georgia. **Nicholas Stewart** (nstewart@ggc.edu) and   
  Mark Schlueter, Georgia Gwinnett College, Lawrenceville, GA
* **D3016**Effects of catalpa sphinx herbivory on defensive chemistry of catalpa trees. **Ansley Curry** (aecurr3488@ ung.edu), Wesley Turner, and Evan Lampert, Univ. of North Georgia, Oakwood, GA

**D3017**

**D3018**

**D3019**

**D3020 D3021**

Effects of dietary carotenoids on carotenoid sequestration and immune response in *Trichoplusia ni*. **Kameron Clark** (kaclar7988@ung.edu), Kieu Oanh Nguyen, and Evan Lampert, Univ. of North Georgia, Oakwood, GA

Electroantennographic activity bioassay of the antennae of the Sri Lankan weevil (*Myllocerus undecimpustulatus undatus* Marshall) to headspace volatiles of peach (*Prunus persica*). **Sana Shareef** (sanas@steds.org),

St. Edward’s School, Port St. Lucie, FL

Cycle affected mortality caused by imidacloprid through mediating P450s in the brown planthopper, *Nilaparvata lugens*. **Kui Kang** (hzausgkk@163.com), Sun Yat-sen Univ., Guangzhou, China

Salt stress confers cold tolerance in *Drosophila*.  
**Gil Yerushalmi** (gili@my.yorku.ca), Heath MacMillan, and Andrew Donini, York Univ., Toronto, ON, Canada

*Toxoneuron nigriceps* bracovirus (*Tn*BV) inhibits ecdysteroidogenesis in *Heliothis virescens* by the inactivation of TOR pathway. **Marisa Nardiello** (nardiellomarisa@gmail.com)1, Carmen Scieuzo1, Rosanna Salvia1, Simona Laurino1, Gerarda Grossi1, Marta Petrone1, Andrea Scala1, S. Bradleigh Vinson2, Heiko Vogel3, Sabino A. Bufo1, and Patrizia Falabella1, 1Univ. of Basilicata, Potenza, Italy, 2Texas A&M Univ., College Station, TX, 3Max Planck Institute for Chemical Ecology, Jena, Germany



**Graduate Student Poster Competition: Agricultural and Forest Entomology**

***West Hall C (Convention Center)***

**D3022** Please pass the salt: The effect of sodium addition on insect contributions to nutrient cycling. **Audrey Maran** (amaran@bgsu.edu)1, Michael Weintraub2, and Shannon Pelini1, 1Bowling Green State Univ., Bowling Green, OH, 2Univ. of Toledo, Toledo, OH

**D3023** Settling behavior of the potato psyllid, *Bactericera cockerelli* (Šulc) (Hemiptera: Triozidae), on potato germplasm with putative resistance to *Candidatus* Liberibacter solanacearum (Lso). **Austin Fife** (afife@ uidaho.edu) and Erik Wenninger, Univ. of Idaho, Kimberly, ID

**D3024** Host selection in arrowhead scale, *Unaspis yanonensis*: Can arrowhead scale infest Kawanonatsudaidai *Citrus natsudaidai*? **Kanari Murakami** (kanari1104@gmail. com)1, Yuji Miyashita2, and Yohei Izumi1, 1Shimane Univ., Matsue, Japan, 2Ehime Research Institute of Agriculture, Forestry and Fisheries, Fruit Tree Research Center, Matsuyama, Japan

**D3025** Rapid molecular detection of thousand cankers disease. **Emel Oren** (eoren1@vols.utk.edu)1, William Klingeman1, Paris L. Lambdin1, John Moulton1, Mark Coggeshall2, Steven Seybold3, and Denita Hadziabdic1, 1Univ. of Tennessee, Knoxville, TN, 2Univ. of Missouri, Columbia, MO, 3USDA - Forest Service, Davis, CA

**D3026** The forest edge effect on the distrbution of saproxylic beetles in Xuejian recreation area. **Hao Su** (ted20438@ gmail.com)1 and Chung-Chi Lin2, 1National Changhua Univ. of Education, Taichung, Taiwan, 2National Changhua Univ. of Education, Changhua, Taiwan

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**MONDAY**

**Monday, September 26 • MORNING •**

* **D3027**Field evaluation of lures to attract *Euwallacea* spp. nr. *fornicatus* (Coleoptera: Scolytinae), the vectors of Fusarium dieback. **Christine Dodge** (cdodg001@ucr.edu)1, Jessica Coolidge1, Crystal May Johnston1, Amanda Alcaraz1, Shannen Hilse1, Miriam Cooperband2, Allard Cossé3, and Richard Stouthamer1, 1Univ. of California, Riverside, CA, 2USDA - APHIS, Buzzards Bay, MA, 3USDA - ARS, Peoria, IL
* **D3028**Energy use by the mountain pine beetle (Coleoptera: Curculionidae: Scolytinae) for dispersal by flight.  
  **Asha Wijerathna** (wijerath@ualberta.ca) and  
  Maya Evenden, Univ. of Alberta, Edmonton, AB, Canada
* **D3029**Evaluating morphological characteristics of pheromone- trapped male gypsy moth (*Lymantria dispar* L.) as an index of habitat quality. **Chelsea Jahant-Miller** (cjjahant@syr.edu)1, Patrick Tobin2, and Dylan Parry1, 1State Univ. of New York, Syracuse, NY, 2Univ. of Washington, Seattle, WA
* **D3030**Presentation withdrawn
* **D3031**Investigating canopy diversity in the Clemson Experimental Forest. **K. Cairco** (kcairco@g.clemson.edu), Robert Bennett, Langston Jones, Charles Matthews, John C. Morse, and Michael Caterino, Clemson Univ., Clemson, SC
* **D3032**Impacts of prescribed fires on forest pollinator communities: Implications for burn size. **Conor Fair** (cfair13@uga.edu)1, Michael D. Ulyshen2, Joseph V. McHugh1, and Scott Horn2, 1Univ. of Georgia, Athens, GA, 2USDA - Forest Service, Athens, GA

**Graduate Student Poster Competition: Apidology, Sericulture, and Social Insects: Ants and Termites**

***West Hall C (Convention Center)***

* **D3033**Is genetic divergence the cause for the existence of two queen morphs in the ant *Myrmica ruginodis*? **Jana Wolf** (jana.wolf@helsinki.fi) and Perttu Seppä, Univ. of Helsinki, Helsinki, Finland
* **D3034**The evolution of body size and body size variation in ants (Formicidae). **Michael Rivera** (mdriver3@illinois. edu) and Andrew Suarez, Univ. of Illinois, Champaign, IL
* **D3035**Consistent self-organized foraging allocations in the macronutrient-regulating carpenter ant *Camponotus fragilis*. **Andrew Burchill** (andrew.burchill@asu.edu), Theodore Pavlic, and Stephen C. Pratt, Arizona State Univ., Tempe, AZ
* **D3036**Macronutrient regulation by the desert leafcutter ant, *Acromyrmex versicolor*. **Nathan Smith** (nesmith6@asu. edu), Arizona State Univ., Tempe, AZ
* **D3037**Relationship of imported fire ant species and hybrid status with worker size in colonies within Tennessee. **Manoj Pandey** (pandeymanoz@gmail.com)1,  
  Jason B. Oliver2, Karla Addesso2, Steven Valles3, Reginald Archer1, Nadeer Youssef2, and Sujan Dawadi1, 1Tennessee State Univ., Nashville, TN, 2Tennessee State Univ., McMinnville, TN, 3USDA - ARS,   
  Gainesville, FL

**D3038** Study of liquid baits control of *Dolichoderus thoracicus* on Xihu Township, Miaoli County, Taiwan (Hymenoptera: Formicidae). **Shao-Ming Huang** (andrew6313516@gmail.com), Chung-Chi Lin, and Po-Cheng Hsu, National Changhua Univ. of Education, Changhua, Taiwan

**D3039** Laboratory response of the eastern subterranean termite, *Reticulitermes flavipes*, to neighboring populations of the Formosan subterranean termite, *Coptotermes formosanus*, baited with noviflumuron. **Sarah Bernard** (s\_bernard@live.com) and Nan-Yao Su, Univ. of Florida, Davie, FL

**D3040** Soldier caste determination through regulation of social communications in termites. **Hajime Yaguchi** (thexxx777@yahoo.co.jp)1, Shuji Shigenobu2, Ken Sa- saki3, and Kiyoto Maekawa1, 1Univ. of Toyama, Toyama, Japan, 2National Institute for Basic Biology, Okazaki, Japan, 3Tamagawa Univ., Tokyo, Japan

**Graduate Student Poster Competition: Apidology, Sericulture, and Social Insects: Bees**

***West Hall C (Convention Center)***

**D3041** Occurrence of select parasites and pathogens in Arkansas honey bees. **Dylan Cleary** (dacleary@uark. edu), A. L. Szalanski, and Donald C. Steinkraus, Univ. of Arkansas, Fayetteville, AR

**D3042** Patterns of parentage in *Ceratina calcarata* (Hymenoptera: Apidae): The costs and benefits of worker production in a socially polymorphic bee. **Wyatt Shell** (was2000@wildcats.unh.edu) and Sandra Rehan, Univ. of New Hampshire, Durham, NH

**D3043** Environmental effects on a complex system: Size variation within a bumble bee (*Bombus impatiens*) colony changes with temperature. **Evan Kelemen** (evankelemen@email.arizona.edu) and Anna Dornhaus, Univ. of Arizona, Tucson, AZ

**D3044** Nutraceuticals for bees? Dietary phytochemicals of honey may boost pesticide detoxification and longevity in honey bees. **Ling-Hsiu Liao** (liao19@illinois.edu) and May R. Berenbaum, Univ. of Illinois, Champaign, IL

**D3045** Determining ideal soil conditions for rearing alkali bees (*Nomia melanderi*). **Emily Wine** (emily.wine@wsu.edu)1 and Douglas Walsh2, 1Washington State Univ., Pullman, WA, 2Washington State Univ., Prosser, WA

**D3046** Conservation genomics of the yellowbanded bumblebee, *Bombus terricola*. **Kailey Michnal** (kvmichna@gmail. com), Amro Zayed, and Sheila R. Colla, York Univ., Toronto, ON, Canada

**D3047** Assessing ultraviolet reflection and aspect effects on establishing wild bumble bees (*Bombus* sp.) in arboreal nest boxes. **James Herndon** (james.herndon85@gmail. com)1, Amber D. Tripodi2, James Strange2, and Karen Kapheim1, 1Utah State Univ., Logan, UT, 2USDA - ARS, Logan, UT

**D3048** Identifying native plants to enhance pollination services for sustainable crop production in Michigan. **Logan Rowe** (roweloga@msu.edu), Dan Gibson, Douglas Landis, and Rufus Isaacs, Michigan State Univ., East Lansing, MI

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**MONDAY**

**Monday, September 26 • MORNING •**

* **D3049**Bee conservation in the urban landscape. **Bernadette Mach** (bernadettemach@uky.edu), Adam Baker, Abiya Saeed, Carl T. Redmond, and Daniel Potter, Univ. of Kentucky, Lexington, KY
* **D3050**Bumble bees and blueberry fields: An analysis of how coarse-scaled landscape characteristics influence the development of *Bombus impatiens* colonies. **Christopher Andrews** (crandrews@dal.ca), Dalhousie Univ., Truro, NS, Canada
* **D3051**The Maryland native bee survey: Utilizing citizen scientists to monitor native bee populations.  
  **Olivia Bernauer** (bernauer@umd.edu) and  
  Dennis vanEngelsdorp, Univ. of Maryland, College Park, MD

**Graduate Student Poster Competition: Biological Control and Insect Pathology**

***West Hall C (Convention Center)***

* **D3052**Can conversion of land influence the presence of  
  native versus exotic lady beetles (Coccinellidae)? **Denisha Parker** (parkerdenisha@yahoo.com), The Ohio State Univ., Columbus, OH
* **D3053**Improving the efficacy of mass rearing *Tamarixia radiata* for biological control of *Diaphorina citri*. **Heather Hernandez** (heather.hernandez01@utrgv.edu)1, Daniel Flores2, and Christopher Vitek1, 1The Univ. of Texas, Edinburg, TX, 2USDA - APHIS, Edinburg, TX
* **D3054**Identification, expression, and bio-activity characterization of a thioredoxin from *Plutella xylostella*, and effects of parasitoid, *Cotesia vestalis*, on its transcript. **Ze-hua Wang** (wang382732003@163. com), Shuang Zhao, Min Shi, and Xue-xin Chen, Zhejiang Univ., Hangzhou, China
* **D3055**Does emerald ash borer (*Agrilus planipennis*) host plant impact the performance of its larval parasitoids? **Jackie Hoban** (jhoban1@umd.edu)1, Jian Duan2,  
  David E. Jennings1, and Paula M. Shrewsbury1, 1Univ. of Maryland, College Park, MD, 2USDA - ARS, Newark, DE
* **D3056**The effects of host-produced wax on searching behavior and efficacy of parasitoids of the giant whitefly *Aleurodicus dugesii* (Hemiptera: Aleyrodidae). **Erich Schoeller** (escho002@ucr.edu), Maher Yassin, and Richard Redak, Univ. of California, Riverside, CA
* **D3057***In vitro* compatibility of selected systemic insecticides with *Beauveria bassiana* (Cordycipitaceae), strain SGI921. **Nokulunga Mzimela** (mzimelan@arc.agric.za)1,2, Justin Hatting1, and Mark Laing2, 1Agricultural Research Council, Bethlehem, South Africa, 2Univ. of KwaZulu- Natal, Pietermaritzburg, South Africa
* **D3058**Field evaluation of *Nomuraea rileyi* against larvae  
  of *Spodoptera frugiperda* on corn in Nuevo Leon. **Diego Camacho-Ponce** (diegoponce01@hotmail.com), Reyna Torres-Acosta, Francisco Lopez-Monzon, and Sergio Sanchez-Peña, Antonio Narro Agrarian Autonomous Univ., Saltillo, Mexico

**D3059** *hcf-1* gene of AcMNPV is an essential viral factor required for productive infection of HycuMNPV in Tn368 cells. **Ami Tachibana** (ami\_wlolw@yahoo.co.jp), Rina Hamajima, Moe Tomizaki, Takuya Kondo, Yoshie Nanba, Michihiro Kobayashi, and Motoko Ikeda, Nagoya Univ., Nagoya, Japan

**D3060** Biological control of Florida red scale (C*hrysomphalus aonidum*). **Ruth Carter** (ruth7db01@gmail.com), Harper Adams Univ., Beds, United Kingdom

**D3061** Host specificity of the psyllid *Calophya terebinthifolii* (Hemiptera: Calophyidae), a potential biological control agent against Brazilian peppertree in Florida, USA. **Patricia Prade** (prade@ufl.edu)1, James P. Cuda1, and William A. Overholt2, 1Univ. of Florida, Gainesville, FL, 2Univ. of Florida, Ft. Pierce, FL

**D3062** Field host specificity of a potential hydrilla biological control agent, *Cricotopus lebetis* Sublette (Diptera: Chironomidae). **Eutychus M. Kariuki** (eutychus1. kariuki@famu.edu)1,2, James P. Cuda1, Raymond L. Hix2, Jennifer Gillett-Kaufman1, and Stephen Hight3, 1Univ. of Florida, Gainesville, FL, 2Florida A&M Univ., Tallahassee, FL, 3USDA - ARS, Tallahassee, FL

**Graduate Student Poster Competition: Ecology and Population Dynamics**

***West Hall C (Convention Center)***

**D3063** Population dynamics of aphid defensive phenotypes. **Clesson Higashi** (clessonh@uga.edu) and  
Kerry M. Oliver, Univ. of Georgia, Athens, GA

**D3064** Relative importance of multiple environmental variables to Ephemeroptera, Plecoptera, and Trichoptera species richness in Kaskaskia River conservation land streams. **Eric South** (ejsouth@illinois.edu), Univ. of Illinois, Champaign, IL

**D3065** The demography of an endangered grassland butterfly species, *Melitaea ambigua*, has traced a historical change in semi-natural grassland area in Japan. **Naoyuki Nakahama** (nakahama.naoyuki.68r@ st.kyoto-u.ac.jp)1, Kei Uchida2, Atushi Ushimaru3, and Yuji Isagi1, 1Kyoto Univ., Kyoto, Japan, 2The Univ. of Tokyo, Tokyo, Japan, 3Kobe Univ., Kobe, Japan

**D3066** Determining bioindicators for the impact of oil spills using the food web of larvae of the greenhead horse  
fly (*Tabanus nigrovittatus*). **Devika Bhalerao** (dbhale1@ lsu.edu), Daniel R. Swale, Lane Foil, and  
Claudia Husseneder, Louisiana State Univ., Baton Rouge, LA

**D3067** Differences in Oklahoma leafhopper (Hemiptera: Cicadellidae) abundance and diversity in mixed grasses compared to King Ranch Bluestem. **Natalie Gahm** (ngahm@okstate.edu), W. Wyatt Hoback, and Astri Wayadande, Oklahoma State Univ., Stillwater, OK

**D3068** Response of larval Lepidoptera and their natural enemies to experimental ice storms in a northeastern forest. **Wendy Leuenberger** (wleuenbe@syr.edu)1, Kimberly F. Wallin2, and Dylan Parry1, 1State Univ. of New York, Syracuse, NY, 2Univ. of Vermont, Burlington, VT

**D3069** Influence of tri-trophic fitness on diet breadth of a generalist herbivore (*Hyphantria cunea*, Lepidoptera: Erebidae). **Mayra Vidal** (mayracvidal@gmail.com) and Shannon Murphy, Univ. of Denver, Denver, CO

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**MONDAY**

**Monday, September 26 • MORNING •**

* **D3070**Genetic variation in the riparian foundation tree predicts arthropod community structure in wild. **Shinnosuke Kagiya** (slotapir-1035@fsc.hokudai.ac.jp)1 and Shunsuke Utsumi2, 1Hokkaido Univ., Nayoro, Japan, 2Hokkaido Univ., Horokanai, Japan
* **D3071**Development of binomial sampling plan for *Bemisia tabaci* in paprika greenhouses. **Ju Wan Kang** (kang3904@gmail.com)1, Ye Jin Im1, Ho Jeong Choe1, won Seok Choi2, and Jung-Joon Park1, 1Gyeongsang National Univ., Jinju, South Korea, 2Kyung Nong Co., Gyeongju, South Korea

**Graduate Student Poster Competition: Ecology of Pesticides, Resistance, Toxicology, and Genetically Modified Crops**

***West Hall C (Convention Center)***

* **D3072**Characterising the amino acid substitutions (L925I, L925M, and L925V) associated with pyrethroid resistance in *Varroa destructor.* **John Grzeskowiak** (stxjwg@nottingham.ac.uk)1, Joel González-Cabrera2, Ian Mellor1, T. G. Emyr Davies3, and Martin Williamson3, 1Univ. of Nottingham, Nottingham, United Kingdom, 2Univ. of València, Burjassot, Spain, 3Rothamsted Research, Harpenden, United Kingdom
* **D3073**Identification of neonicotinoid-tolerant honey bee (*Apis mellifera*) colony for commercial development. **Yiyun Xu** (xuyiy@missouri.edu)1 and Moneen Jones2, 1Univ. of Missouri, Columbia, MO, 2Univ. of Missouri, Portageville, MO
* **D3074**Determination of toxic pesticide reference standards for use in semi-field methods to assess the toxicity of pesticide exposure to *Bombus impatiens* (Cresson). **Tara Celetti** (tceletti@uoguelph.ca)1, Angela Gradish1, Cynthia Scott-Dupree1, Chris Cutler2, and Paul Sibley1, 1Univ. of Guelph, Guelph, ON, Canada, 2Dalhousie Univ., Truro, NS, Canada
* **D3075**Cytochrome P450s are responsible for the  
  metabolism of thiacloprid in a solitary bee pollinator. **Katherine Beadle** (k.beadle@exeter.ac.uk)1,  
  Bartek Troczka2, Emma Randall1, Christoph Zimmer1,  
  T. G. Emyr Davies2, Lin Field2, Martin Williamson2,  
  Ralf Nauen3, and Chris Bass1, 1Univ. of Exeter, Penryn, United Kingdom, 2Rothamsted Research, Harpenden, United Kingdom, 3Bayer CropScience, Monheim, Germany
* **D3076**A genomic approach to understanding metabolic insecticide resistance to diamides in diamondback moth (*Plutella xylostella*). **Mark Mallott** (mark.mallott@ rothamsted.ac.uk)1, Lin Field1, Jan Elias2, Russell Slater3, Mark Paine4, Charles Wondji4, Martin Williamson1, and Chris Bass5, 1Rothamsted Research, Harpenden, United Kingdom, 2Syngenta Crop Protection, Stein, Switzerland, 3Syngenta Crop Protection, Basel, Switzerland, 4Liverpool School of Tropical Medicine, Liverpool, United Kingdom, 5Univ. of Exeter, Penryn, United Kingdom
* **D3077**Toxicology and mode of action of basic amines to mosquitoes. **Minyuan Tie** (mtie@ufl.edu)1, Baonan Sun1, Maia Tsikolia1, Ulrich Bernier2, and Jeffrey Bloomquist1, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Gainesville, FL

**D3078** Pyrethroid resistance reduces the biting protection of treated clothing against Puerto Rican *Aedes aegypti*. **Natasha Agramonte** (nme@ufl.edu)1,2, Jeffrey Bloomquist1, and Ulrich Bernier2, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Gainesville, FL

**D3079** Ryanodine receptor from the rice stem borer (*Chilo suppressalis*): Gene identification, cloning, phylogenetic analysis, and expression levels on induction by chlorantraniliprole. **Yingchuan Peng** (ycpeng13@gmail. com), Chengwang Sheng, Zhaojun Han, and Chunqing Zhao, Nanjing Agricultural Univ., Nanjing, China

**D3080** The degradation of imidacloprid and thiamethoxam in sugar beet plants in open field conditions and in glasshouses. **Zrinka Drmic** (zdrmic@agr.hr),  
Helena Viric Gasparic, Maja Cacija, Darija Lemic, and Renata Bazok, Univ. of Zagreb, Zagreb, Croatia

**D3081** Effects of insecticide synergists and cross-resistance on pyrethroid resistant western corn rootworm (*Diabrotica virgifera virgifera* LeConte) populations. **Adriano Pereira** (aelias374@yahoo.com.br)1,  
Dariane Souza1, Haichuan Wang1, Sarah Zukoff2,  
Blair Siegfried3, and Lance Meinke1, 1Univ. of Nebraska, Lincoln, NE, 2Kansas State Univ., Manhattan, KS, 3Univ. of Florida, Gainesville, FL

**D3082** Proactive resistance management of *Bemisia tabaci* in the cross-commodity systems of Arizona and Califor- nia. **Naomi Pier** (nmpier@email.arizona.edu)1, Peter Ellsworth1, John Palumbo2, Yves Carrière3, Al Fournier1, Wayne Dixon1, Lydia Brown1, Steven J. Castle4, and Nilima Prabhaker5, 1Univ. of Arizona, Maricopa, AZ, 2Univ. of Arizona, Yuma, AZ, 3Univ. of Arizona, Tucson, AZ, 4USDA - ARS, Maricopa, AZ, 5Univ. of California, Riverside, CA

**Graduate Student Poster Competition: Frontiers in Entomology**

***West Hall C (Convention Center)***

**D3083** Geographic variation in the responses of insect herbivores to nutrient balance and temperature.  
**Kate Augustine** (kaugust1@live.unc.edu) and  
Joel Kingsolver, Univ. of North Carolina, Chapel Hill, NC

**D3084** The role of timing in the heat shock effects on a host-parasitoid system. **Aleix Valls** (aleix.valls@ndsu. edu), James Kopco, and Jason Harmon, North Dakota State Univ., Fargo, ND

**D3085** Digitization: What is it good for? Or, how biodiversity informatics can inform us about the inherent and social aspects of entomology. **Katherine Nesheim** (nesheim.1@buckeyemail.osu.edu) and Norman Johnson, The Ohio State Univ., Columbus, OH

**D3086** Effects of host-plant density on herbivores and their parasitoids: A field experiment with a native perennial legume. **Andrea Salas** (asala035@fiu.edu)1, Suzanne Koptur1, Krishnaswamy Jayachandran1, Jay Sah1 and Tomas Ayala-Silva2, 1Florida International Univ., Miami, FL, 2USDA - ARS, Miami, FL

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* **D3087**Assessing the role of sugar nutrition in braconid parasitoids that specialize on the wheat stem sawfly. **Dayane Reis** (dayane.reis@msu.montana.edu), Megan L. Hofland, Robert K. D. Peterson, and   
  David K. Weaver, Montana State Univ., Bozeman, MT
* **D3088**Vectorial capacity of female sciarid flies (*Lycoriella ingenua* Dufour) towards mushroom green mold   
  disease (*Trichoderma aggressivum*) in commercial (*Agaricus bisporus*) mushroom production: A fitness related behaviour. **Maria Mazin** (mtm267@psu.edu) and Edwin Rajotte, Pennsylvania State Univ., University Park, PA
* **D3089**Sequential infection of *soybean vein necrosis virus* in the alimentary canal and salivary glands of its vector, soybean thrips (*Neohydathothrips variabilis*). **Jinlong Han** (hanj01@ipfw.edu), Vamsi Nalam, and Punya Nachappa, Indiana Univ.-Purdue Univ., Fort Wayne, IN
* **D3090**A framework for the application of genetic pest management in agriculture. **Jennifer Baltzegar** (jen\_baltzegar@ncsu.edu), Johanna Elsensohn,  
  Nicole Gutzmann, Jessica Cavin Barnes, Michael Jones, Sheron King, and Jayce Sudweeks, North Carolina State Univ., Raleigh, NC
* **D3091**Edible insects of Nagaland, India. **Lobeno Mozhui** (lobenommozhui@gmail.com), Sapu Changkija, and L. N. Kakati, Nagaland Univ., Nagaland, India

**Graduate Student Poster Competition: Genetics and Evolutionary Entomology**

***West Hall C (Convention Center)***

* **D3092**Getting useful information from RNA-seq contaminants: A case of study in *Tetrapedia diversipes* transcriptome. **Natalia Araujo** (na.araujo@usp.br), Alexandre Zuntini, and Maria Arias, Univ. of São Paulo, São Paulo, Brazil
* **D3093**Physical mapping and integration of the genome assemblies for the malaria mosquito *Anopheles funestus*. **Jiyoung Lee** (jylee43@vt.edu)1, Phillip George1, Maryam Kamali1, Adam Phillippy2, Sergey Koren2, Scott Emrich3, Igor Sharakhov1, and Nora J. Besansky3, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2National Human Genome Research Institute, Bethesda, MD, 3Univ. of Notre Dame, South Bend, IN
* **D3094**Integrated transcriptomic and proteomic approach  
  to identify the major *Toxoneuron nigriceps* venom proteins. **Gerarda Grossi** (gerarda.grossi@unibas.it)1, Simona Laurino1, Pietro Pucci2, S. Bradleigh Vinson3, Heiko Vogel4, Carmen Scieuzo1, Marisa Nardiello1, Rosanna Salvia1, Marta Petrone1, Andrea Scala1,  
  Sabino Bufo1, and Patrizia Falabella1, 1Univ. of Basilicata, Potenza, Italy, 2CEINGE-Biotecnologie Avanzate, Napoli, Italy, 3Texas A&M Univ., College Station, TX, 4Max Planck Institute for Chemical Ecology, Jena, Germany
* **D3095**Transcriptome analysis of a polyembryonic parasitoid *Copidosoma floridanum*. **Takuma Sakamoto** (tsakamoto1988@gmail.com), Hitomi Ono, and Kikuo Iwabuchi, Tokyo Univ. of Agriculture and Technology, Tokyo, Japan

**D3096** Developmental causes of allometry in *Manduca sexta*. **Kenneth McKenna** (kzm@duke.edu) and Fred Nijhout, Duke Univ., Durham, NC

**D3097** Transcriptome and functional analysis of JH dependent genes in termites and woodroaches. **Yudai Masuoka** (yudaisan20@yahoo.co.jp)1, Hajime Yaguchi1,  
Kouhei Toga1, Shuji Shigenobu2, Christine Nalepa3, and Kiyoto Maekawa1, 1Univ. of Toyama, Toyama, Japan, 2National Institute for Basic Biology, Okazaki, Japan, 3North Carolina State Univ., Raleigh, NC

**D3098** A survey of chemosensory gene expression patterns within the vampire moth genus *Calyptra* Ochsenheimer (Lepidoptera: Erebidae: Calpinae). **Julia Snyder** (snyder65@purdue.edu) and Jennifer Zaspel, Purdue Univ., West Lafayette, IN

**D3099** Mechanism of stable polymorphism of antennal segments number: Trade-off between pre- and post-copulatory fitness in a seed beetle species. **Katsuto Fukuda** (fukudparty@yahoo.co.jp) and Midori Tuda, Kyushu Univ., Fukuoka, Japan

**D3100** Molecular evidence of host-associated genetic differentiation in *Prodiplosis longifila* (Diptera: Cecidomyiidae). **Diana Duque-Gamboa** (diana.nataly.duque@correounivalle.edu.co)1,  
Maria Castillo-Cardenas1, Luis Hernández2, Yoan Guzman2, Maria Manzano2, and Nelson Toro-Perea1, 1Univ. of Valle, Cali, Colombia, 2National University of Colombia, Palmira, Colombia

**D3101** Transcriptome analysis of the large milkweed bug (*Oncopeltus fasciatus*) testis. **Ashley Duxbury** (aduxbur@uga.edu) and Patricia Moore, Univ. of Georgia, Athens, GA

**Graduate Student Poster Competition: Insect Chemical Ecology**

***West Hall C (Convention Center)***

**D3102** Chemically-mediated dispersal and mating behavior of billbugs (Coleoptera: Curculionidae) associated with turfgrass. **Alexandra Duffy** (duffy14@purdue.edu), Gabriel Hughes, Matthew Ginzel, and Douglas Richmond, Purdue Univ., West Lafayette, IN

**D3103** Behavioral chemical disruption of the host selection behavior of the walnut twig beetle: A chemical ecological approach. **Jackson Audley** (jpaudley@ ucdavis.edu)1, Paul L. Dallara1, Wittko Francke2, and Steven Seybold3, 1Univ. of California, Davis, CA, 2Univ. of Hamburg, Hamburg, Germany, 3USDA - Forest Service, Davis, CA

**D3104** Evaluating the behavior of oriental beetle (*Anomala orientalis*) in proximity to pheromone point sources used in mating disruption and attract-and-kill. **Robert Holdcraft** (rholdcra@rci.rutgers.edu)1 and Cesar Rodriguez-Saona2, 1Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, 2Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

**D3105** Expression pattern and functional analysis of pheromone receptors in two sibling species, *Helicoverpa armigera* and *H. assulta*. **Ke Yang** (yangke@ioz.ac.cn), Ling-Qiao Huang, and Chen-Zhu Wang, Chinese Academy of Sciences, Beijing, China

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* **D3106**Comparison of gene expression involving in pheromone biosynthesis in the pheromone gland of *Plutella xylostella* (L.). **Yoon Jung Hwang** (kum3245@hanmail. net) and Dae-weon Lee, Kyungsung Univ., Busan, South Korea
* **D3107**Identification of genes involving in pheromone production via transcriptome of the pheromone gland in the diamondback moth, *Plutella xylostella* (L.). **Wook Hyun Cha** (whcha17@gmail.com) and Dae-weon Lee, Kyungsung Univ., Busan, South Korea
* **D3108**Host preference in parasitic phorid flies: Response  
  of *Pseudacteon curvatus* and *P*. *obtusus* to venom alkaloids of native and imported *Solenopsis* fire ants. **Olufemi Ajayi** (osa0001@auburn.edu)1, Li Chen2, and Henry Fadamiro1, 1Auburn Univ., Auburn, AL, 2Chinese Academy of Sciences, Beijing, China
* **D3109**Effect of canola infection with clubroot disease on oviposition by the bertha armyworm.   
  **Chaminda De Silva Weeraddana** (weeradda@ualberta. ca), Victor Manolii, Stephen Strelkov, and  
  Maya L. Evenden, Univ. of Alberta, Edmonton,  
  AB, Canada
* **D3110**The use of synthetic pheromone lures to assess presence of Cerambycidae species at several sites across Idaho. **Claudia D. Lyons-Yerion** (yeri5309@ vandals.uidaho.edu)1, Stephen P. Cook1,   
  Lawrence M. Hanks2, Jocelyn G. Millar3,  
  Christopher J. Williams1, Frank W. Merickel1,  
  Renae Shrum1, and James D. Barbour4, 1Univ. of Idaho, Moscow, ID, 2Univ. of Illinois, Urbana, IL, 3Univ. of California, Riverside, CA, 4Univ. of Idaho, Parma, ID
* **D3111**Glutathione S-transferase *SlGSTE1* in *Spodoptera litura* may be involved in feeding adaption of host plants. **Xiaopeng Zou** (z0625p@126.com), South China Normal Univ., Guangzhou, China
* **D3112**Daily patterns of insect herbivory and secondary plant metabolites in a lowland tropical forest. **Luke Zehr** (lnzehr2@illinois.edu)1, Brian Sedio2, and  
  May R. Berenbaum1, 1Univ. of Illinois, Champaign, IL, 2Smithsonian Tropical Research Institute, Panama City, Panama

**Graduate Student Poster Competition: Invasive and Exotic Entomology**

***West Hall C (Convention Center)***

* **D3113**Spatial patterns in the morphology and microbiome of the invasive kudzu bug, *Megacopta cribraria*.  
  **Riley Lovejoy** (rztunnell@crimson.ua.edu) and Jeffrey D. Lozier, Univ. of Alabama, Tuscaloosa, AL
* **D3114**Comparative transcriptome analysis reveals differences in flight ability between *Bactrocera dorsalis* and  
  *B. correcta* (Diptera: Tephritidae). **Shaokun Guo** (mscgsk@163.com), Zihua Zhao, Lijun Liu, Jie Shen, and Zhihong Li, China Agricultural Univ., Beijing, China
* **D3115**The spatial and temporal distribution of spotted wing drosophila and other drosophilids. **Amanda Chamberlain** (amanda.chamberlain@ubc.ca)1, Robert Lalonde1, and Howard Thistlewood2, 1The Univ. of British Columbia, Kelowna, BC, Canada, 2Agriculture and Agri-Food Canada, Summerland, BC, Canada

**D3116** Laboratory assessment of the attractiveness of selected fruit and leaf volatiles to *Drosophila suzukii*. **Grant Bolton** (lgbcm4@mail.missouri.edu)1,  
Bruce A. Barrett1, and Jaime Pinero2, 1Univ. of Missouri, Columbia, MO, 2Lincoln Univ., Jefferson City, MO

**D3117** *Drosophila suzukii* in North Dakota: Distribution  
and future research. **Caitlin Krueger** (c.krueger@ndsu. edu)1, Janet Knodel1, Esther McGinnis1,  
Harlene Hatterman-Valenti1, Kathy Wiederholt2, Charles Elhard3, Patrick Beauzay1, and Jesse Ostrander1, 1North Dakota State Univ., Fargo, ND, 2North Dakota State Univ. Extension, Carrington, ND, 3North Dakota Dept. of Agriculture, Fargo, ND

**D3118** Tracking spatial and temporal patterns of host use by *Drosophila suzukii* (Matsumura) to improve management programs in fruit crops. **Katharine Swoboda Bhattarai** (kaswobod@ncsu.edu) and Hannah Burrack, North Carolina State Univ., Raleigh, NC

**D3119** The relative attractiveness of different host substrates to parasitoids (Hymenoptera) of frugivorous drosophilids. **James Wahls** (jcew90@vt.edu), Douglas G. Pfeiffer, and Scott Salom, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

**D3120** Structure access and settling behavior of overwintering brown marmorated stink bugs (*Halyomorpha halys*). **Benjamin Chambers** (bdc0112@vt.edu)1, Thomas P. Kuhar1, Annie Pearce1, Tracy C. Leskey2, and Georg Reichard1, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2USDA - ARS, Kearneysville, WV

**Graduate Student Poster Competition: RNAi and Gene Expression Control in Insects**

***West Hall C (Convention Center)***

* **D3121**Variations in RNAi efficacy among insect species, mediated through different delivery modes, is attributable to dsRNA degradation *in vivo*.  
  **Kangxu Wang** (Kangxwang@hotmail.com),  
  Yingchuan Peng, Jian Pu, Jiale Wang, and Zhaojun Han, Nanjing Agricultural Univ., Nanjing, China
* **D3122**RNA interference as a novel approach to control red flour beetle, *Tribolium castaneum* (Herbst).  
  **Baida Alshukri** (b.m.h.alshukri@newcastle.ac.uk), Martin Edwards, and Angharad M. R. Gatehouse, Newcastle Univ., Newcastle upon Tyne, United Kingdom
* **D3123**Silencing of *Laccase2* in *Dectes texanus* (Coleoptera: Cerambycidae) by RNA interference. **Lina Aguirre-Rojas** (liaguiro@ksu.edu) and C. Michael Smith, Kansas State Univ., Manhattan, KS
* **D3124**RNA interference of carboxyesterases increases pesticides susceptibility in the Asian citrus psyllid, *Diaphorina citri*. **Abdelaziz Kishk** (akishk@ufl.edu) and Nabil Killiny, Univ. of Florida, Lake Alfred, FL
* **D3125**Screening of RNAi targets and impacts on spotted wing drosophila, *Drosophila suzukii*. **Siew Bee Tang** (tangsie@oregonstate.edu)1, Kelly Donahue2, Seung-Joon Ahn1,2, and Man-Yeon Choi2, 1Oregon State Univ., Corvallis, OR, 2USDA - ARS, Corvallis, OR
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* **D3126**Epigenetic regulation of molting and metamorphosis in the red flour beetle, *Tribolium castaneum* (Herbst). **Smitha George** (smitha.george@uky.edu) and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY
* **D3127**Presentation withdrawn
* **D3128**The function and DNA methylation regulation of *Bombyx mori* chitin synthase *2b* (*BmCHSA-2b*). **Guanfeng Xu** (1473220308@qq.com), South China Normal Univ., Guangzhou, China
* **D3129**RNAi targeted to the circadian clock gene *period* disrupts photoperiodism of the jewel wasp, *Nasonia vitripennis*. **Ayumu Mukai** (ayumukai64@gmail.com) and Shin Goto, Osaka City Univ., Osaka, Japan

**Student Virtual Poster Competition: Undergraduate**

***West Hall C (Convention Center)***

* **VP01**How specific are specific primers? A *Beauveria* and *Metarhizium* case. **Tania Leandro-Espinoza** (tle109@gmail.com)1, Ruth Castro2, Ramón Molina-Bravo2, and Mauricio Montero-Astúa1, 1Univ. of Costa Rica, San José, Costa Rica, 2National Univ. of Costa Rica, Heredia, Costa Rica
* **VP02**Morphological separateness of aphid genera *Stomaphi*s Walker and *Parastomaphis* Pašek (Insecta, Hemiptera, Aphididae). **Mariusz Kanturski** (mariusz.kanturski@ us.edu.pl) and Lukasz Depa, Univ. of Silesia, Katowice, Poland
* **VP03**Aphids as biosensors: Exploring a protocol to characterize aphids’ DNA methylation in response to changes in temperature. **Izayana Sandoval** (izayanasc@ yahoo.com), William Villalobos, Laura Garita, and Mauricio Montero-Astúa, Univ. of Costa Rica, San José, Costa Rica
* **VP04**Presence of secondary bacterial endosymbionts according to whitefly species in tomato crops from Costa Rica. **Xareni Can** (xareni.can@ucr.ac.cr), Natalia Barboza, and Eduardo Hernandez, Univ. of Costa Rica, San Jose, Costa Rica

**Student Virtual Poster Competition: Graduate**

***West Hall C (Convention Center)***

* **VP05**Competing for space: A case study of horse chestnut leaf miner (*Cameraria ohridella*) and leaf blotch disease (*Guignardia aesculi*). **Michal Kopacka** (michalkopacka@seznam.cz)1,2 and Rostislav Zemek1, 1Czech Academy of Sciences, České Budějovice, Czech Republic, 2Univ. of South Bohemia, České Budějovice, Czech Republic
* **VP06**Morphology of the forewing base articulation among Sternorrhyncha groups. **Barbara Franielczyk-Pietyra** (barbara.franielczyk-pietyra@us.edu.pl) and  
  Piotr Wegierek, Univ. of Silesia, Katowice, Poland
* **VP07**Antennal transcriptome analysis of odorant receptor genes in *Hyphantria cunea* (Drury). **Ke Kang** (kangke@ ahau.edu.cn)1, Long-Wa Zhang1, and Ya-Nan Zhang2, 1Anhui Agricultural Univ., Hefei, China, 2Huaibei Normal Univ., Huaibei, China

**VP08** Effects of temperature on life demographic parameters of two Malaysian strains of *Aedes albopictus* Skuse. **Rozilawati Harun** (rozilawatiharun80@gmail.com)1, Zairi Jaal1, and Mohd Masri Saranum2, 1Univ. of Science, Minden, Malaysia, 2Mardi, Kuala Lumpur, Malaysia

**VP09** Plant-provided resources for omnivorous natural enemies: The spatial aspect of prey and plant feeding. **Tarryn Schuldiner-Harpaz** (tarryn.harpaz@mail.huji. ac.il) and Moshe Coll, The Hebrew Univ., Rehovot, Israel

**VP10** Polarized light cues affect host selection in  
*Pieris rapae*. **Adam Blake** (adam@ajblake.info), Matthew Go, and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada

**VP11** Survival and development of *Hermetia illucens* L. (Diptera: Stratiomyidae): A biodegradation agent of organic waste. **Ana Samayoa** (anaclariza@gmail.com), National Chung Hsing Univ., Taichung, Taiwan

**Poster Session 1: Agriculture and Forest Entomology, Part 1**

***West Hall C (Convention Center)***

**D3130** Populations of sugarcane aphid and corn leaf aphid infesting *Sorghum bicolor* and *S. halepense* in Kansas show low levels of genetic diversity. **Alicia Timm** (aetimm@gmail.com) and C. Michael Smith, Kansas State Univ., Manhattan, KS

**D3131** Sugarcane aphid crisis for sweet sorghum in southeastern United States. **Ric Bessin** (rbessin@uky. edu), Univ. of Kentucky, Lexington, KY

**D3132** Interactions of green peach aphid, *Myzus persicae* (Sulzer) (Hemiptera: Aphididae), feeding and initial infestation of oriental fruit moth, *Grapholita molesta* (Busck) (Lepidoptera: Tortricidae). **Wilson Barros-Parada** (wbarros@utalca.cl), Jaime Verdugo, Eduardo Fuentes- Contreras, and Claudio Ramirez, Univ. of Talca, Talca, Chile

**D3133** Field guide of Spanish pollinators. **Elisa Viñuela** (elisa.vinuela@upm.es)1, Alberto Fereres2, and Oscar Aguado1, 1Polytechnic Univ., Madrid, Spain, 2Institute of Agricultural Sciences, Madrid, Spain

**D3134** Rapid community assembly and species saturation in coffee agroecosystems suggest caffeine does not deter host-switching on a global scale. **Zachary Hajian- Forooshani** (zhajianf@umich.edu), Univ. of Michigan, Ann Arbor, MI

**D3135** Insect pests of rice in Burkina Faso and their control. **Souleymane Nacro** (snacro2006@gmail.com)1, Dakouo Dakouo1, Malick Ba1, Lucien Sawadogo2, and Minyèmba Souobou3, 1INERA, Bobo-Dioulasso, Burkina Faso, 2Dept. of Plant Protection and Packaging, Ouagadougou, Burkina Faso, 3AMVS, Tougan, Burkina Faso

**D3136** A new electronic guide to arthropods of floriculture and greenhouses. **Matthew Bertone** (matt\_bertone@ncsu. edu), Steven Frank, and Brian Whipker, North Carolina State Univ., Raleigh, NC

**D3137** Influences of agroecosystem edge plant communities on insect community structure. **Daniel M. Pavuk** (dmpavuk@bgnet.bgsu.edu), Bowling Green State Univ., Bowling Green, OH

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* **D3138**The weekly occurrence of hymenopteran insects in *Miscanthus* fields in Korea in the spring. **June-Yeol Choi** (scelio@korea.kr) and Nakjung Choi, National Institute of Crop Science, Wanju, South Korea
* **D3139**Presentation withdrawn
* **D3140**The *JpL* species of the *Bemisia tabaci* complex in Korea: Detection by an extensive field survey and analysis of *COI* sequence variability. **Gwan-Seok Lee** (gslee12@korea.kr)1 and Wonhoon Lee2, 1National Academy of Agricultural Science, Wanju, South Korea, 2Animal and Plant Quarantine Agency, Gyeonggi-do, South Korea
* **D3141**Updating economic thresholds for lygus bugs in canola in Alberta, Canada. **Héctor Cárcamo** (hector.carcamo@agr.gc.ca)1, Jennifer Otani2,  
  Neil Harker3, James Broatch4, Sheree Daniels1, and Patty Reid3, 1Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, 2Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, 3Agriculture and Agri-Food Canada, Lacombe, AB, Canada, 4Alberta Agriculture and Forestry, Lacombe, AB, Canada
* **D3142**Estimation of minimum sample size for scouting of *Frankliniella occidentalis* in flowers crops in Cundinamarca, Colombia. **Marco Diaz Tapias** (control. biologico@unimilitar.edu.co), Daniel Rodriguez,   
  Jhon Avellaneda, and Stephanie Numa, Nueva Granada Military Univ., Cajica, Colombia
* **D3143**Development and emergence of *Cleruchoides noackae* (Hymenoptera: Mymaridae) in *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae) eggs at different temperatures. Juliana Maia1, Luciane Becchi2, Angelo Rodrigues3, Luis Junqueira2, **Leonardo Barbosa** (leonardo.r.barbosa@embrapa.br)1, and Carlos Wilcken2, 1Brazilian Agricultural Research Corporation, Colombo, Brazil, 2São Paulo State Univ., Botucatu, Brazil, 3Federal Univ. of Paraná, Curitiba, Brazil
* **D3144**Using agent-based models to prepare for the impending invasion of *Rhagoletis pomonella* (Walsh) (Diptera: Tephritidae) into the southern interior of British Columbia. **Brian Muselle** (btmuselle@gmail.com)1, Jason Pither1, Lael Parrott1, and Howard Thistlewood2, 1The Univ. of British Columbia, Kelowna, BC, Canada, 2Agriculture and Agri-Food Canada, Summerland, BC, Canada
* **D3145**First report of lemon scent *Eucalyptus* gall wasp *Epichrysocharis burwelli* Schauff & Garrison,  
  2000 (Hymenoptera: Eulophidae) from Uruguay. **Carolina Jorge** (carolina.jorge@cut.edu.uy)1,2, Gonzalo Martinez3, Sofia Simeto3, Gustavo Balmelli3, and Demian Gomez3, 1Univ. of the Republic, Tacuarembó, Uruguay, 2São Paulo State University, Botucatu, Brazil, 3National Institute of Agricultural Research, Tacuarembó, Uruguay
* **D3146**Biology and management of the peanut burrower  
  bug (*Pangaeus bilineatus*) in Southeast United States runner-type peanut. **Mark R. Abney** (mrabney@uga. edu)1, Mark Crosby2, and Stephanie Hollifield3, 1Univ. of Georgia, Tifton, GA, 2Univ. of Georgia, Swainsboro, GA, 3Univ. of Georgia, Quitman, GA

**D3147** Regulatory entomology: Protecting agriculture and natural resources. **Michelle DaCosta** (michelle.dacosta@ aphis.usda.gov), Fernando Lenis, and Charles Brodel, USDA - APHIS, Miami, FL

**D3148** Parameter estimation for the temperature-dependent development models of *Phyllocnistis citrella* (Lepidoptera: Gracillaridae) in the laboratory.  
Hyun Seung Young1, Elekçioglu Zulal2, Kim Su Bin1, Soon Hwa Kwon1, and **Dong-Soon Kim** (dongsoonkim@ jejunu.ac.kr)1, 1Jeju National Univ., Jeju, South Korea, 2Çukurova Univ., Adana, Turkey

**D3149** Host alternation by the mother of pearl moth, *Patania ruralis* (Lepidoptera: Crambidae). **Atsuhiko Nagasawa** (atsu.nagasawa@gmail.com), Tohoku Univ., Sendai, Japan

**D3150** Presentation withdrawn

**D3151** Maize leaf weevil (*Tanymecus dilaticollis* Gyll): Present situation in Romania. **Georgescu Emil** (emilgeorgescu2013@gmail.com)1, Cana Lidia1 and Rasnoveanu Luxita2,3, 1National Agricultural Research Development, Fundulea, Romania, 2Agricultural Research Development Station, Braila, Romania, 3”Dunarea de Jos” Univ. of Galati, Braila, Romania

**D3152** Differences in wing morphometrics of *Lymantria dispar* between populations that vary in female flight capability. **Juan Shi** (shi\_juan@263.net)1, Fang Chen1, and Melody A. Keena2, 1Beijing Forestry Univ., Beijing, China, 2USDA - Forest Service, Hamden, CT

**D3153** Effect of common beech leaves on development of *Lymantria dispar* larvae. **Milan Pernek** (milanp@sumins. hr), Ivan Lukiæ, and Nikola Lackovic, Croatian Forest Research Institute, Jastrebarsko, Croatia

**D3154** Occurence of forest pests in *Eucalyptus* plantations in Brazil during 2010-2015. **Luis Junqueira** (lrenatoj2@ yahoo.com.br)1, Leonardo Barbosa2, José Zanuncio3, and Carlos Wilcken1, 1São Paulo State Univ., Botucatu, Brazil, 2Brazilian Agricultural Research Corporation, Colombo, Brazil, 3Federal Univ. of Viçosa, Viçosa, Brazil

**D3155** Characterization and patterning spatial dispersal of pine wilt disease on the basis of GIS data from 1994 to 2005 in the Republic of Korea. **Kwang Choi** (choiks99@ korea.kr)1, Hye Jung Song1, Won Il Choi1, Youngwoo Nam1, and Young-Seuk Park2, 1National Institute of Forest Science, Seoul, South Korea, 2Kyung Hee Univ., Seoul, South Korea

**D3156** Study on sterilization using gamma rays on *Monochamus saltuarius* (Coleptera: Cerambycidae). **Gun-Hyung Kwon** (zuron1000@gmail.com), Min-Seop Lee, Yoon-Mi Jeong, Geun-Seop Lee, and Young-Dae Kwon, Gyeonggi-do Forestry Environment Research Institute, Osan, South Korea

**D3157** Effects of continued prescribed fire and fire surrogates on insect pollinators of the Blue Ridge province in North Carolina. **Patrick Vigueira** (pvigueir@highpoint. edu)1, Joshua Campbell2, and Cindy Vigueira1, 1High Point Univ., High Point, NC, 2Univ. of Florida, Gainesville, FL

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**MONDAY**

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**D3158** The sublethal effect of microsporidian infection  
on flight capacity of the forest tent caterpillar, *Malacosoma disstria* (Lepidoptera: Lasiocampidae). **Maya Evenden** (mevenden@ualberta.ca)1, Pasan Arachchige1, Chetna Saran1, B. Andrew Keddie1, and Chris J. K. MacQuarrie2, 1Univ. of Alberta, Edmonton, AB, Canada, 2Natural Resources Canada, Sault Ste. Marie, ON, Canada

**Poster Session 1: Biodiversity, Biogeography, and Conservation of Arthropods, Part 1**

***West Hall C (Convention Center)***

* **D3159**Chrysomelid beetles along an altitudinal gradient in Southeast Brazil. **Vivian Flinte** (flinte@biologia.ufrj. br)1, Margarete de Macedo1, Peter Mayhew2, and Ricardo Monteiro1, 1Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil, 2Univ. of York, York, United Kingdom
* **D3160**Beetles in fine-woody flood-debris. **Michael Ferro** (spongymesophyll@gmail.com), Clemson Univ., Clemson, SC
* **D3161**Diversity and distribution in the world of Megalopodidae Latreille (Coleoptera: Chrysomeloidea). **Geovanni Rodríguez Mirón** (geo20araa@yahoo.com.mx), National Autonomous Univ. of México, Mexico City, Mexico
* **D3162**The faunal elements of Bostrichidae (Insecta: Coleoptera). **Lan-Yu Liu** (liulysky@gmail.com), National Pingtung Univ., Pingtung City, Taiwan
* **D3163**Phylogeography of weaver ant, *Oecophylla smaragdina*, in Bangladesh (Hymenoptera: Formicidae). **Md. Mamunur Rahman** (mamunur111@gmail.com), Kazuo Ogata, and Shingo Hosoishi, Kyushu Univ., Fukuoka, Japan
* **D3164**Variability of mitochondrial DNA shows strong structuration among populations of *Melipona subnitida* (Apidae: Meliponini) in Northeast of Brazil.  
  **Vanessa Bonatti** (vanessa\_bonatti@usp.br)1,   
  Marcela Barbosa2, Juliana Teixeira2, Maria Arias2, and Tiago Francoy2, 1Univ. of São Paulo, Ribeirão Preto, Brazil, 2Univ. of São Paulo, São Paulo, Brazil
* **D3165**Biogeography of Afrotropical Tachinidae (Diptera). **James O’Hara** (james.ohara@agr.gc.ca)1, Pierfilippo Cerretti2, and John Stireman III3, 1Agriculture and Agri-Food Canada, Ottawa, ON, Canada, 2Univ of Padova, Legnaro, Italy, 3Wright State Univ., Dayton, OH
* **D3166**The fauna of Tachinidae (Insecta: Diptera) of Northeast China. **Chuntian Zhang** (chuntianzhang@ aliyun.com)1, Qiang Wang2, Yansen Zhang1, Xin Li1, Houcan Liang1, and Henan Li1, 1Shenyang Normal Univ., Shenyang, China, 2Nankai Univ., Tianjin, China
* **D3167**Expansion of the northeastern range of selected North American gall-forming midges (Diptera: Cecidomyiidae: *Celticecis* spp.) on hackberries (Cannabaceae: *Celtis* spp.). **Carol Mapes** (mapes@kutztown.edu) and Duncan Brown, Kutztown Univ., Kutztown, PA
* **D3168**Comparative phylogeography of three widespread dung beetles (Coleoptera: Scarabaeinae) in Cameroon. **Christie Sukhdeo** (christie.sukhdeo@gmail.com)1 and T. Keith Philips2, 1The Univ. of New Orleans, New Orleans, LA, 2Western Kentucky Univ., Bowling Green, KY

**D3169** *Guyalna platyrhina* Sanborn & Heath 2014 (Hemiptera: Cicadidae): First registry from Brazil. **Douglas Maccagnan** (douglas.hbm@ueg.br) and Marco de Sá, Goiás State Univ., Iporá, Brazil

**D3170** Recent discoveries of Trichoptera (caddisfly) biodiversity in Florida. **Andrew K. Rasmussen** (andrew.rasmussen@ famu.edu)1, Dana R. Denson2, and Steven C. Harris3, 1Florida A&M Univ., Tallahassee, FL, 2Reedy Creek Improvement District, Lake Buena Vista, FL, 3Clarion Univ., Clarion, PA

**D3171** Diversity of terrestrial arthropods in a tropical moist forest from west Ecuador. **Marcos Medina-Pinoargote** (malmedin@espol.edu.ec)1, Jorge Paredes-Montero2 and Myriam Arias3, 1Superior Polytechnical School of the Coast, Guayaquil, Ecuador, 2Univ. of Arizona, Tucson, AZ, 3National Independent Institute of Agricultural Research, Quito, Ecuador

**D3172** Diversity of Araneidae (Arachnida: Araneae) in Sierra de Huautla, Morelos, Mexico. **Monica Salas-Rodríguez** (msalasrod@hotmail.com)1, Ventura Rosas-Echeverría1, and Griselda Montiel-Parra2, 1Autonomous State Univ. of Morelos, Cuernavaca, Mexico, 2National Autonomous Univ. of México, Mexico City, Mexico

**D3173** Diversity of Salticidae (Arachnida: Araneae) in Sierra de Huautla, Morelos: A first taxonomic inventory. Miguel Menéndez-Acuña1, César Durán-Barrón2, and **Ventura Rosas-Echeverria** (mvrosase@gmail.com)3, 1Autonomous State Univ. of Morelos, Cuernavaca, Mexico, 2National Autonomous Univ. of México, Mexico City, Mexico, 3Autonomous State Univ. of Morelos, Jojutla, Mexico

**D3174** Distribution and demography of arthropod taxa of conservation concern on the high alpine Maunakea volcano in Hawaii. **Jesse A. Eiben** (eiben@hawaii.edu)1 and Daniel Rubinoff2, 1Univ. of Hawai’i, Hilo, HI, 2Univ. of Hawai’i, Honolulu, HI

**D3175** Distribution and conservation status of butterflies in South Carolina. **Brian G. Scholtens** (scholtensb@cofc. edu)1, Dennis Forsythe2, and Tom Smith3, 1College of Charleston, Charleston, SC, 2The Citadel, Charleston, SC, 3College of Charleston, Woodbridge, VA

**D3176** Caddisfly (Trichoptera) of National Park Service properties in the Heartland Inventory and Monitoring Network. **David E. Bowles** (david\_bowles@nps.gov), U.S. National Park Service, Republic, MO

**D3177** Arctiidae and Sphingidae diversity (Insecta: Lepidoptera) in Sierra de Huautla, Morelos, Mexico. **Nazario García Ángel** (n.angel.g21@gmail.com)1, Ventura Rosas-Echeverria2, and Adolfo Ibarra Vazquez3, 1Autonomous State Univ. of Morelos, Cuernavaca, Mexico, 2Autonomous State Univ. of Morelos, Jojutla, Mexico, 3National Autonomous Univ. of México, Mexico City, Mexico

**D3178** Exploration of ‘A few observations on the genus *Papilio*’, thought to be from the field notebook of a youthful W. J. Holland (1848-1932), circa 1861.  
**David B. Hogg** (dhogg@cals.wisc.edu), Walter Goodman, and Gene R. DeFoliart (deceased), Univ. of Wisconsin, Madison, WI

* **D3179**OKEON Chura-mori Project: A new environmental monitoring project in Okinawa, Japan.   
  **Masashi Yoshimura** (myoshimura@ant-database.org), Takuma Yoshida, Masako Ogasawara, and Evan Economo, Okinawa Institute of Science and Technology, Onna, Japan
* **D3180**Preliminary list of the ants (Hymenoptera: Formicidae) of Virginia. **Kaloyan Ivanov** (antzmail@gmail.com), Virginia Museum of Natural History, Martinsville, VA
* **D3181**Trap-nesting bees and wasps of deep east Texas. **Daniel Bennett** (bennettdj@sfasu.edu)1, David Kulhavy1, and R. Alan Shadow2, 1Stephen F. Austin State Univ., Nacogdoches, TX, 2USDA - NRCS, Nacogdoches, TX
* **D3182**Survey of Hymenoptera parasitoids of Geometridae (Lepidoptera) larvae in Brazil. **Manoel Dias** (manoelmd@ufscar.br), Mariana Geraldo and Angélica Dias, Federal Univ. of SãosCarlos, São Carlos, Brazil
* **D3183**Abundance of parasitoids along a vertical tree  
  gradient in temperate deciduous forest. **Martin Sigut** (martin.sigut@osu.cz)1, Nela Kotaskova1, Petr Pyszko1, Jan Šipoš2, and Pavel Drozd1, 1Univ. of Ostrava, Ostrava, Czech Republic, 2Czech Academy of Sciences, Brno, Czech Republic
* **D3184**Diversity of Braconidae (Hymenoptera) from a Brazilian mountain ecosystem. **Angélica Dias** (angelica@ufscar.br), Carolina Gessner, Clóvis Castro, and Giulia Campos, Federal Univ. of São Carlos, São Carlos, Brazil

**Poster Session 1: Ecology of Pesticides, Resistance, Toxicology, and Genetically Modified Crops, Part 1**

***West Hall C (Convention Center)***

* **D3185**Effect of Mohlolo insecticide bait on German cockroach, *Blattella germanica*, populations in residential areas  
  of South Africa. **Maboko Mphosi** (maboko.mphosi@ ul.ac.za)1, Clarah Mbowani1, and Phatu Mashela2,   
  1Univ. of Limpopo, Sovenga, South Africa, 2Univ. of Limpopo, Polokwane, South Africa
* **D3186**Determining the correlation between *Drosophila melanogaster* toluene exposure and the resulting toxicity effects on fly survival and fecundity. **Vanessa Trivino** (trivinovanessa@gmail.com), Rosemarie Rosell,   
  Luke Hebert, Heidi Reinhardt, Quy Lam, Elmer Ledesma, Zara Lodhra, Laura Castillo, Anna Donnelly, Tang Nguyen, Michael MacGregor, and Brenda Nunez, Univ. of  
  St. Thomas, Houston, TX
* **D3187**Fitness of pyrethroid resistance in *Triatoma*  
  *infestans*, a vector of Chagas disease. **María Picollo** (mpicollo@gmail.com)1, Monica Germano2, and  
  Gastón Mougabure-Cueto2, 1Center for Insecticide and Pest Research, Villa Martelli, Argentina, 2Center for Insecticide and Pest Research, Buenos Aires, Argentina
* **D3188**Reduction of clothianidin and thiamethoxam susceptibilities under selection pressure by imidacloprid in the brown planthopper, *Nilaparvata lugens*. **Tomohisa Fujii** (tomofuji@affrc.go.jp),  
  Sachiyo Sanada-Morimura, and Masaya Matsumura, NARO Kyushu Okinawa Agricultural Research  
  Center, Kumamoto, Japan

**D3189** Presentation withdrawn

**D3190** Evaluation of imidacloprid ingestion on honey bee, *Apis mellifera*, colony health. **Jon Zawislak** (jzawislak@uaex.edu)1, Don Johnson2, Gus Lorenz2, John Adamczyk3, William Meikle4, Milagra Weiss4, and Quinton Hornsby2, 1Univ. of Arkansas, Little Rock, AR, 2Univ. of Arkansas, Lonoke, AR, 3USDA - ARS, Poplarville, MS, 4USDA - ARS, Tucson, AZ

**D3191** Neonicotinoid residues in fresh corn pollen and proportion of corn pollen in bee-collected pollen during corn pollination. **Yingen Xue** (yingen.xue@uoguelph.ca)1, Victor Limay-Rios1, Jocelyn Smith1, Luis Forero1,  
Tracey Baute2, and Arthur Schaafsma1, 1Univ. of Guelph, Ridgetown, ON, Canada, 2Ontario Ministry of Agriculture, Food and Rural Affairs, Ridgetown, ON, Canada

**D3192** A novel source for off-target movement of neonicotinoid residues during agricultural practices in southwestern Ontario, Canada. **Luis Forero** (lforerom@uoguelph.ca), Victor Limay-Rios, and Arthur Schaafsma, Univ. of Guelph, Ridgetown, ON, Canada

**D3193** Development of regional resistance of twospotted spider mite, *Tetranychus urticae*, against several kinds of acaricides. **Il Hyun Byun** (ilhyun45@naver.com), Chungnam National Univ., Daejeon, South Korea

**D3194** Chemical structure advantage of cyclaniliprole against the diamides-resistant diamondback moth, *Plutella xylostella*. **Taku Hamamoto** (t-hamamoto@iskweb.co.jp)1, Chiaki Takeda1, Shigeru Mitani1, Kiyomitsu Yoshida1, and Masayuki Morita2, 1Ishihara Sangyo Kaisha, Ltd., Kusatsu, Japan, 2Ishihara Sangyo Kaisha, Ltd., Osaka, Japan

**D3195** Global pesticide registration: What constitutes a bee data package for a globally registered insecticide? **Bridget O’Neill** (bridget.o-neill@dupont.com), DuPont Crop Protection, Newark, DE

**D3196** Presentation withdrawn

**D3197** The effect of some insecticides on behaviour of the large pine weevil, *Hylobius abietis*. **Ivar Sibul** (ivar.sibul@emu.ee) and Angela Ploomi, Estonian Univ. of Life Sciences, Tartu, Estonia

**D3198** Preliminary data on the effects of chlorantraniliprole treatment of grasshoppers and Mormon crickets on non-target rangeland insects. **Brian Reily** (brianhreily@ gmail.com) and Nico Franz, Arizona State Univ., Tempe, AZ

**D3199** Population genetic structure of *Frankliniella fusca*. **Alana Jacobson** (alj0043@auburn.edu)1, Paul Labadie2, George G. Kennedy2, and Anders Huseth2, 1Auburn Univ., Auburn, AL, 2North Carolina State Univ., Raleigh, NC

**D3200** Insecticide resistance monitoring and correlation analysis of insecticides in field populations of *Nilaparvata lugens* in China. **Jianhong Li** (jianhl@mail.hzau.edu.cn), Huazhong Agricultural Univ., Wuhan, China

**D3201** Development of natural insecticides for *Bemisia*  
*tabaci* (Hemiptera: Alyrodidae) on greenhouse sweet pepper. **Soowan Kim** (cygnus0721@naver.com), Minhyung Jung, Yoon-Jae Song, Se Chan Kang, and Doo-Hyung Lee, Gachon Univ., Seongnam, South Korea

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**MONDAY**

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**D3202** Genotyping for the G4946E site of the ryanodine receptor gene in *Plutella xylostella* (Lepidoptera: Yponomeutidae) considering gene duplication. **Shoji Sonoda** (sonodas@cc.utsunomiya-u.ac.jp), Utsunomiya Univ., Utsunomiya, Japan

**Poster Session 1: Functional Genomics and Transgenesis**

***West Hall C (Convention Center)***

* **D3203**Identification and functional analysis of peroxiredoxin genes in the diamondback moth, *Plutella xylostella* (L.). **Miao Xie** (xmshelly@gmail.com)1,2, Jianyu Li2, Minsheng You2, and Qisheng Song1, 1Univ. of Missouri, Columbia, MO, 2Fujian Agriculture and Forestry Univ., Fuzhou, China
* **D3204**Comparative analyses of Cu-Zn superoxide dismutase (SOD1) and thioredoxin reductase (TrxR) at the mRNA level between *Apis mellifera* L. and *Apis cerana* F. under stress conditions. **Hyun-Na Koo** (hyunnakoo@ hanmail.net)1, Seung-Hwan Yun1, JaeSeon Lee1,   
  Hyun Kyung Kim1, Yong Soo Choi2, and Gil-Hah Kim1, 1Chungbuk National Univ., Cheongju, South Korea, 2National Academy of Agricultural Science, Wanju-gun, South Korea
* **D3205**Corazonin gene controls gregarious characteristics in the desert and migratory locusts. **Ryohei Sugahara** (rsugahara@affrc.go.jp)1,2, Seiji Tanaka1, Akiya Jouraku1, and Takahiro Shiotsuki1, 1National Institute of Agrobiological Sciences, Tsukuba, Japan, 2Japan Society for the Promotion of Science, Tsukuba, Japan
* **D3206**Gene expression profiles during post-embryonic development in the mosquito, *Aedes aegypti*. **Caroline Gonçalves** (carolinemacedo@yahoo.com. br)1, Kenner Morais Fernandes1, Franciane Miranda1, Matthew Heerman2, Marcelo Ramalho-Ortigao2, and Gustavo Martins1, 1Federal Univ. of Viçosa, Viçosa, Brazil, 2Kansas State Univ., Manhattan, KS
* **D3207**Transcriptome analysis of the genes differentially expressed between two *Bombyx* body color mutants *i-lem* and *lem*. Junshan Gao1, Rui Shu1, Lanlan Wu1, Daobo Zhang1, Chun Liu2, and **Yan Meng** (mengyan@ ahau.edu.cn)1, 1Anhui Agricultural Univ., Hefei, China, 2Southwest Univ., Chongqing, China
* **D3208**Characterization of the moth color mutation, wild wing spot, in the silkworm *Bombyx mori*. **Katsuhiko Ito** (katsuito@cc.tuat.ac.jp), Manabu Yoshikawa, Takeshi Fujii, Hiroko Tabunoki, and Takeshi Yokoyama, Tokyo Univ. of Agriculture and Technology, Fuchu, Japan
* **D3209**The influence of viral infection of host plant on Colorado potato beetle’s growth and midgut gene expression. **Marko Petek** (marko.petek@nib.si)1,  
  Ana Rotter1, Polona Kogovšek1, Špela Baebler1,  
  Axel Mithöfer2, and Kristina Gruden1, 1National Institute of Biology, Ljubljana, Slovenia, 2Max Planck Institute for Chemical Ecology, Jena, Germany
* **D3210**Metabolic and genetic implications of survival in anoxic *Drosophila*. **Jacob Campbell** (jacob.campbell.1@asu.edu) and Jon Harrison, Arizona State Univ., Tempe, AZ

**D3211** Localized expression of water-specific aquaporins in the salivary glands of the Formosan subterranean termite, *Coptotermes formosanus*. **Kohei Kambara** (kambara@ffpri.affrc.go.jp)1, Wakako Ohmura1, Mariya Maruyama2, and Masaaki Azuma2, 1Forestry and Forest Products Research Institute, Tsukuba, Japan, 2Tottori Univ., Tottori, Japan

**D3212** The role of circadian clock genes in the overwintering diapause of the northern house mosquito, *Culex pipiens*. **Megan E. Meuti** (meganmeuti@gmail.com)1, Alena Kobelkova2, and David L. Denlinger3, 1Kenyon College, Gambier, OH, 2Czech Academy of Sciences, České Budějovice, Czech Republic, 3The Ohio State Univ., Columbus, OH

**D3213** microRNAs may regulate pupal diapause in the flesh fly, *Sarcophaga bullata.* **Julie Reynolds** (reynolds.473@ osu.edu) and David L. Denlinger, The Ohio State Univ., Columbus, OH

**D3214** A large family of bacterial genes in the Hessian fly, *Mayetiola destructor*, genome. **Xiaoyan Cheng** (xycheng@ksu.edu)1, Sandra Carrera1, R. Jeff Whitworth1, Yoonseong Park1, Jeffrey J. Stuart2, and Ming-Shun Chen1, 1Kansas State Univ., Manhattan, KS, 2Purdue Univ., West Lafayette, IN

**D3215** Obtaining a robust larval gastric caecae and posterior midgut-specific promoter from *Aedes aegypti* mosquitoes and its application for development of tissue-specific Gal4-UAS system. **Jianwu Chen** (jwchen97@yahoo.com), Univ. of California, Riverside, CA

**D3216** Reducing gene expression level in *Drosophila* embryos by strong maternal Gal4 lines: For building a gene drive system in insects. **Cheng Han Hiseh** (041211@nhri.org. tw), National Health Research Institutes, Miaoli, Taiwan

**D3217** Expression of *hairy* gene is induced by juvenile hormone in tissue-dependent manner. **Toru Togawa** (togatoru@chs.nihon-u.ac.jp)1, Takumi Kayukawa2, Kosuke Uchida1, Haruna Ishino1, Daiki Suzuki1, and Tetsuro Shinoda2, 1Nihon Univ., Tokyo, Japan, 2National Institute of Agrobiological Sciences, Tsukuba, Japan

**D3218** Analysis of core 1, 3-fucosyltransferase gene of the silkworm, *Bombyx mori*, cell line for metabolic engineering of *N*-glycosylation pathway by genome editing. **Hiroyuki Kayaki** (v009gm@yamaguchi-u.ac.jp)1 and Jun Kobayashi2, 1Yamaguchi Univ., Yoshida, Japan, 2Yamaguchi Univ., Yamaguchi, Japan

**D3219** Development of CRISPR/Cas9 for use in codling moth, *Cydia pomonella*. **Stephen F. Garczynski** (steve.garczynski@ars.usda.gov), Jessica A. Martin, Margaret Griset, Laura Willett, and William Rodney Cooper, USDA - ARS, Wapato, WA

**D3220** RNAi and Cas9-mediated gene editing in *Bombus impatiens* ovaries. **Vanessa Macias** (vzm10@psu.edu), Vanessa Macias, and Jason Rasgon, Pennsylvania State Univ., University Park, PA

**D3221** Identifying functional domains of a pesticide receptor using CRISPR/Cas9. **Nicole Gutzmann** (negutzma@ ncsu.edu)1, Marcé Lorenzen1, and Brenda Oppert2, 1North Carolina State Univ., Raleigh, NC, 2USDA - ARS, Manhattan, KS



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* **D3222**Genetic variations of *Tetranychus kanzawai* conferring different abilities on host plant adaptation and pesticide resistance. **Rika Ozawa** (ozawar@ecology.kyoto-u.ac. jp)1, Hiroki Endo2, Koichi Sugimoto1, Junji Takabayashi1, Tetsuo Gotoh3, and Gen-ichiro Arimura2, 1Kyoto Univ., Otsu, Japan, 2Tokyo Univ. of Science, Tokyo, Japan, 3Ibaraki Univ., Ibaraki, Japan
* **D3223**Genomic and transcriptomic insights into the cytochrome P450 monooxygenase gene repertoire in the rice pest brown planthopper, *Nilaparvata lugens*. **Yanyuan Bao** (yybao@zju.edu.cn) and Chuan-Xi Zhang, Zhejiang Univ., Hangzhou, China
* **D3224***Drosophila* validation of CYP9Q-mediated detoxification of insecticides in the honey bee, *Apis mellifera*.  
  **Rafael Homem** (rafael.homem@rothamsted.ac.uk)1, Christoph Zimmer2, Bartek Troczka1, Lin Field1, Ralf Nauen3, Chris Bass2, Martin Williamson1, and T. G. Emyr Davies1, 1Rothamsted Research, Harpenden, United Kingdom, 2Univ. of Exeter, Penryn, United Kingdom, 3Bayer CropScience, Monheim, Germany
* **D3225**Targeting a detoxification enzyme gene using two genome editing technologies to test causality for insecticide resistance. **Kentaro Itokawa** (Itokawa@ nih.go.jp)1,2, Osamu Komagata2, Kohei Ogawa2, Shinji Kasai2, and Takashi Tomita2, 1Japan Agency for Medical Research and Development, Tokyo, Japan, 2National Institute of Infectious Diseases, Tokyo, Japan
* **D3226**Proteomic identification of sex biomarkers for two  
  fruit fly species at pupal stage. **Chiou Ling Chang** (stella.chang@ars.usda.gov)1, Cynthia Goodman2, Beverly DaGue3, and David Stanley2, 1USDA - ARS,  
  Hilo, HI, 2USDA - ARS, Columbia, MO, 3Univ. of Missouri, Columbia, MO
* **D3227**Construction of *Aedes aegypti* genetic sexing  
  strain. **Helena Araújo** (helenarca@gmail.com),  
  André Costa-da-Silva, Danilo Carvalho, Bianca Kojin, and Margareth Capurro, Univ. of São Paulo, São Paulo, Brazil
* **D3228**Developing a death upon infection system in transgenic *Aedes aegypti* infected with Dengue virus.  
  **André Costa-da-Silva** (alcosta@icb.usp.br), Danilo Carvalho, Bianca Kojin, Helena Araújo, Rafaella Ioshino, Isabel Marques, and Margareth Capurro, Univ. of São Paulo, São Paulo, Brazil

**Poster Session 1: Medical and Veterinary Entomology, Part 1**

***West Hall C (Convention Center)***

**D3229** Metagenomic analyses of viral communities carried by mosquitoes in the greater Houston area.  
**Annette Phan** (phanaa@stthom.edu)1, Marlen Benitez1, Cristina Garcia1, Ezinne Ufomadu1, Yasmine Hoballah1, Amber Day1, Niki Knepper2, Anna Fields2,

Dalton McWhinney2, Maia Larios-Sanz1, and  
Rosemarie C. Rosell1, 1Univ. of St. Thomas, Houston, TX, 2Houston Community College, Houston, TX

**D3230** Callphoridae as vectors of antibiotic-resistant  
bacteria in the agricultural industry. **Sarah Russell** (smruss3913@ung.edu)1 and Evan Lampert2, 1Univ. of North Georgia, Dahlonega, GA, 2Univ. of North Georgia, Oakwood, GA

**D3231** The search for a null hypothesis in vertebrate decomposition: How should insect species be included? **Trevor I. Stamper** (stampert@purdue.edu)1,  
M. Eric Benbow2, and Jeffrey Holland1, 1Purdue Univ., West Lafayette, IN, 2Michigan State Univ., East Lansing, MI

**D3232** The feeding behavior of forensically significant Coleoptera and its effect on their gut microbiota. **Bethany Walker** (bah029@shsu.edu), Sibyl Bucheli, and Aaron Lynne, Sam Houston State Univ., Huntsville, TX

**D3233** Comparison of forensic interest dipterofauna in distinct regions of São Paulo, Brazil: Calliphoridae, Fanniidae, Muscidae, and Sarcophagidae. **Maria Cavallari** (malu\_bio@hotmail.com)1,2, Fabio Baltazar2,

Daniel Muñoz1, and José Tolezano2, 1Univ. of São Paulo, São Paulo, Brazil, 2Adolfo Lutz Institute, São Paulo, Brazil

**D3234** The effect of tissues and temperatures under the development of immature *Chrysomya megacephala* (Diptera: Calliphoridae) and implications for forensics. Fábio Rezende. **Aricio Linhares** (aricio@unicamp.br), Maria Paseto, Patricia J. Thyssen, and Marina Aquino, Univ. of Campinas, Campinas, Brazil

**D3235** Estimation of the postmortem interval of a highly decayed body with the development of *Aldrichina grahami* (Diptera: Calliphoridae) in southwestern China: A case report. **Zhou Lyu** (forensicluzhou@hotmail. com)1 and Li-hua Wan2, 1Southwest Univ. of Political Science and Law, Chongqing, China, 2Chongqing Medical Univ., Chongqing, China

**D3236** Maggot debridement therapy for a case of Fournier’s gangrene. **Alicia Fonseca Muñoz** (afonsem@yahoo. com.mx)1,2, Hugo Edgardo Sarmiento Jimenez2, Jeffery K. Tomberlin3, Rafael Perez Pacheco1, and Liliana Robles Bautista4, 1National Polytechnic Institute, Oaxaca, Mexico, 2Hospital Bianni San Jose, Oaxaca, Mexico, 3Texas A&M Univ., College Station, TX, 4 Benito Juárez Autonomous Univ., Oaxaca, Mexico

**D3237** Establishment of monitoring system of scrub typhus vectors using chigger mite collecting trap in South Korea (2013-2014). Seong Yoon Kim, **Won Il Park** (pwi4014@korea.kr), Bong Gu Song, Eun Hee Shin, Kyu Sik Chang, Wook Gyo Lee, E-Hyun Shin, Mi Yeoun Park, Young Ran Ju, and Jong Yul Roh, Korea National Research Institute of Health, Cheongju, South Korea

**D3238** Phenology of *Ixodes scapularis* and emerging tick-borne pathogens in Wisconsin. **Susan Paskewitz** (paskewit@entomology.wisc.edu)1, Darby Murphy1, Scott Larson1, and Diep Hoang Johnson2, 1Univ. of Wisconsin, Madison, WI, 2Wisconsin Dept. of Health Services, Madison, WI

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**MONDAY**

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* **D3239**Transovarial transmission of severe fever with thrombocytopenia syndrome virus in ixodid tick, *Haemaphysalis flava* (Acari: Ixodidae). Eun Hee Shin, Seong Yoon Kim, Chang Won Jang, Won Il Park, Bong Gu Song, Kyu Sik Chang, Wook Gyo Lee, E-Hyun Shin, Young Ran Ju, and **Jong Yul Roh** (rohling@korea.kr), Korea National Research Institute of Health, Cheongju, South Korea
* **D3240**Screening of novel antigens for the control of *Boophilus microplus* through artificial feeding. **Charluz Arocho Rosario** (charluz.arocho@upr.edu)1, Robert J. Miller1, Felix Guerrero2, Pete Teel3, and Adalberto A. Pérez de León2, 1USDA - ARS, Edinburg, TX, 2USDA - ARS, Kerrville, TX, 3Texas A&M Univ., College Station, TX
* **D3241**Proteomic characterization of *Rhipicephalus microplus* saliva. Lucas Tirloni1, Tae Kim2, Carlos Termignoni1, Antônio Pinto3, Jolene Diedrich4, James Moresco4, John Yates III4, Albert Mulenga2, and **Itabajara Vaz** (itabajara.vaz@ufrgs.br)1, 1Federal Univ. of Rio Grande, Porto Alegre, Brazil, 2Texas A&M Univ., College Station, TX, 3Pontifical Catholic Univ., Porto Alegre, Brazil,   
  4The Scripps Research Institute, La Jolla, CA
* **D3242**Proteome analysis of *Rickettsia parkeri*-infected *Amblyomma maculatum* ticks. **Karthik Balamurugan** (karthik.balamurugan@eagles.usm.edu)1, Chien-Chung Chao2, Khemraj Budachetri1,   
  Gary Crispell1, Wei-Mei Ching2, and Shahid Karim1, 1Univ. of Southern Mississippi, Hattiesburg, MS, 2Naval Medical Research Center, Silver Spring, MD
* **D3243**Reverse chemical ecology-based approach for the identification of repellents for a Chagas disease vector, *Rhodnius prolixus*. **Thiago A. Franco** (thiago.biovr@ gmail.com)1, Pingxi Xu2, Monica F. Moreira1,   
  Walter S. Leal2, and Ana C. A. Melo1,2, 1Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil, 2Univ. of California, Davis, CA
* **D3244**Demystifying kissing bugs identification for a broad audience: Guide to Chagas disease vector species of the United States (Hemiptera: Reduviidae: Triatominae). **Justin Bejcek** (jbejcek13@tamu.edu)1, Sarah Hamer2, and Gabriel Hamer2, 1Texas A&M Univ., Celina, TX, 2Texas A&M Univ., College Station, TX
* **D3245**Chagas disease in New Mexico? Changes in incidence of *Trypanosoma cruzi* in NM Triatomines. **Jane Breen Pierce** (japierce@nmsu.edu)1, Stephen Hanson1,  
  Derik Bendixsen2, and Devin Bendixsen2, 1New Mexico State Univ., Las Cruces, NM, 2New Mexico State Univ., Artesia, NM
* **D3246**Presentation withdrawn
* **D3247**Incidence, factors associated with pediculosis capitis and control populations of basic education in the states of Yucatán and Nuevo León, Mexico. Adriana Flores1, **Gerardo Trujillo-Rodriguez** (gerardo.trujillo36@ hotmail.com)1, Olga Villanueva1, Iram Rodriguez1,   
  Pablo Manrique-Saide2, and Gutsavo Ponce-Garcia1, 1Autonomous Univ. of Nuevo León, San Nicolas de los Garza, Mexico, 2Autonomous Univ. of Yucatán, Mérida, Mexico

**D3248** Research to enhance mass rearing screwworms, *Cochliomyia hominivorax*. **S. R. Skoda** (steve.skoda@ ars.usda.gov)1, M. Chaudhury2, P. Phillips1, and  
A. Sagel3, 1USDA - ARS, Kerrville, TX, 2USDA - ARS, Lincoln, NE, 3USDA - ARS, Panama City, Panama

**D3249** A new module of AFRIMS’ spoon for larval food quantity affects development time, survival, and  
adult body size of *Anopheles dirus* under laboratory conditions. **Kanchana Pantuwattana** (kanchanap@ afrims.org), Siriporn Phasomkusolsil, Jaruwan Tawong, Weeraphan Khongtak, Yossasin Kertmanee,

Nantaporn Monkanna, Sakon Khaosanorh, and Silas Davidson, Armed Forces Research Institute of Medical Sciences, Rachatewee, Thailand

**D3250** Production of *Plasmodium vivax* sporozoites in laboratory-bred *Anopheles darlingi* mosquitoes. **Gissella Vasquez** (gissella.m.vasquez.fn@mail.mil)1, Victor López-Sifuentes2, Karin Escobedo-Vargas2, Anibal Huayanay-Repetto2, Luz Romero-Dávila2, Carmen Flores-Mendoza1, Salomon Durand2,  
Edward Smith1, Christian Baldeviano1, Robert Gerbasi1, and Craig Stoops1, 1U.S. Naval Medical Research Unit, Callao, Peru, 2U.S. Naval Medical Research Unit, Iquitos, Peru

**D3251** Mosquito metabolic pathways are influenced by West Nile virus infection and contribute to vector ability. **Dongyoung Shin** (dshin@ufl.edu) and Chelsea Smartt, Univ. of Florida, Vero Beach, FL

**D3252** Vector competence of British mosquitoes for arboviruses. **Marcus Blagrove** (marcus.blagrove@ liverpool.ac.uk)1, Matthew Baylis1, Daniel Impoinvil2, Jolyon Medlock3, Philip McCall1, Tom Solomon1, and Gareth Lycett1, 1Univ. of Liverpool, Liverpool, United Kingdom, 2Centers for Disease Control and Prevention, Atlanta, GA, 3Public Health England, Salisbury, United Kingdom

**D3253** Characterization of different *Aedes aegypti* populations in Florida for interfering with chikungunya virus transmission. **Chelsea Smartt** (ctsmart@ufl.edu) and Dongyoung Shin, Univ. of Florida, Vero Beach, FL

**D3254** Factors affecting epidemic potential for chikungunya virus in Florida. **Cynthia C. Lord** (clord@ufl.edu),  
L. Philip Lounibos, Naoya Nishimura, Joseph J. Pohedra, and Barry Alto, Univ. of Florida, Vero Beach, FL

**Poster Session 1: Stored Products Entomology**

***West Hall C (Convention Center)***

**D3255** Efficacy and residue analysis of nitric oxide fumigation of strawberries for control of *Drosophila suzukii*. **Xiang-Bing Yang** (xbya@ucdavis.edu)1 and Yong-Biao Liu2, 1Univ. of California, Salinas, CA, 2USDA - ARS, Salinas, CA

**D3256** Synergistic effects of oxygen on phosphine and ethyl formate for the control of *Phthorimaea operculella* (Lepidoptera: Gelechiidae). **Hyun Kyung Kim** (nshk0917@gmail.com)1, Seon-Woo Lee1, Ju-Il Kim2, Jeong Oh Yang3, Hyun-Na Koo1, and Gil-Hah Kim1, 1Chungbuk National Univ., Cheongju, South Korea, 2Rural Development Adminstration, Pyeongchang, South Korea, 3Animal and Plant Quarantine Agency, Suwon, South Korea



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* **D3257**Edible gels as methyl bromide alternatives to protect dry cured hams from infestation by *Tyrophagus putrescentiae* (Acari: Acaridae). **Salehe Abbar** (abbar@k-state.edu)1, Yan Campbell2, Yuanjun Zhao2, M. Wes Schilling2, and Thomas Phillips1, 1Kansas State Univ., Manhattan, KS, 2Mississippi State Univ., Mississippi State, MS
* **D3258**Biotoxic efficacy of different fractions of *Acalypha godseffiana* oil extract against *Callosobruchus maculatus* infesting stored cowpea. **Mercy Oni** (mercyyinka2007@yahoo.co.uk) and Olaniyi Ogungbite, Federal Univ. of Technology, Akure, Nigeria
* **D3259**Effects of low rates of application of essential oils of *Eugenia aromatica* and *Piper guineense* on the cowpea seed weevil, *Callosobruchus maculatus*. **Joy Idoko** (jeidoko@yahoo.com) and Thomas Ofuya, Federal Univ. of Technology, Akure, Nigeria
* **D3260**Electroantennographic and behavioral responses of *Sitophilus zeamais* to cereal volatiles.   
  **Giacinto Germinara** (giacinto.germinara@unifg.it)1, Antonio De Cristofaro2, and Giuseppe Rotundo2, 1Univ. of Foggia, Foggia, Italy, 2Univ. of Molise, Campobasso, Italy
* **D3261**Thermal remediation in flour mill: Response of three stored food pests to heat treatments. **Orlando Campolo** (orlando.campolo@unirc.it), Giuseppe Algeri, Francesca Laudani, Antonino Malacrinò, Cinzia Strano, Paolo Zoccali, and Vincenzo Palmeri, Univ. of Reggio Calabria, Reggio Calabria, Italy
* **D3262**New technology in fumigant scrubbers. James Feston, Tom Mueller, and **David Mueller** (d.mueller@insectslimited. com), Insects Limited, Westfield, IN
* **D3263**Presentation withdrawn
* **D3264**Transcriptomic analysis of the drugstore beetle, *Stegobium paniceum*, in response to hypercarbia stress. **Wenjia Yang** (yangwenjia10@126.com), Kangkang Xu, Yonglu Meng, Yu Cao, and Can Li, Guiyang Univ., Guiyang, China
* **D3265**Phototactic response of Laemophloeidae insects to light-emitting diodes. **Zhongming Wang** (wzm@ chinagrain.org)1, Yang Cao1, Yanyu Li1, and Yanmei Qi2, 1Academy of State Administration of Grain, Beijing, China, 2Henan Univ. of Technology, Zhengzhou, China

**Symposium: Microbial Associates and Microbial Control of Ambrosia Beetles**

***Room W223 A (Convention Center)***

**Moderators and Organizers:** John Vandenberg1 and Louela Castrillo2, 1USDA - ARS, Ithaca, NY, 2Cornell Univ., Ithaca, NY

9:15 **0014** Assessing coevolution between the hyper- diverse ambrosia beetles and their microbiomes. **Craig Bateman** (batemanc@gmail.com), Univ. of Florida, Gainesville, FL

9:30 **0015** Diversity, ecology, and evolution of the fungal symbionts of ambrosia beetles. Thomas Harrington and **Chase G. Mayers** (cgmayers@iastate.edu), Iowa State Univ., Ames, IA

10:00 **0016** Evolution of the *Fusarium*–*Euwallacea* ambrosia beetle mutualism. **Kerry O’Donnell** (kerry.odonnell@ars.usda.gov), USDA - ARS, Peoria, IL

**10:15 BREAK**

10:30 **0017** *Raffaelea* species associated with *Xyleborus glabratus* with particular emphasis on *R. lauricola*, the cause of laurel wilt. **Stephen W. Fraedrich** (sfraedrich@ fs.fed.us), USDA - Forest Service, Athens, GA

10:45 **0018** Management of ambrosia beetles using entomopathogenic fungi. **John Vandenberg** (john. vandenberg@ars.usda.gov), USDA - ARS, Ithaca, NY

11:00 **0019** Competitive interactions between biological control fungi and fungal symbionts of ambrosia beetles *Xylosandrus crassiusculus* and *X. germanus*. **Louela Castrillo** (lac48@cornell.edu), Cornell Univ., Ithaca, NY

11:15 **Discussion**  
**Symposium: Genomics and Genome Engineering**

***Room W330 A (Convention Center)***

**Moderators and Organizers:** Takashi Kiuchi1 and  
Kallare Arunkumar2, 1The Univ. of Tokyo, Tokyo, Japan,  
2Centre for DNA Fingerprinting and Diagnostics, Hyderabad, India

9:15 **0020** Genomics and gene engineering in the silkworm: Toward the next era. **Marian Goldsmith** (mki101@etal.uri.edu), Univ. of Rhode Island, Kingston, RI

9:45 **0021** Development of transgenic and genome editing technologies in the silkworm. **Takuya Tsubota** (tsubota@affrc.go.jp), National Institute of Agrobiological Sciences, Tsukuba, Japan

10:00 **0022** Efficient multiplex editing of *Bombyx* genome and global effect of off-target cleavage. **Sanyuan Ma** (masy@swu.edu.cn) and Qingyou Xia, Southwest Univ., Chongqing, China

**10:15 BREAK**

10:30 **0023** Genome editing in the masculinizing gene of the silkworm, *Bombyx mori*. **Takashi Kiuchi** (kiuchi@ ss.ab.a.u-tokyo.ac.jp), Yudai Sugano, Toru Shimada, and Susumu Katsuma, The Univ. of Tokyo, Tokyo, Japan

10:45 **0024** Studies on silkworm sex chromosome dosage compensation through large-scale transcriptome sequence analysis. **Kallare Arunkumar** (arun@cdfd.org. in) and Gajula Gopinath, Centre for DNA Fingerprinting and Diagnostics, Hyderabad, India

11:00 **0025** Sex chromosome dosage compensation in Lepidoptera: Insights from nymphalid butterflies and codling moth. **Jamie Walters** (jrwalters@ku.edu)1, Aloy Gu1, and Thomas Hardcastle2, 1Univ. of Kansas, Lawrence, KS, 2Univ. of Cambridge, Cambridge, United Kingdom

11:15 **0026** Electroporation-mediated functional analyses for various developmental processes in insects. **Haruhiko Fujiwara** (haruh@k.u-tokyo.ac.jp), The Univ. of Tokyo, Kashiwa, Japan

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**in the Silkworm**

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**MONDAY**

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**Symposium: Wild Sericulture for Alternative Income and Economic Incentive for Biodiversity Conservation**

***Room W222 B (Convention Center)***

**Moderators and Organizers:** Ken Fening1 and Esther Kioko2, 1Univ. of Ghana, Accra, Ghana, 2National Museums of Kenya, Nairobi, Kenya

9:15 **0027** Wild silk farming as an economic incentive  
for resource-poor forest adjacent communities to participate in biodiversity conservation in Africa.  
**Ken Fening** (kenof2@yahoo.com)1, Esther Kioko2, and Suresh Raina3, 1Univ. of Ghana, Accra, Ghana, 2National Museums of Kenya, Nairobi, Kenya, 3International Centre of Insect Physiology and Ecology, Nairobi, Kenya

9:45 **0028** Economic benefits of utilizing wild silkworm bioresources for sericultural development in Kenya. **Muo Kasina** (kasina.j@gmail.com)1, Hannah Gitonga1, Eliud Gatambia1, M. Guantai1, M. Maina1, Joyce Wainaina1, D. Mutisya2, D. Nyamango3, C. Omondi4 and L. Wasilwa4, 1The National Sericulture Research Center, Thika, Kenya, 2Kenya Agricultural and Livestock Research Organization, Machakos, Kenya, 3Genetic Resources Research Institute, Mtwapa, Kenya, 4Kenya Agricultural and Livestock Research Organization, Nairobi, Kenya

10:00 **0029** Possibilities of commercializing native silkworms through increased cultivation and conservation of their host plants in Kenya.  
**Eliud Gatambia** (eliud.gatambia@kalro.org),  
Muo Kasina, J. Wanjeri and J. Wambui, The National Sericulture Research Center, Thika, Kenya

**10:15 BREAK**

10:30 **0030** Survey on diversity of wild silkmoth species and their potential role in forest based sericulture: A case study in Arabuko Sokoke Forest, Kenya. Boniface Ngoka1, Everlyne Nguku1, **Esther Kioko** (ekioko@museums.or.ke)2, Suresh Raina1 and

Jones Mueke3, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2National Museums of Kenya, Nairobi, Kenya, 3Kenyatta University, Nairobi, Kenya

10:45 **0031** Biology of the wild silkmoth Anaphe panda  
in the Kakamega Forest of Western Kenya.  
**Norbert Mbahin** (norber.mbahin@au-ibar.org)1, Esther Kioko2 and Suresh Raina3, 1African Union – InterAfrican Bureau for Animal Resources, Nairobi, Kenya, 2National Museums of Kenya, Nairobi, Kenya, 3International Centre of Insect Physiology and Ecology, Nairobi, Kenya

11:00 **0032** Formation of *Anaphe pand*a regenerated silk fibrion nanofibres/nets via electro-netting.

**Benson Dulo** (githaiga03@yahoo.com)1, Bin Ding2, Eric Oyondi1, and Diana Madara1, 1Moi Univ., Eldoret, Kenya, 2Donghua Univ., Shanghai, China

11:15 **0033** Assessment of sericin loss and spun silk yield from cocoons of G*onometa postica* (Lepidoptera: Bombycidae). **Esther Kioko** (ekioko@museums.or.ke)1, Ken Fening2, Boniface Ngoka3, and Suresh Raina3, 1National Museums of Kenya, Nairobi, Kenya, 2Univ. of Ghana, Accra, Ghana, 3International Centre of Insect Physiology and Ecology, Nairobi, Kenya

* **SD0034**Status of wild sericulture in Ghana. Gloria Agyeiwaa1, **Ken Fening** (kenof2@yahoo.com)1 and Daniel Obeng-Ofori2, 1University of Ghana, Accra, Ghana, 2University of Energy and Natural Resources, Sunyani, Ghana
* **SD0035**Identification and documentation of wild silkmoth Epiphora bauhiniae in West Pokot, Northern Kenya. Clement Ng’oriareng1, Owuor Okeyo2, **Esther Kioko** (ekioko@museums.or.ke)3, Suresh Raina4 and   
  Rolf Gloor5, 1Kenya Forest Service, Nairobi, Kenya, 2University of Eldoret, Eldoret, Kenya, 3National Museums of Kenya, Nairobi, Kenya, 4International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 5International Centre of Insect Physiology and Ecology, Kapenguria, Kenya
* **SD0036**Supplementing household income through wild silk farming. Hannah Gitonga and **Muo Kasina** (kasina.j@ gmail.com), The National Sericulture Research Center, Thika, Kenya

**Symposium: Biology, Ecology, and Management of the Asian Citrus Psyllid, *Diaphorina citri,* Vector of Huanglongbing**

***Room W315 B (Convention Center)***

**Moderators and Organizers:** Philip A. Stansly and Jawwad A. Qureshi, Univ. of Florida, Immokalee, FL

9:15 **0037** Rising against the wind: Effects of wind speed and direction on the host selection and field distribution of Asian citrus psyllid (Hemiptera: Liviidae). **Mamoudou Setamou** (mamoudou.setamou@tamuk.edu), Texas A&M Univ., Weslaco, TX

9:30 **0038** Examining color vision in the Asian citrus psyllid. **Sandra Allan** (sandy.allan@ars.usda.gov)1, Thomson Paris2 and Philip A. Stansly3, 1USDA - ARS, Gainesville, FL, 2Univ. of Florida, Gainesville, FL, 3Univ. of Florida, Immokalee, FL

9:45 **0039** Patterns and drivers of Asian citrus psyllid movement behavior. **Lukasz L. Stelinski** (stelinski@ufl. edu), Xavier Martini, and Kirsten S. Pelz-Stelinski, Univ. of Florida, Lake Alfred, FL

10:00 **0040** Psyllid vector-*Liberibacter* interactions at cellular and molecular interfaces. **Judith K. Brown** (jkbrown@ag.arizona.edu), Timothy J. Rast, and Tonja W. Fisher, Univ. of Arizona, Tucson, AZ

**10:15 BREAK**

10:30 **0041** Harnessing the Asian citrus psyllid microbiome for management of huanglongbing. **Kirsten S. Pelz-Stelinski** (pelzstelinski@ufl.edu), Univ. of Florida, Lake Alfred, FL

10:45 **0042** An integrative taxonomic approach to control Asian citrus psyllid. **Laura Boykin** (lboykin@mac.com), Univ. of Western Australia, Crawley, Australia

11:00 **0043** Surprising results and implications of the Florida psyllid testing project. **Susan Halbert** (halbers@ doacs.state.fl.us), Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

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**MONDAY**

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11:15 **0044** Molecular interdiction of important feeding/ digestive processes as a novel control strategy for the Asian citrus psyllid. **Angela Kruse** (ark253@cornell. edu)1, Eldesouky Ammar2, Dov Borovsky2,

Abdullah Ozer1, Ric Strange2, Richard Johnson3,  
Kasie Sturgeon4, Michael MacCoss3, John Lis1,  
Robert G. Shatters2, Michelle Cilia5, and Erica Warwick4, 1Cornell Univ., Ithaca, NY, 2USDA - ARS, Ft. Pierce, FL, 3Univ. of Washington, Seattle, WA, 4Univ. of Florida, Ft. Pierce, FL, 5USDA - ARS, Ithaca, NY

11:30 **0045** Functional response and implications for mass rearing of *Tamarixia radiata* (Hymenoptera: Eulophidae), parasitoid of the citrus greening disease vector *Diaphorina citri* (Hemiptera: Psyllidae).

**Xulin Chen** (xulin527@ufl.edu) and Philip A. Stansly, Univ. of Florida, Immokalee, FL

11:45 **0046** Integrated use of conventional and organic insecticides and biological control for management of Asian citrus psyllid. **Jawwad A. Qureshi** (jawwadq@ufl. edu), Univ. of Florida, Immokalee, FL

12:00 **0047** Thresholds for HLB vector control in infected commercial citrus and compatibility with biological control. **Cesar Monzo** (cmonzo@ufl.edu), Univ. of Florida / IVIA Valencia Spain, Immokalee, FL

12:15 **0048** Strategies for bringing young citrus trees into production in the face of HLB. **Philip A. Stansly** (pstansly@ufl.edu) and Scott D. Croxton, Univ. of Florida, Immokalee, FL

**Symposium: Arthropods of Madagascar: Historical Biogeography, Diversity, and Patterns of Distribution**

***Room W414 C (Convention Center)***

**Moderator and Organizer:** Michael Irwin, Univ. of Illinois (Emeritus), Vail, AZ

9:15 **0049** Madagascar: Historical biogeography, diversity, and patterns of distribution. **Steve Goodman** (sgoodman@vahatra.mg), Vahatra Foundation, Antananarivo, Madagascar

9:45 **0050** Biogeography of spiders (Arachnida: Araneae) in and around Madagascar. **Charles Griswold** (cgriswold@calacademy.org), California Academy of Sciences, San Francisco, CA

10:00 **0051** Insights into the origin of leafhoppers (Cicadellidae) in Madagascar. **Sindhu Krishnankutty** (oriolealis@gmail.com), Xavier Univ., Buzzards Bay, MA

**10:15 BREAK**

10:30 **0052** Dryinidae (Hymenoptera: Chrysidoidea) of Madagascar: Current status and knowledge gaps. **Massimo Olmi** (olmi@unitus.it), Tropical Entomology Research Center, Viterbo, Italy

10:45 **0053** Mapping habitat and species to restore and sustain natural capital in Madagascar. **Brian L. Fisher** (bfisher@calacademy.org), California Academy of Sciences, San Francisco, CA

11:00 **0054** The *Paussus* L. (Carabidae: Paussinae) of Madagascar: An explosive adaptive radiation of myrmecophilous beetles. **James Robertson** (erotylid@gmail. com) and Wendy Moore, Univ. of Arizona, Tucson, AZ

11:15 **0055** Riffle bugs of Madagascar (Heteroptera: Veliidae): An insular radiation in freshwater lotic ecosystems. **Dan Polhemus** (bugman@bishopmuseum. org), Bishop Museum, Honolulu, HI

**Symposium: Ecological and Developmental Insights from Comparative Hemipteroid Genomics**

***Room W330 C (Convention Center)***

**Moderator and Organizer:** Kristen Panfilio, Univ. of Cologne, Cologne, Germany

9:15 **0056** Trends in bug genome size, gene structure, and gene repertoires. **Kristen Panfilio** (kristen.panfilio@ alum.swarthmore.edu), Univ. of Cologne, Cologne, Germany

9:45 **0057** Transcriptomics of the *F. occidentalis*-tospovirus interaction. **Dorith Rotenberg** (drotenbe@ksu.edu), Derek Schneweis, and Anna Whitfield, Kansas State Univ., Manhattan, KS

10:00 **0058** Transcriptomic and genomic dissection of microbial symbiosis in a hemipteran insect *Nysius*

*plebeius*. **Yu Matsuura** (yumatsu@comb.u-ryukyu. ac.jp), Univ. of the Ryukyus, Nishihara, Japan

**10:15 BREAK**

10:30 **0059** Segmentation genes in the brown marmorated stink bug, *Halyomorpha halys*. **Leslie Pick** (lpick@umd. edu)1, Yong Lu1,2, and Mengyao Chen1, 1Univ. of Maryland, College Park, MD, 2State Univ. of New York, Stony Brook, NY

10:45 **0060** Dorsoventral patterning in the milkweed  
bug, *Oncopeltus fasciatus*: An evolutionary perspective. **Siegfried Roth** (siegfried.roth@uni-koeln. de), Univ. of Cologne, Cologne, Germany

11:00 **0061** Development, selection, and species diversification. **Abderrahman Khila** (abderrahman. khila@ens-lyon.fr), École Normale Supérieure, Lyon, France

11:15 **0062** Transcriptomic analysis of variation in a life history trade-off in response to diet. **Patricia Moore** (pjmoore@uga.edu) and Ashley Duxbury, Univ. of Georgia, Athens, GA

**Symposium: Global Entomological Collaborations**

***Room W340 A (Convention Center)***

**Moderators and Organizers:** Theresa M. Cira1, Ian M. Grettenberger2, Amy C. Morey1, and William R. Morrison3, 1Univ. of Minnesota,  
St. Paul, MN, 2Univ. of California, Davis, CA, 3Michigan State Univ., East Lansing, MI

9:15 **0063** The art and science of global collaborations: Keys to establishing and sustaining international research collaborations. **Henry Fadamiro** (fadamhy@ auburn.edu), Auburn Univ., Auburn, AL

9:30 **0064** International entomological research: Rewards of fighting through the red tape. **Mariana Bulgarella** (mbulgare@umn.edu)1, Charlotte Causton2,  
Martin Quiroga3, and George Heimpel1, 1Univ. of Minnesota, St. Paul, MN, 2Charles Darwin Foundation for the Galapagos Islands, Galapagos Islands, Ecuador, 3National Univ. of Litoral, Esperanza, Argentina

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10:00 **0065** Collaborating internationally: Taking risks and finding your niche. **Susan Worner** (susan.worner@ lincoln.ac.nz), Lincoln Univ., Canterbury, New Zealand

**10:15 BREAK**

10:30 **0066** Building an international network as a graduate student. **Theresa M. Cira** (cirax002@umn.edu), Univ. of Minnesota, St. Paul, MN

10:45 **0067** Contextualizing the entomology graduate degree in preparation for an international career. **Edwin Rajotte** (egrajotte@psu.edu) and  
Melanie Miller-Foster, Pennsylvania State Univ., University Park, PA

11:00 **Recognition of ESA STEP ICE Travel Awards** 11:30 **Student Transition and Early Career Professional**

**(STEP/ECP) Reception**

*Sponsored by PLOS Neglected Tropical Diseases*

**Symposium: Small RNAs: A New Frontier in Insect Science**

***Room W231 B (Convention Center)***

**Moderators and Organizers:** Sassan Asgari1 and  
Alexander Raikhel2, 1Univ. of Queensland, Brisbane, Australia, 2Univ. of California, Riverside, CA

9:15 **0068** MicroRNAs and the evolution of insect metamorphosis. **Xavier Belles** (xavier.belles@ibe. upf-csic.es), Guillem Ylla, Ana Fernandez-Nicolas and Maria-Dolors Piulachs, Institute of Evolutionary Biology, Barcelona, Spain

9:45 **0069** Sex-biased expression of microRNAs: Causes and consequences. **Antonio Marco** (amarco@essex. ac.uk), Univ. of Essex, Colchester, United Kingdom

10:00 **0070** RNAi in the American house dust mite. **Alex Flynt** (alex.flynt@usm.edu), Univ. of Southern Mississippi, Hattiesburg, MS

**10:15 BREAK**

10:30 **0071** Regulation and function of *let-7-Complex* microRNAs in *Drosophila melanogaster*.  
**Nicholas Sokol** (nsokol@indiana.edu), Indiana Univ., Bloomington, IN

10:45 **0072** Exploring the role of microRNAs in insect development and immunity. **Andreas Vilcinskas** (andreas.vilcinskas@agrar.uni-giessen.de)1,2,  
Andre Billion2, and Krishnendu Mukherjee2, 1Justus Liebig Univ., Gießen, Germany, 2Fraunhofer Institute for Molecular Biology and Applied Ecology, Gießen, Germany

**Symposium: Rapid Evolution of Insect Pests within Agroecosystems**

***Room W331 C (Convention Center)***

**Moderators and Organizers:** Yolanda Chen1 and Sean Schoville2, 1Univ. of Vermont, Burlington, VT, 2Univ. of Wisconsin, Madison, WI

9:15 **Introductory Remarks** 170

9:30 **0073** Biological invasions in agricultural settings: Insights from evolutionary biology and population genetics. **Eric Lombaert** (lombaert@sophia.inra.fr)1, Emeline Deleury2, and Thomas Guillemaud2, 1Sophia Institute of Agrobiotechnology, Sophia Antipolis, France, 2INRA, Sophia Antipolis, France

9:45 **0074** Understanding mechanisms of rapid evolution from spatial analysis of genomic variation in the Colorado potato beetle. **Sean Schoville** (sean.schoville@ wisc.edu)1, David J. Hawthorne2, and Yolanda Chen3, 1Univ. of Wisconsin, Madison, WI, 2Univ. of Maryland, College Park, MD, 3Univ. of Vermont, Burlington, VT

10:00 **0075** Anthropogenic selection pressures and  
the consequences of sublethal pesticide usage. **Leena Lindstrom** (leena.m.lindstrom@jyu.fi), Univ. of Jyväskylä, Jyväskylä, Finland

**10:15 BREAK**

10:30 **0076** Effects of insecticide on methylation on the Colorado potato beetle. **Kristian Brevik** (kristian.a.brevik@ gmail.com)1, Stephanie McKay1, Sean Schoville2, and Yolanda Chen1, 1Univ. of Vermont, Burlington, VT, 2Univ. of Wisconsin, Madison, WI

10:45 **0077** A link between host plant adaptation and pesticide resistance in the polyphagous spider mite *Tetranychus urticae*. **Wannes Dermauw** (dermauwwannes@gmail.com)1, Nicky Wybouw2, Rene Feyereisen1, Richard Clark3, and

Thomas Van Leeuwen1, 1Ghent Univ., Ghent, Belgium, 2Univ. of Amsterdam, Amsterdam, Netherlands, 3Univ. of Utah, Salt Lake City, UT

11:00 **0078** Symbiotic complements of insect pests. **Takema Fukatsu** (t-fukatsu@aist.go.jp), National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan

11:15 **0079** Host-associated differentiation in agro- ecosystems: Findings and implications. **Raul Medina** (rfmedina@tamu.edu), Texas A&M Univ., College Station, TX

11:30 **0080** How to weed out wannabes and evolve the perfect pest: The critical influence of insect dispersal in agroecosystems. **Thomas Sappington** (tom.sappington@ ars.usda.gov), USDA - ARS, Ames, IA

11:45 **0081** Evolutionary trade-offs and insecticide resistance. **Andrei Alyokhin** (andrei.alyokhin@umit.maine.edu), Univ. of Maine, Orono, ME

12:00 **0082** Managing soybean aphid virulence: Can we achieve an evolutionarily stable state within an agroecosystem? **Matt O’Neal** (oneal@iastate.edu) and Adam Varenhorst, Iowa State Univ., Ames, IA

12:15 **0083** Rapid adaptation to aphid-resistant soybean by the invasive soybean aphid. **Andrew Michel** (michel.70@osu.edu), Jacob Wenger, Brian Cassone, Ashley Yates, and Vitor Pavinato, The Ohio State Univ., Wooster, OH

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**MONDAY**

**Monday, September 26 • MORNING •**

**Symposium: From the Laboratory Bench to Commercial Products: Semiochemical-Based Technology Development and Regulation Worldwide**

***Room W314 B (Convention Center)***

**Moderators and Organizers:** Jerry Zhu1, Jocelyn G. Millar2, and Thomas C. Baker3, 1USDA - ARS, Lincoln, NE, 2Univ. of California, Riverside, CA, 3Pennsylvania State Univ., University Park, PA

9:15 **0084** Decisions, trials, and tribulations of synthesizing and commercializing semiochemicals in the US and internationally. **Robert Bedoukian** (rhb@bedoukian. com), Bedoukian Research, Inc., Danbury, CT

9:45 **0085** Commercial development and applications  
of a plant volatile-based attract-and-kill product.  
**Peter Gregg** (pgregg@une.edu.au)1, Alice Del Socorro1, Matt Binns1, and Anthony Hawes2, 1Univ. of New England, Armidale, Australia, 2AgBiTech Pty, Ltd., Toowoomba, Australia

10:00 **0086** Importance of linking technologies with mechanisms when developing behavioral controls for insects: Examples from mating disruption of moths. **Jim Miller** (miller20@msu.edu), Michigan State Univ., East Lansing, MI

**10:15 BREAK**

10:30 **0087** Development and registration of a mating disruptant for a carpenter moth, *Cossus insularis* (Lepidoptera: Cossidae). **Kiyoshi Nakamuta** (nakamuta@ faculty.chiba-u.jp), Chiba Univ., Matsudo, Japan

10:45 **0088** Commercial semiochemical synthesis — scaling and getting green. **Cam Oehlschlager** (cam@pheroshop. com), ChemTica Internacional, San Jose, Costa Rica

11:00 **0089** Current status of practical applications of semiochemical-based pest management in China. **Yinzhong Cui** (sino@aliyun.com), Pherobio Technology Co., Ltd., Beijing, China

11:15 **0090** Development of semiochemical products in fruit growing regions around the world: Successes and pitfalls. **Amanda Ramsey** (aramsey@scentry.com), Scentry Biologicals, Inc., Billings, MT

11:30 **0091** Development of new pheromone products poised to increase semiochemical-based market share in the insect pest management industry. **Agenor Mafra-Neto** (president@iscatech.com), ISCA Technologies, Inc., Riverside, CA

**Symposium: Host Adaptations in Insect S ymbioses: Elements That Facilitate Stability and Persistence**

***Room W330 B (Convention Center)***

**Moderators and Organizers:** Gaelen Burke and Kevin J. Vogel, Univ. of Georgia, Athens, GA

9:15 **0092** Symbiont-mediated shift in the evolutionary ecology of host-parasite interactions. **John Jaenike** (joja@mail.rochester.edu)1, Vince Martinson1, Tamara Haselkorn2, Robert Unckless3, and Steve J. Perlman4, 1Univ. of Rochester, Rochester, NY, 2Washington Univ., St. Louis, MO, 3Univ. of Kansas, Lawrence, KS, 4Univ. of Victoria, Victoria, BC, Canada

9:30 **0093** Mosquito-fungus interactions enhance susceptibility to dengue virus. **Yesseinia Anglero- Rodriguez** (yangler1@jhu.edu), Benjamin Blumberg, Celia Demby, Octavio Talyuli, and George Dimopoulos, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

9:45 **0094** Gut microbiota and larval mosquito development. **Kevin J. Vogel** (kjvogel@uga.edu), Mark R. Brown, and Michael R. Strand, Univ. of Georgia, Athens, GA

10:00 **0095** The first collaboration: Gut morphogenesis stimulated by symbiotic bacteria in the bean bug *Riptortus pedestris*. **Yoshitomo Kikuchi** (y-kikuchi@ aist.go.jp), National Institute of Advanced Industrial Science and Technology, Sapporo, Japan

**10:15 BREAK**

10:30 **0096** Mechanisms of host regulation at the symbiotic interface in sap-feeding insects.  
**Alex C. C. Wilson** (acwilson@bio.miami.edu), Univ. of Miami, Coral Gables, FL

10:45 **0097** Aphid gene of bacterial origin encodes a protein transported to *Buchnera*. **Atsushi Nakabachi** (nakabachi@eiiris.tut.ac.jp), Toyohashi Univ. of Technology, Aichi, Japan

11:00 **0098** The role of methylation in the aphid-*Buchnera* symbiosis. Dohyup Kim and **Allison Hansen** (akh@ illinois.edu), Univ. of Illinois, Champaign, IL

**Symposium: Insect-Plant Interactions in a Changing Climate: Effects on Populations Dynamics and Biological Control**

***Room W230 D (Convention Center)***

**Moderators and Organizers:** Ruth A. Hufbauer and Ellyn Bitume, Colorado State Univ., Fort Collins, CO

9:15 **0099** Effects of land-use change and altitudinal variation on the outcome of plant-insect interactions in agricultural systems. **Katja Poveda** (kap235@cornell. edu), Cornell Univ., Ithaca, NY

9:30 **0100** Effects of hybridization on population genetic structure along a latitudinal gradient. **Ellyn Bitume** (ebitume@gmail.com)1, Dan W. Bean2, and  
Ruth A. Hufbauer1, 1Colorado State Univ., Fort Collins, CO, 2Colorado Dept. of Agriculture, Palisade, CO

9:45 **0101** Understanding the mechanism driving changes in herbivory under elevated atmospheric carbon dioxide. **Evan H. DeLucia** (delucia@life.uiuc.edu)1,  
May R. Berenbaum1, and Linus Gog2, 1Univ. of Illinois, Champaign, IL, 2Western Illinois Univ., Macomb, IL

10:00 **0102** Climate warming affects biological control by shifting interactions of invasive plants and insects. **Jianqing Ding** (dingjianqing@yahoo.com)1, Xinmin Lu1, and Evan Siemann2, 1Chinese Academy of Sciences, Wuhan, China, 2Rice Univ., Houston, TX

**10:15 BREAK**

10:30 **0103** Understanding how insects manipulate plant resources: Implications for resource use under climate change. **Paul Nabity** (paul.nabity@wsu.edu), Washington State Univ., Pullman, WA

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10:45 **0104** Changes in the timing of life cycle events  
along a climatic gradient: Causes, mechanisms, and implications for biological control. **Peter McEvoy** (mcevoyp@science.oregonstate.edu) and Linda Buergi, Oregon State Univ., Corvallis, OR

11:00 **0105** Biological control under experimental CO2 enrichment and warming: Increased seed consumption tempers invasive plant response. **Dana Blumenthal** (dana.blumenthal@ars.usda.gov)1 and Justin L. Reeves2, 1USDA - ARS, Fort Collins, CO, 2Kent State Univ., Kent, OH

11:15 **Discussion**  
**Symposium: Host Plant Resistance Towards**

***Room W230 C (Convention Center)***

**Moderator and Organizer:** Ben Vosman, Wageningen Univ. and Research Centre, Wageningen, Netherlands

9:15 **0106** Host plant resistance towards insects.  
**Ben Vosman** (ben.vosman@wur.nl) and  
Roeland E. Voorrips, Wageningen Univ. and Research Centre, Wageningen, Netherlands

9:45 **0107** Characterization of host plant resistance to herbivores through high-throughput phenotyping. Argelia Lorence1, **Fiona L. Goggin** (fgoggin@uark.edu)2, and Alisa Huffaker3, 1Arkansas State Univ., Jonesboro, AR, 2Univ. of Arkansas, Fayetteville, AR, 3Univ. of California, La Jolla, CA

10:00 **0108** Characterization of brown planthopper resistance genes in rice. **Guangcun He** (gche@whu.edu. cn), Wuhan Univ., Wuhan, China

**10:15 BREAK**

10:30 **0109** Unraveling whitefly resistance mechanisms  
in cabbage. **Colette Broekgaarden** (c.broekgaarden@ uu.nl)1,2, Koen Pelgrom2, Roeland E. Voorrips2, and Ben Vosman2, 1Utrecht Univ., Utrecht, Netherlands, 2Wageningen Univ. and Research Centre, Wageningen, Netherlands

10:45 **0110** Finding that needle in the haystack: Targeting SNPs to a marker-deficient region of wheat chromosome containing an important Hessian fly-resistance gene. **Christie E. Williams** (cwilliams@purdue.edu)1,2, Subhashree Subramanyam2, Jill A. Nemacheck1, Xiangye Xiao2, and Melissa McDonald2, 1USDA - ARS, West Lafayette, IN, 2Purdue Univ., West Lafayette, IN

11:00 **0111** Aphid-host interactions: Effectors and resistance protein activation. **Isgouhi Kaloshian** (isgouhi.kaloshian@ucr.edu)1, Ritu Chaudhary1,  
Hagop Atamian1, Frank Takken2 and Hsuan-Chieh Peng1, 1Univ. of California, Riverside, CA, 2Swammerdam Institute for Life Sciences, Amsterdam, Netherlands

11:15 **0112** Discovery of effector proteins that suppress host plant resistance to aphids, from the genome of the green peach aphid. **Sam Mugford** (sam.mugford@ jic.ac.uk)1, Claire Drurey1, Yazhou Chen1, Tom Mathers2, Cock Van Oosterhout3, David Swarbreck2, and Saskia A. Hogenhout1, 1The John Innes Centre, Norwich, United Kingdom, 2The Genome Analysis Centre, Norwich, United Kingdom, 3Univ. of East Anglia, Norwich, United Kingdom

**Symposium: Sustainable Agriculture through Ecological Pest Management**

***Room W222 A (Convention Center)***

**Moderators and Organizers:** Abdul Hakeem1 and Gregory J. Wiggins2, 1Texas A&M Univ., Lubbock, TX, 2Univ. of Tennessee, Knoxville, TN

9:15 **0113** Climate-smart push-pull: A conservation agriculture technology for food security and environmental sustainability in Africa. **Zeyaur Khan** (zkhan@icipe.org)1, Charles Midega1, Jimmy Pittchar1, Alice Murage1, and John Pickett2, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Rothamsted Research, Harpenden, United Kingdom

9:45 **0114** Ecologically-based pest management on  
the U.S. Central High Plains: Structuring a better environment for conservation biology to work in sugar beet. Jeffrey Bradshaw1, **R. J. Pretorius** (rjpretor@cut. ac.za)2, and Gary Hein2, 1Univ. of Nebraska, Scottsbluff, NE, 2Univ. of Nebraska, Lincoln, NE

10:00 **0115** Mulch affects arthropod assemblage associated with field crops grown under conservation agricultural practices in North America. **Ariel Rivers** (arielrivers@ psu.edu)1, Mary Barbercheck1, Tijana Stancic2,

Bram Govaerts2, and Nele Verhulst2, 1Pennsylvania State Univ., University Park, PA, 2International Maize and Wheat Improvement Center, ElsBatán, Mexico

**10:15 BREAK**

10:30 **0116** Insect-related concerns for sustainable, small-scale agriculture in the tropics. **Timothy Motis** (tmotis@echonet.org)1 and Abram Bicksler2, 1ECHO, Inc., Fort Myers, FL, 2ECHO, Inc., Chiang Mai, Thailand

10:45 **0117** Ecological methods of insect pest management in Texas High Plains cotton. **Abdul Hakeem** (ahakeem@ vols.utk.edu) and Megha N. Parajulee, Texas A&M AgriLife Research, Lubbock, TX

11:00 **0118** Biological control as an ecologically-based pest management technique in forest systems. **Gregory J. Wiggins** (wiggybug@utk.edu), Jerome F. Grant, and Paris L. Lambdin, Univ. of Tennessee, Knoxville, TN

11:15 **Discussion**  
**Symposium: Zoophytophagous Arthropods in**

***Room W331 D (Convention Center)***

**Moderators and Organizers:** Josep Jaques1 and Alberto Urbaneja2, 1Univ. Jaume I, Castelló de la Plana, Spain, 2Valencian Institute of Agricultural Research, Moncada, Spain

9:15 **0119** Increasing resilience of pepper crops by exploiting zoophytophagy. **Alberto Urbaneja** (aurbaneja@ivia.es)1, Sarra Bouagga1, Josep Jaques2, Víctor Flors2, and Meritxell Pérez-Hedo2, 1Valencian Institute of Agricultural Research, Moncada, Spain, 2Univ. Jaume I, Castelló de la Plana, Spain

9:30 **0120** New South American mirid predators attack important lepidopteran pests and whiteflies, but also the host plant. **Vanda Bueno** (vhpbueno@den.ufla. br)1 and Joop van Lenteren2,3, 1Federal Univ. of Lavras,



**Insect Pests**



**Biological Control (IOBC)**



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Lavras, Brazil, 2Univ. of São Paulo, Piracicaba, Brazil, 3Wageningen Univ. and Research Centre, Wageningen, Netherlands

9:45 **0121** Beyond predation: Plant-mediated effects of the zoophytophagous predator *Macrolophus pygmaeus* on its herbivorous prey. **Maria Pappas** (mpappa@agro. duth.gr)1, Anke Steppuhn2, Chara Kyriakaki1,

Chrysa Mersina1, Nicole M. van Dam3, and  
Georgios Broufas1, 1Democritus Univ. of Thrace, Orestiada, Greece, 2Freie Univ., Berlin, Germany, 3German Centre for Integrative Biodiversity Research, Leipzig, Germany

10:00 **0122** Below ground-above ground interactions: Effects of root fungi on zoophytophagous predators of tomato pests. **Cristina Castañé** (cristina.castane@irta. es)1, Juliana Duran2, Amelia Camprubi1, and D

onatella Battaglia2, 1IRTA, Cabrils, Spain, 2Univ. of Della Basilicata, Potenza, Italy

**10:15 BREAK**

10:30 **0123** Zoophytophagy in tomato may contribute to improve current IPM programs. **Meritxell Pérez-Hedo** (meritxell\_p@hotmail.com)1, Josep Jaques1,  
Víctor Flors1, and Alberto Urbaneja2, 1Univ. Jaume I, Castelló de la Plana, Spain, 2Valencian Institute of Agricultural Research, Moncada, Spain

10:45 **0124** Zoophytophagy in insect predators: Implications for rearing. **Patrick De Clercq** (patrick.declercq@ugent. be), Ghent Univ., Ghent, Belgium

11:00 **0125** Alternative host plants for the management of the omnivorous mirid *Nesidiocoris tenuis*.  
**Lucia Zappalà** (lzappala@unict.it), Mario Naselli, Giovanna Tropea-Garzia, Antonio Biondi, and Gaetano Siscaro, Univ. of Catania, Catania, Italy

11:15 **0126** Reproduction of *Nesidiocoris tenuis* on *Bemisia tabaci*, *Thrips palmi*, and banker plants.  
**Eizi Yano** (yano@nara.kindai.ac.jp)1, Junichiro Abe2, Miku Nakauchi1, and Shun Hosaka1, 1Kinki Univ., Nara, Japan, 2NARO Western Region Agricultural Research Center, Fukuyama, Japan

11:30 **0127** Can plant-feeding omnivorous Phytoseiidae induce plant defensive responses of interest for biological control? **Josep Jaques** (josep.jaques@uji.es), Joaquín Cruz-Miralles, and Meritxell Pérez-Hedo, Univ. Jaume I, Castelló de la Plana, Spain

**Symposium: Engineering Beneficial Traits into Insects Using Novel Gene Drive Systems**

***Room W414 B (Convention Center)***

**ModeratorsandOrganizers:** ZachAdelman1andChun-HongChen2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Institute of Molecular and Genomic Medicine, Zhunan, Taiwan

9:15 **0128** The mutagenic chain reaction: A potent drive system for dispersing effector transgenes in insect populations. **Ethan Bier** (ebier@ucsd.edu), Univ. of California, La Jolla, CA

9:45 **0129** Gene drive: What is possible at the population level with currently-available molecular components? **John Marshall** (john.marshall@berkeley.edu), Univ. of California, Berkeley, CA

**10:15 BREAK**

10:30 **0130** Creating an insect synthetic population to fight dengue fever. **Chun-Hong Chen** (chunhong@nhri.org. tw), Institute of Molecular and Genomic Medicine, Zhunan, Taiwan

10:45 **0131** Engineering invasive Y chromosomes for mosquito control. **Philippos Papathanos** (p.papathanos@ gmail.com), Univ. of Perugia, Perugia, Italy

11:00 **0132** Insect biotechnology for eco-friendly pest control. **Marc Schetelig** (marc.schetelig@ime.fraunhofer. de), Fraunhofer Institute for Molecular Biology and Applied Ecology, Gießen, Germany

11:15 **0133** Development of an underdominance-based gene drive system for mosquitoes. **Omar Akbari** (omar.akbari@ucr.edu), Univ. of California, Riverside, CA

11:30 **0134** Regulation and containment of gene drive systems in arthropods. **Zach Adelman** (zachadel@ vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

11:45 **Panel Discussion**  
**Symposium: Vector Development and Reproduction**

***Room W414 A (Convention Center)***

**Moderators and Organizers:** Molly Duman Scheel1 and Flaminia Catteruccia2, 1Indiana Univ. School of Medicine, South Bend, IN, 2Harvard School of Public Health, Boston, MA

9:15 **0135** Molecular basis of mating and reproduction in *Anopheles gambiae*. **Flaminia Catteruccia** (fcatter@ hsph.harvard.edu), Harvard School of Public Health, Boston, MA

9:30 **0136** How to be a supportive mother: Mechanisms underlying tsetse fly adenotrophic viviparity. **Joshua Benoit** (benoitja@ucmail.uc.edu), Univ. of Cincinnati, Cincinnati, OH

9:45 **0137** Regulatory genomics of vector insects.  
**Marc Halfon** (mshalfon@buffalo.edu), Univ. at Buffalo, Buffalo, NY

10:00 **0138** Engineered chromosome translocations as a high threshold, reversible, gene-driven system.  
**Bruce A. Hay** (haybruce@caltech.edu), Anna Buchman, Omar Akbari, John Marshall, and Tobin Ivy, California Institute of Technology, Pasadena, CA

**10:15 BREAK**

10:30 **0139** siRNA larvicides for control of vector mosquitoes. **Molly Duman Scheel** (mscheel@nd.edu)1,2, Keshava Mysore1,2, Longhua Sun2, Elizabeth Harper1, and David Severson1,2, 1Indiana Univ. School of Medicine, South Bend, IN, 2Univ. of Notre Dame, South Bend, IN

10:45 **0140** Tyrosine detoxification is an essential trait in life history of blood-feeding insects. **Pedro Lagerblad de Oliveira** (pedro@bioqmed.ufrj.br), Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

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11:00 **0141** Quantitative genetics of circadian rhythm activity on female blood feeding and male swarming behaviors in *Culex pipiens*. **David Severson** (severson.1@ nd.edu)1, Paul Hickner1, Diane Lovin1, Joanne Cunningham1, Dave Chadee2, and Akio Mori1, 1Univ. of Notre Dame, South Bend, IN, 2Univ. of the West Indies, St. Augustine, Trinidad and Tobago

11:15 **0142** The trade-off between immunity and reproduction. Julien Pompon1 and **Elena Levashina** (levashina@mpiib-berlin.mpg.de)2,3, 1Univ. of Strasbourg, Strasbourg, France, 2Max Planck Institute for Infection Biology, Berlin, Germany, 3Germany

**Symposium: Zika Virus**

***Chapin Theater (Convention Center)***

**Moderators and Organizers:** Constância Ayres1 and  
Adriana Costero2, 1Oswaldo Cruz Foundation, Recife, Brazil, 2National Institutes of Health, Bethesda, MD

9:15 **0143** Epidemiology of microcephaly in Brazil. **Celina Martelli** (turchicm@gmail.com), Institute of Tropical Pathology and Public Health, Goiés, Brazil

9:30 **0144** Zika virus in the Americas: 2015 to the present. **Stephen Higgs** (shiggs@k-state.edu), Kansas State Univ., Manhattan, KS

9:45 **0145** p history, spread, and potential for sexual transmission. **Brian D. Foy** (bdfoy1@gmail.com), Colorado State Univ., Fort Collins, CO

10:00 **0146** Tracking the incrimination of *Aedes aegypti* as a Zika virus vector. **Constância Ayres** (tans@cpqam. fiocruz.br), Oswaldo Cruz Foundation, Recife, Brazil

**10:15 BREAK**

10:30 **0147** Dynamics of Zika virus replication in *Aedes aegypti* and *Culex quinquefasciatus*. **Duschinka Guedes** (duschinka@gmail.com), Oswaldo Cruz Foundation, Recife, Brazil

10:45 **0148** *Wolbachia* as an arbovirus biocontrol strategy in Brazil. **Luciano Moreira** (lamoreira2008@gmail. com), Oswaldo Cruz Foundation, Belo Horizonte, Brazil

11:00 **0149** Genetic approaches for controlling transmission of mosquito-borne arboviruses. **Anthony James** (aajames@uci.edu), Univ. of California, Irvine, CA

11:15 **Discussion**  
**Symposium: Neuronal Correlates of Odorant**

***Room W331 B (Convention Center)***

**Moderators and Organizers:** Markus Knaden and Silke Sachse, Max Planck Institute for Chemical Ecology, Jena, Germany

9:15 **0150** Linking brain activity to odor-guided behavior in *Manduca sexta*. **Sonja Bisch-Knaden** (sbisch-knaden@ ice.mpg.de), Ajinkya Dahake, Silke Sachse, and  
Bill Hansson, Max Planck Institute for Chemical Ecology, Jena, Germany

9:45 **0151** Mushroom body output neurons encode the valence and guide memory-based action selection in *Drosophila*. **Yoshinori Aso** (asoy@janelia.hhmi.org) and Gerald Rubin, The Howard Hughes Medical Institute, Ashburn, VA

**10:15 BREAK**

10:30 **0152** Learned valence in larval *Drosophila*. Bertram Gerber and **Michael Schleyer** (michael.schleyer@ lin-magdeburg.de), Leibniz Institute for Neurobiology, Magdeburg, Germany

10:45 **0153** Plastic control of pheromone sensitivity increases male courtship performance. **Aki Ejima** (aki@mail.ecc.u-tokyo.ac.jp) and Kazushige Touhara, The Univ. of Tokyo, Tokyo, Japan

11:00 **0154** Neural representation of social pheromones  
in the dual olfactory pathway of the honey bee. Julie Carcaud1, Martin Giurfa2, and **Jean-Christophe Sandoz** (jean-christophe.sandoz@egce.cnrs-gif.fr)1, 1National Center for Scientific Research, Gif sur Yvette, France, 2National Center for Scientific Research, Toulouse, France

11:15 **0155** Encoding and processing of odor valence in the *Drosophila* brain. Amelie Baschwitz, Ahmed Mohamed, Veit Grabe, Bill Hansson, and **Silke Sachse** (ssachse@ ice.mpg.de), Max Planck Institute for Chemical Ecology, Jena, Germany

**Symposium: Stick Insect Research in the Era of Genomics: Exploring the Evolution of a Mesodiverse Insect Order**

***Room W414 D (Convention Center)***

**Moderators and Organizers:** Sven Bradler1 and  
Thomas R. Buckley2, 1Georg August Univ., Göttingen, Germany, 2Landcare Research, Auckland, New Zealand

9:15 **0156** Ecological genomics of speciation in *Timema s*tick insects. Patrik Nosil1, Zachariah Gompert1, and **Victor Soria-Carrasco** (victor.soria.carrasco@gmail.com)2, 1Univ. of Sheffield, Sheffield, United Kingdom, 2Univ. of Boulder, Boulder, CO

9:45 **0157** Convergent gene expression changes across independent transitions to asexuality: Insights from stick insects. **Tanja Schwander** (tanja.schwander@unil. ch), Jens Bast, and Kirsten Jalvingh, Univ. of Lausanne, Lausanne, Switzerland

10:00 **0158** Phasmatodea phylogenomics: New insights on the relationships of stick and leaf insects. **Sabrina Simon** (sabrina.simon@wur.nl)1, Paul B. Frandsen2,  
Thomas R. Buckley3, Ryuichiro Machida4, Shalin Liu5, Xin Zhou5, Benjamin Wipfler6, and Sven Bradler7, 1Wageningen Univ. and Research Centre, Wageningen, Netherlands, 2Smithsonian Institution, Herndon, VA, 3Landcare Research, Auckland, New Zealand, 4Univ.

of Tsukuba, Nagano, Japan, 5BGI, Shenzhen, China, 6Friedrich Schiller Univ., Jena, Germany, 7Georg August Univ., Göttingen, Germany

**10:15 BREAK**

10:30 **0159** The evolution of phasmid oviposition techniques and a convergent ant mutualism between stick insects and angiosperms. **Michael F. Whiting** (michael\_whiting@ byu.edu)1, James A. Robertson2, and Sven Bradler3, 1Brigham Young Univ., Provo, UT, 2Univ. of Arizona, Tucson, AZ, 3Georg August Univ., Göttingen, Germany

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**Valence in Insects**



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**MONDAY**

**Monday, September 26 • MORNING •**

10:45 **0160** Adaptation and speciation in the New Zealand stick insect *Clitarchus hookeri* (Phasmatodea). **Thomas R. Buckley** (buckleyt@landcareresearch. co.nz)1, Richard D. Newcomb2, Howard Ross3,

Sven Bradler4, and Shelley Myers5, 1Landcare Research, Auckland, New Zealand, 2The New Zealand Institute for Plant & Food Research, Ltd., Auckland, New Zealand, 3Univ. of Auckland, Auckland, New Zealand, 4Georg August Univ., Göttingen, Germany, 5Clemson Univ., Clemson, SC

11:00 **0161** Origin of the Malagasy stick insects and convergent adaptive radiations of Phasmatodea in geographic isolation. **Julia Goldberg** (jule.goldberg@ gmail.com) and Sven Bradler, Georg August Univ., Göttingen, Germany

11:15 **0162** Single origin of the Mascarene stick insects reveals ancient radiation on sunken islands.  
**Sven Bradler** (sbradle@gwdg.de)1 and  
Thomas R. Buckley2, 1Georg August Univ., Göttingen, Germany, 2Landcare Research, Auckland, New Zealand

11:30 **0163** Stem-group stick insects found in the Eocene, much younger than expected. S. Bruce Archibald1, Olivier Bethoux2, and **Sven Bradler** (sbradle@gwdg.de)3, 1Simon Fraser Univ., Burnaby, BC, Canada, 2National Museum of Natural History, Paris, France, 3Georg August Univ., Göttingen, Germany

11:45 **0164** Multiple processes drive wing size diversity in stick insects. **Yu Zeng** (dreavoniz@berkeley.edu) and Robert Dudley, Univ. of California, Berkeley, CA

12:00 **0165** Fast synchrotron X-ray imaging of stick insects. **Thomas van de Kamp** (thomas.vandekamp@kit.edu)1, Tomy dos Santos Rolo1, Janes Odar1, Tilo Baumbach1, Hartmut Greven2, and Sven Bradler3, 1Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany, 2Heinrich Heine Univ., Düsseldorf, Germany, 3Georg August Univ., Göttingen, Germany

**Symposium: Photoperiodic Induction of Diapause and Seasonal Morphs**

***Room W340 B (Convention Center)***

**Moderators and Organizers:** Daniel Hahn1 and Shin Goto2, 1Univ. of Florida, Gainesville, FL, 2Osaka City Univ., Osaka, Japan

9:15 **0166** The path from perception of photoperiod to generation of the diapause phenotype. **David Denlinger** (denlinger.1@osu.edu)1, Megan E. Meuti1, and Cheolho Sim2, 1The Ohio State Univ., Columbus, OH, 2Baylor Univ., Waco, TX

9:30 **0167** Connection of circadian and photoperiodic clocks in the linden bug, *Pyrrhocoris apterus*.  
**Lenka Pivarciova** (chodakova@entu.cas.cz),  
Joanna Kotwica-Rolinska, and David Dolezel, Czech Academy of Sciences, České Budějovice, Czech Republic

9:45 **0168** Neuronal circuitry for control of seasonal diapause in the blow fly *Protophormia terraenovae*. **Sakiko Shiga** (shigask@sci.osaka-cu.ac.jp), Osaka City Univ., Osaka, Japan

10:00 **0169** Photoperiodic control of phenotypic plasticity: Are dopamine and insulin pathways involved in the seasonal change of reproductive mode in aphids?

Gaël Le Trionnaire, Sylvie Hudaverdian,  
Jean-Pierre Gauthier, Nathalie Leterme, and  
**Denis Tagu** (denis.tagu@rennes.inra.fr), INRA, Le Rheu, France

**10:15 BREAK**

10:30 **0170** Carotenoids and diapause in the twospotted spider mite: Lessons from an albino mutant.  
**Astrid Bryon** (astrid.bryon@ugent.be)1, Andre Kurlovs2, Luc Tirry1, Richard Clark2, and Thomas Van Leeuwen1, 1Ghent Univ., Ghent, Belgium, 2Univ. of Utah, Salt Lake City, UT

10:45 **0171** The evolution of diapause and alternative developmental pathways in temperate butterflies. **Karl Gotthard** (karl.gotthard@zoologi.su.se), Stockholm Univ., Stockholm, Sweden

11:00 **0172** The role of diapause for the evolution of voltinism: Molecular evidence from European corn borer moths. **Erik Dopman** (erik.dopman@tufts.edu), Tufts Univ., Medford, MA

11:15 **0173** Genomic diversity in the maintenance and termination of diapause. **William Bradshaw** (bradshaw@ uoregon.edu) and Christina Holzapfel, Univ. of Oregon, Eugene, OR

11:30 **0174** The (non)conserved diapause transcriptome: What we have learned from molecular natural history of the diapause responses across insect species. **Gregory Ragland** (gragland@ksu.edu) and

Edwina Dowle, Kansas State Univ., Manhattan, KS 11:45 **0175** Presentation withdrawn

**Undergraduate Student Oral Competition: Frontiers in Entomology**

***Room W240 A (Convention Center)***

**Moderators:** Richard Brown1, Nico Franz2, and Rodrigo Diaz3, 1Mississippi Entomological Museum, Mississippi State, MS, 2Arizona State Univ., Tempe, AZ, 3Louisiana State Univ., Baton Rouge, LA

9:15 **0176** Body slamming and bolt-back behavior: Characterizing an embiopteran’s (*Antipaluria urichi*) bizarre backwards run. **Erin Kelly** (etaylorkelly2@ gmail.com)1, Thomas Libby2, and Janice S. Edgerly1, 1Santa Clara Univ., Santa Clara, CA, 2Univ. of California, Berkeley, CA

9:30 **0177** Management of aphid populations in daylily crops using green lacewings (*Chrysoperla rufilabris*). **Bret Nash** (bret2012@tamu.edu), Texas A&M Univ., College Station, TX

9:45 **0178** Species composition and population biology of pollinators in a restored grassland community.  
**Flint Devine** (rebecca.devine@und.edu)1, Tiffany Huwe1, Leslie Yellow Hammer1, Sami Swartz1,

Rebecca B. Simmons1, Mia Park2, Brett Goodwin1, and Kathryn Yurkonis1, 1Univ. of North Dakota, Grand Forks, ND, 2Cornell Univ., Ithaca, NY

10:00 **0179** The effects of honey bee (*Apis mellifera*) queen insemination volume on colony growth. **Alexandria Payne** (alexnpayne@gmail.com)1 and Juliana Rangel2, 1Texas A&M Univ., Spring, TX, 2Texas A&M Univ., College Station, TX

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**MONDAY**

**Monday, September 26 • MORNING •**

**10:15 BREAK**

10:30 **0180** The cost of color: Investigating pigmentation as a bioindicator of bee stress. **Daniel Snellings** (das5885@psu.edu) and Heather M. Hines, Pennsylvania State Univ., University Park, PA

10:45 **0181** Feeling those vibes: How do caterpillars sense plant-borne vibrations? **Conrado A. Rosi-Denadai** (conradodenadai@cmail.carleton.ca)1,2,  
Raul Narciso C. Guedes1, and Jayne Yack2, 1Federal Univ. of Viçosa, Viçosa, Brazil, 2Carleton Univ., Ottawa, ON, Canada

**Graduate Student Oral Competition: Apidology, Sericulture, and Social Insects: Honey Bees I**

***Room W230 B (Convention Center)***

**Moderators:** Ana Velez1 and Juan Luis Jurat-Fuentes2, 1Univ. of Nebraska, Lincoln, NE, 2Univ. of Tennessee, Knoxville, TN

9:15 **0182** The effects of lifelong nutrition on honey bee cognition. **Keziah Katz** (kdkatz@rams.colostate.edu) and Dhruba Naug, Colorado State Univ., Fort Collins, CO

9:30 **0183** Learning of floral preference by bees in the absence of nectar rewards. **Avery Russell** (averyrussell@ email.arizona.edu), Univ. of Arizona, Tucson, AZ

9:45 **0184** How can honey bees (*Apis mellifera*) optimize the fitness trade-off between drone production and swarming? **Natalie Lemanski** (natalie.lemanski@ rutgers.edu)1 and Nina Fefferman1,2, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2Rutgers, The State Univ. of New Jersey, Piscataway, NJ

10:00 **0185** Acetylcholinesterase 1 expression level is associated with brood rearing status in the honey  
bee. Young-Ho Kim1, Ju Hyeon Kim2, **Kyungmun Kim** (kkamboosi@snu.ac.kr)3, and Si Hyeock Lee3, 1Kansas State Univ., Manhattan, KS, 2Univ. of Massachusetts, Amherst, MA, 3Seoul National Univ., Seoul, South Korea

**10:15 BREAK**

10:30 **0186** Emergency queen selection in honey bees (*Apis mellifera*). **James Withrow** (jmwithro@ncsu.edu) and David Tarpy, North Carolina State Univ., Raleigh, NC

10:45 **0187** Chemical manipulation of honey bee behavior. **Nicholas Larson** (nlarson@vt.edu)1, Carlyle C. Brewster1, Uli Bernier2, Jeffrey Bloomquist3, and Troy D. Anderson1, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2USDA - ARS, Gainesville, FL, 3Univ. of Florida, Gainesville, FL

11:00 **0188** Larval and adult pollen diets affect honey bee worker response to the queen. **Alexander Walton** (awalton@iastate.edu), Adam Dolezal, and Amy L. Toth, Iowa State Univ., Ames, IA

11:15 **0189** Honey bee sociometry: Tracking honey bee colonies and their nest contents from swarm until death. **Michael Smith** (mls453@cornell.edu), Cornell Univ., Ithaca, NY

11:30 **0190** Does the source colony affect the survival rate of honey bee (*Apis mellifera*) larvae that are reared *in vitro*? **Ashley Mortensen** (mortensena@ufl.edu) and James Ellis, Univ. of Florida, Gainesville, FL

11:45 **0191** The negative effects of in-hive miticides and agrochemicals on honey bee (*Apis mellifera*) drones. **Adrian Fisher II** (solifuge9378@tamu.edu) and Juliana Rangel, Texas A&M Univ., College Station, TX

12:00 **0192** Laboratory and field treatments of atrazine elicit oxidative stress responses in bees.  
**Jennifer Williams** (jdub12@vt.edu), Richard D. Fell, Carlyle C. Brewster, and Troy D. Anderson, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

12:15 **0193** Elucidating the effects of real world pesticide load and diet variety on honey bee health.  
**Andrew Garavito** (agaravit@terpmail.umd.edu)  
and Dennis vanEngelsdorp, Univ. of Maryland, College Park, MD

12:30 **0194** Managing reproduction in workers: The  
primer and releaser effects of tergal gland secretions in honeybee workers. **Olabimpe Okosun** (bimpe.okosun@ gmail.com), Abdullahi Yusuf, Robin Crewe, and Christian Pirk, Univ. of Pretoria, Pretoria, South Africa

**Graduate Student Oral Competition: Apidology, Sericulture, and Social Insects: Termites**

***Room W231 C (Convention Center)***

**Moderators:** Justin Talley1 and Edward Vargo2, 1Oklahoma State Univ., Stillwater, OK, 2Texas A&M Univ., College Station, TX

9:15 **0195** Policing behavior resolves reproductive conflict in the Eastern subterranean termite, *Reticulitermes flavipes*. **Jordan Hampton** (jdha238@uky.edu), Kenneth F. Haynes, Xuguo Zhou, and Qian Sun, Univ. of Kentucky, Lexington, KY

9:30 **0196** Efficient antioxidative defense system contributing to longevity in the subterranean termite *Reticulitermes speratus*. **Eisuke Tasaki** (s015gm@ yamaguchi-u.ac.jp)1,2, Kazuya Kobayashi3,

Kenji Matsuura3, and Yoshihito Iuchi2, 1Tottori Univ., Yamaguchi, Japan, 2Yamaguchi Univ., Yamaguchi, Japan, 3Kyoto Univ., Kyoto, Japan

9:45 **0197** Inter- and intraspecific interactions in subterranean termites, *Reticulitermes* (Isoptera: Rhinotermitidae). **Mark Janowiecki** (janowiecki@tamu. edu) and Edward Vargo, Texas A&M Univ., College Station, TX

10:00 **0198** The Asian subterranean termite, *Coptotermes gestroi*, baited with insect growth regulators in extended foraging arenas. **Lucas Carnohan** (carnohanl@ufl.edu) and Nan-Yao Su, Univ. of Florida, Davie, FL

**10:15 BREAK**

10:30 **0199** Chemical mediation of queen and king recognition in subterranean termites (*Reticulitermes flavipes*). **Colin Funaro** (cffunaro@ncsu.edu)1,  
Coby Schal1, and Edward Vargo2, 1North Carolina State Univ., Raleigh, NC, 2Texas A&M Univ., College Station, TX

10:45 **0200** Genomic correlates to kin recognition and invasiveness in a subterranean termite. **Tian Wu** (twu54@uwo.ca) and Graham Thompson, Univ. of Western Ontario, London, ON, Canada

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**MONDAY**

**Monday, September 26 • MORNING – AFTERNOON •**

11:00 **0201** Caste-specific and sex-specific expression  
of chemoreceptor genes in a termite. **Yuki Mitaka** (ymitaka@kais.kyoto-u.ac.jp)1, Kazuya Kobayashi1, Alexander Mikheyev2, Mandy Tin2, Yutaka Watanabe2, and Kenji Matsuura1, 1Kyoto Univ., Kyoto, Japan, 2Okinawa Institute of Science and Technology,

Onna, Japan

11:15 **0202** Intraspecific variation of termite shelter-tube structures: Building mechanism and its organization in their society. **Nobuaki Mizumoto** (nobuaki.mzmt@ gmail.com), Kazuya Kobayashi, and Kenji Matsuura, Kyoto Univ., Kyoto, Japan

11:30 **0203** Double amount DNA in queen fat body cells: Reproductive division of labor and endoreduplication in termites. **Tomonari Nozaki** (nozaki.tomonari.38v@st. kyoto-u.ac.jp) and Kenji Matsuura, Kyoto Univ., Kyoto, Japan

**Graduate Student Oral Competition: Biological Control and Insect Pathology: Entomopathogens and Weed Biocontrol**

***Room W231 A (Convention Center)***

**Moderators:** John Diaz-Montano1 and Naresh Duggal2, 1Colombian Corporation for Agricultural Research, Rionegro, Colombia, 2Santa Clara County, San Jose, CA

9:15 **0204** Infectious disease of *Enterococcus mundtii* in silkworm, *Bombyx mori*. **Daniel Nwibo** (nwibodanieldon@ gmail.com) and Kazuhisa Sekimizu, The Univ. of Tokyo, Tokyo, Japan

9:30 **0205** Biological control of *Meligethes aeneus* beetles with entomopathogenic fungi — the tricky path to an efficient formulation. **Deborah Kaiser** (deborah.kaiser@ agroscope.admin.ch)1, Sven Bacher2, and

Giselher Grabenweger1, 1Agroscope, Zürich, Switzerland, 2Univ. of Fribourg, Fribourg, Switzerland

9:45 **0206** Identification of entomopathogenic fungi from west central Nebraska and pathogenicity against the western corn rootworm. **Camila Oliveira-Hofman** (coliveirahofman@gmail.com)1, Anthony Adesemoye2, Lance Meinke1, and Julie Peterson2, 1Univ. of Nebraska, Lincoln, NE, 2Univ. of Nebraska, North Platte, NE

10:00 **0207** The genetic basis for variation in resistance to fungal infection in *Drosophila melanogaster*. **Jonathan Wang** (jonwang@umd.edu), Hsiao-Ling Lu, and Raymond J. St. Leger, Univ. of Maryland, College Park, MD

**10:15 BREAK**

10:30 **0208** Can entomopathogenic fungi induce plant defenses to suppress soybean aphid? **Eric H. Clifton** (eclifton@iastate.edu), Erin W. Hodgson, and  
Aaron J. Gassmann, Iowa State Univ., Ames, IA

10:45 **0209** The efficacy of entomopathogenic nematodes (genera *Steinernema* and *Heterorhabditis*) collected in the United Kingdom as a potential biocontrol for vector and nuisance biting hematophagous insects. **Sandra Edmunds** (s.hughes-crean@2011.ljmu.ac.uk), Robbie Rae, and Craig Wilding, Liverpool John Moores Univ., Liverpool, United Kingdom

11:00 **0210** The role of pathogen diversity on the evolution of resistance in an insect. **Leon Yu Zheng Li** (leonl@sfu. ca) and Jenny Cory, Simon Fraser Univ., Burnaby, BC, Canada

11:15 **0211** RNA-seq transcriptome analysis of *Bombyx mori* cells infected with *B. mori* nucleopolyhedrovirus (NPV) and *Autographa californica* multiple NPV.  
**Rina Hamajima** (q2u\_q1@yahoo.co.jp)1, Masanao Sato2, Michihiro Kobayashi1, and Motoko Ikeda1, 1Nagoya Univ., Nagoya, Japan, 2Keio Univ., Yamagata, Japan

11:30 **0212** Phenology of the biological control agent of Dalmatian toadflax, *Mecinus janthiniformis* (Curculionidae: Coleoptera), in Utah. **Samantha Willden** (samwillden@gmail.com) and Edward W. Evans, Utah State Univ., Logan, UT

11:45 **0213** Under cover: An evaluation of artificial weevil refugia for improving biological control of giant salvinia in the United States. **Lori Moshman** (lmoshman@ agcenter.lsu.edu) and Rodrigo Diaz, Louisiana State Univ., Baton Rouge, LA

12:00 **0214** Supercooling point, mortality at low temperatures, and chill coma recovery time of adult *Cyrtobagous salviniae* (Coleoptera: Curculionidae). **Alana Russell** (aruss45@lsu.edu), Seth Johnson, and Rodrigo Diaz, Louisiana State Univ., Baton Rouge, LA

**Graduate Student Oral Competition: Biological Control and Insect Pathology: Predators**

***Room W240 C (Convention Center)***

**Moderators:** Louis E. N. Jackai1 and Paul Robbins2, 1North Carolina A&T State Univ., Greensboro, NC, 2Cornell Univ., Geneva, NY

9:15 **0215** Effects of abiotic conditions on interactions among three predators of *Tetranychus urticae* (Acarina: Tetranychidae). **Pablo Urbaneja-Bernat** (paurbaneja@gmail.com)1, Marta Montserrat2, and Josep Jaques1, 1Univ. Jaume I, Castellón de la Plana, Spain, 2Institute of Mediterranean and Subtropical Horticulture, Algarrobo-Costa, Spain

9:30 **0216** Intraspecific competition of *Galendromus flumenis* (Acari: Phytoseiidae) on Banks grass mite. **Fatemeh Ganjisaffar** (fatemeh.ganjisaffar@email.ucr. edu) and Thomas M. Perring, Univ. of California, Riverside, CA

9:45 **0217** Field collections and habitat surveys of *Tetanocera elata* (Diptera: Sciomyzidae) to develop sustainable slug pest management in Ireland. **Allison Bistline-East** (a.bistline-east1@nuigalway. ie) and Michael J. Gormally, National Univ. of Ireland, Galway, Ireland

10:00 **0218** Manipulation of natural enemy behavior to enhance their ecosystem services in agricultural crops. **Jordano Salamanca** (jordanosalamanca@gmail.com)1, Cesar Rodriguez-Saona2, and Brígida Souza1, 1Federal Univ. of Lavras, Lavras, Brazil, 2Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

**10:15 BREAK**

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**MONDAY**

**Monday, September 26 • MORNING •**

10:30 **0219** Molecular identification of arthropod predators of cucumber beetles. **Molly Dieterich Mabin** (dieterich.9@ osu.edu)1, Celeste Welty1, and Mary Gardiner2, 1The  
Ohio State Univ., Columbus, OH, 2The Ohio State Univ., Wooster, OH

10:45 **0220** Species composition and seasonality of the natural enemies of sugarcane aphid (*Melanaphis sacchari*) on susceptible and resistant sorghum.  
**Erin Maxson** (elmaxson@gmail.com)1, Michael Brewer2, and James Woolley1, 1Texas A&M Univ., College Station, TX, 2Texas A&M AgriLife Research, Corpus Christi, TX

11:00 **0221** Natural enemies of western bean cutworm, *Striacosta albicosta*, in maize agroecosystems in western Nebraska. **Westen Archibald** (westen.archibald@ gmail.com)1, Robert Wright1 and Julie Peterson2, 1Univ. of Nebraska, Lincoln, NE, 2Univ. of Nebraska, North Platte, NE

11:15 **0222** Do latitudinal gradients in arthropod predation pressure hold in simplified agroecosystems?  
**Hannah Gray** (grayx379@umn.edu) and David A. Andow, Univ. of Minnesota, St. Paul, MN

11:30 **0223** Influence of food supplementation during overwintering on the survival of *Hippodamia convergens* adults. **Nathan Mercer** (nhmercer13@ gmail.com), John Obrycki, and Ric Bessin, Univ. of Kentucky, Lexington, KY

11:45 **0224** Relative importance of habitat management and plant quality on herbivore choice, consumptive and non-consumptive effects. **Margaret Lund** (lundmar6@ msu.edu) and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

12:00 **0225** Multi-scale land use effects on ant predation in agroecosystems. **Hannah J. Penn** (hannahjpenn@ gmail.com) and James Harwood, Univ. of Kentucky, Lexington, KY

**Graduate Student Oral Competition: Ecology and Population Dynamics: Behavior**

***Room W240 D (Convention Center)***

**Moderators:** Anders Huseth1 and Murugesan Rangasamy2, 1North Carolina State Univ., Raleigh, NC, 2Dow AgroSciences, Indianapolis, IN

9:15 **0226** Both spring warmth and winter chilling can affect spring phenology of butterflies. **Sandra Stålhandske** (sandra.stalhandske@zoologi.su.se), Karl Gotthard, and Olof Leimar, Stockholm Univ., Stockholm, Sweden

9:30 **0227** Seasonal effects on the morphology and reproductive behavior of *Narnia femorata* (Hemiptera: Coreidae). **Lauren Cirino** (lacirino@ufl.edu) and Christine W. Miller, Univ. of Florida, Gainesville, FL

9:45 **0228** Active pollen feeding and frequent flower visit by a stonefly species in *Corylopsis gotoana*

(Hamamelidaceae). **Akira Wong Sato** (ws.akira@gmail. com) and Makoto Kato, Kyoto Univ., Kyoto, Japan

10:00 **0229** Interactions between thermoregulatory behavior and color plasticity in pipevine swallowtail (*Battus philenor*) caterpillars: Causes and consequences. **Matthew Nielsen** (nielsenm@email.arizona.edu) and Daniel Papaj, Univ. of Arizona, Tucson, AZ

**10:15 BREAK**

10:30 **0230** *Parasitodiplogaster* (Nematoda: Diplogastridae) infection of male fig wasps: Consequences for mutualism and coexistence. **Justin Van Goor** (jvangoor@iastate. edu) and John D. Nason, Iowa State Univ., Ames, IA

10:45 **0231** Examining bird-insect food webs to improve avian conservation efforts. **Ashley C. Kennedy** (kennedya@udel.edu) and Douglas W. Tallamy, Univ. of Delaware, Newark, DE

11:00 **0232** Do multimodal warning signals have an effect on decision making? A glimpse into jumping spider (Araneae: Salticidae) psychology. **Michael Vickers** (michaelvickers@ufl.edu) and Lisa Taylor, Univ. of Florida, Gainesville, FL

11:15 **0233** Individual specialization in the black and yellow mud dauber, *Sceliphron caementarium*, and implications for newly introduced spider species. **Erin Powell** (erinpowell@ufl.edu) and Lisa Taylor, Univ. of Florida, Gainesville, FL

11:30 **0234** Identifying floral hosts of cerambycid beetles using palynology. **Alexander Hazel** (xhazel@illinois.edu)1 and Lawrence M. Hanks2, 1Univ. of Illinois, Champaign, IL, 2Univ. of Illinois, Urbana, IL

11:45 **0235** If you can’t stand the heat: A temperature-driven shift in soil detritivore community dynamics could hold significant consequences for carbon flux and nutrient cycling in temperate forest ecosystems. **Eric Moore** (eamoore@bgsu.edu) and Shannon Pelini, Bowling Green State Univ., Bowling Green, OH

12:00 **0236** Effects of forest disturbance on the movement of ground-dwelling invertebrates. **Kayla I. Perry** (perry.1864@osu.edu)1, Kimberly F. Wallin2,3, John Wenzel4, and Daniel Herms1, 1The Ohio State Univ., Wooster, OH, 2Univ. of Vermont, Burlington, VT, 3USDA - Forest Service, Burlington, VT, 4Carnegie Museum of Natural History, Rector, PA

12:15 **0237** Evaluating ecological landscape design as a tool for managing pests on urban trees. **Sarah Parsons** (separson@ncsu.edu) and Steven Frank, North Carolina State Univ., Raleigh, NC

**Graduate Student Oral Competition: Insect Immunology**

***Room W232 A (Convention Center)***

**Moderator:** Aaron Gross, Univ. of Florida, Gainesville, FL

9:15 **0238** The toll pathway modulated *Beauveria bassiana* infection in *Anopheles gambiae*. **Victoria Davidson** (victorea@ksu.edu) and Kristin Michel, Kansas State Univ., Manhattan, KS

9:30 **0239** Immune responses within tobacco hornworms (*Manduca sexta*) following consumption of *Solanum carolinense* trichomes. **Alexandra Serpi** (alex.serpi@ psu.edu) and Andrew Stephenson, Pennsylvania State Univ., University Park, PA

9:45 **0240** Characterization and evolutionary implications of a recently acquired symbiotic poxvirus in parasitoid wasps. **Kelsey Coffman** (kcoffman@uga.edu) and Gaelen Burke, Univ. of Georgia, Athens, GA

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**MONDAY**

**Monday, September 26 • MORNING •**

10:00 **0241** Immune priming of the Asian citrus psyllid (*Diaphorina citri*). **Alex Arp** (aarp@ufl.edu) and Kirsten Pelz-Stelinski, Univ. of Florida, Lake Alfred, FL

**10:15 BREAK**

10:30 **0242** Genome-wide analysis of selection in immune genes within and among butterfly populations. **Naomi Keehnen** (naomi.keehnen@zoologi.su.se), Jason Hill, Sören Nylin, and Christopher Wheat, Stockholm Univ., Stockholm, Sweden

10:45 **0243** Pathogen-induced paternal effects in a  
social insect. **Erin Cole** (cole.eri@husky.neu.edu)1, Rebeca B. Rosengaus1, Graham Thompson2, and Jessica Empringham2, 1Northeastern Univ., Boston, MA, 2Univ. of Western Ontario, London, ON, Canada

11:00 **0244** Monarch butterfly-microbe interactions and their implications for disease resistance. **Erica Harris** (evharri@emory.edu), Nicole Gerardo, and  
Jacobus C. De Roode, Emory Univ., Atlanta, GA

11:15 **0245** Ecoimmunology of *Manduca sexta*: Therapeutic effects of plant chemistry on the immune response as a mediator of tritrophic interactions. **Michael Garvey** (garveym@purdue.edu)1,  
Curtis Creighton2, and Ian Kaplan1, 1Purdue Univ., West Lafayette, IN, 2Purdue Univ., Hammond, IN

**Graduate Student Oral Competition: Invasive and Exotic Entomology: Drosophilids**

***Room W240 B (Convention Center)***

**Moderators:** Matthew Buffington1 and Anastasia Cooper2, 1USDA - ARS, Washington, DC, 2Kansas State Univ., Manhattan, KS

9:15 **0246** Effect of abiotic factors on circadian rhythms, biology, and behavior of *Drosophila suzukii* (Diptera: Drosophilidae). **Richard Evans** (revans90@uga.edu) and Ashfaq Sial, Univ. of Georgia, Athens, GA

9:30 **0247** Incorporation of yeast species into bait sprays for control of *Drosophila suzukii*. **Alix Whitener** (alix.crilly@wsu.edu)1, Boyd Mori2, Paul Becher2, Peter Witzgall2, and Elizabeth H. Beers1, 1Washington State Univ., Wenatchee, WA, 2Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

9:45 **0248** Attractiveness of different baits to *Drosophila suzukii* of different reproductive states. **Kyoo Park** (parkk@oregonstate.edu)1, Vaughn Walton1, Jana Lee2, and Adam Cave2, 1Oregon State Univ., Corvallis, OR, 2USDA - ARS, Corvallis, OR

10:00 **0249** Investigating wild flora for viable hosts of *Drosophila suzukii* (Diptera: Drosophilidae) in the southeastern U.S. **Joshua Grant** (joshua.grant25@uga. edu) and Ashfaq Sial, Univ. of Georgia, Athens, GA

**10:15 BREAK**

10:30 **0250** An exploration into pesticide resistance in spotted wing drosophila, *Drosophila suzukii*.  
**Grace Sward** (sward023@umn.edu) and  
Christopher R. Philips, Univ. of Minnesota, St. Paul, MN

10:45 **0251** Improving the efficiency of monitoring tools for spotted wing drosophila, *Drosophila suzukii*. **Danielle Kirkpatrick** (kirkpa42@msu.edu), Larry Gut, and James R. Miller, Michigan State Univ., East Lansing, MI

11:00 **0252** Monitoring and exclusion of *Drosophila suzukii* on fruit crops and wild hosts. **Lizabeth Herrera** (lrherrer@email.uark.edu), Don Johnson, and  
Barbara Lewis, Univ. of Arkansas, Fayetteville, AR

11:15 **0253** Susceptibility of selected boreal fruits and berries to the invasive pest spotted wing drosophila (*Drosophila suzukii*). **Catherine Little** (clittle@mun. ca)1,2, Tom Chapman1, Debra Moreau3, and Kirk Hillier2, 1Memorial Univ. of Newfoundland, St. John’s, NF, Canada, 2Acadia Univ., Wolfville, NS, Canada, 3Agriculture and Agri-Food Canada, Kentville, NS, Canada

11:30 **0254** Interspecific competition between *Zaprionus indianus* and *Drosophila suzukii* in Virginia vineyards. **Meredith Shrader** (mcassell@vt.edu) and  
Douglas G. Pfeiffer, Virginia Polytechnic Institute

and State Univ., Blacksburg, VA

11:45 **0255** Seeing spots in the southwest: What have  
we learned about spotted wing drosophila, *Drosophila suzukii* (Drosophilidae: Matsumura), in Oklahoma? **Haley Butler** (haley.butler@okstate.edu), Jackie Lee, and Eric Rebek, Oklahoma State Univ., Stillwater, OK

12:00 **0256** Rebuilding raspberry IPM programs after invasion by spotted wing drosophila. **Heather Leach** (leachhea@msu.edu), Eric Hanson, Josh Moses, Steven VanTimmeren, and Rufus Isaacs, Michigan State Univ., East Lansing, MI

12:15 **0257** Survey of Z*aprionus indianus* in Florida  
and oviposition behavior in berries. **Lindsy Iglesias** (liglesias@ufl.edu) and Oscar Liburd, Univ. of Florida, Gainesville, FL

**Graduate Student Oral Competition: Medical and Veterinary Entomology: Ticks**

***Room W232 B (Convention Center)***

**Moderators:** Ben Mans1 and Clifford Keil2, 1Agricultural Research Council, Onderstepoort, South Africa, 2Pontifical Catholic Univ., Quito, Ecuador

9:15 **0258** The prevalence of *Anaplasma phagocytophilum*, *Babesia microti*, and *Borrelia burgdorferi* in *Ixodes scapularis* and small mammals from two Provincial Parks in Manitoba, Canada. **Zach Polk** (polkzc25@ gmail.com) and Kateryn Rochon, Univ. of Manitoba, Winnipeg, MB, Canada

9:30 **0259** Impact of saturation deficit on the diel questing patterns of the blacklegged tick (*Ixodes scapularis*) in laboratory and field studies. **Xia Lee** (xlee1@wisc.edu), Univ. of Wisconsin, Madison, WI

9:45 **0260** Regional discoveries of the ticks parasitizing Tennessee beef cattle. **David Theuret** (dtheuret@vols. utk.edu), David Paulson, and Rebecca Trout Fryxell, Univ. of Tennessee, Knoxville, TN

10:00 **0261** Laboratory studies of host-seeking behavior in colonized nymphal *Amblyomma maculatum* Koch ticks (Acari: Ixodidae). **José Portugal III** (jsp281@msstate. edu), Robert Wills, and Jerome Goddard, Mississippi State Univ., Mississippi State, MS

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**10:15 BREAK**

10:30 **0262** *Ixodes scapularis* tick saliva proteins sequentially secreted every 24h during blood feeding. **Tae Kim** (taekim009@gmail.com)1, Lucas Tirloni2, Antônio Pinto3, James Moresco4, John Yates III4, Itabajara Vaz2, and Albert Mulenga1, 1Texas A&M Univ., College Station, TX, 2Federal Univ. of Rio Grande, Porto Alegre, Brazil, 3Pontifical Catholic Univ., Porto Alegre, Brazil, 4The Scripps Research Institute, La Jolla, CA

10:45 **0263** Ticks vs. the host immune system: A tug of war. **Mariam Bakshi** (mbakshi@cvm.tamu.edu), Tae Kim, Željko Radulović, Lindsay Porter, Waithaka Mwangi, and Albert Mulenga, Texas A&M Univ., College Station, TX

11:00 **0264** Population genetic structure of the blacklegged tick (*Ixodes scapularis*) questing at different heights. **Mackenzie Tietjen** (kenzietietjen@tamu.edu)1,  
Maria Esteve-Gassent1, Ivan Castro-Arellano2,

Andrew Li3, and Raul F. Medina1, 1Texas A&M Univ., College Station, TX, 2Texas State Univ., San Marcos, TX, 3USDA - ARS, Beltsville, MD

11:15 **0265** Sex specific expression of ionotropic and gustatory receptors in the Haller’s organ of *Ixodes scapularis* ticks (Acari: Ixodidae). **Tanya Josek** (tanyajosek@ gmail.com), Hugh M. Robertson, Marianne Alleyne, Brian F. Allan, and Kimberly K. O. Walden, Univ. of Illinois, Champaign, IL

11:30 **0266** Fluorescent properties of ticks (family Ixodidae). **Dakota Shade** (das09780@ucmo.edu), Univ. of Central Missouri, Warrensburg, MO

11:45 **0267** The salivary gland transcriptome of the causative agent of spring lamb paralysis, *Rhipicephalus eversti evertsi*. **Ronel Pienaar** (volschenkr@arc.agric. za)1, Minique de Castro1,2,3, Daniel De Klerk1,  
Abdalla Latif1, and Ben Mans1,2,4, 1Agricultural Research Council, Onderstepoort, South Africa, 2Univ. of South Africa, Pretoria, South Africa, 3Agricultural Research Council, Pretoria, South Africa, 4Univ. of Pretoria, Pretoria, South Africa

**Graduate Student Oral Competition: Urban Entomology in a Changing Environment: Biting Pests**

***Room W232 C (Convention Center)***

**Moderators:** Alvaro Romero1 and Heather Jordan2, 1New Mexico State Univ., Las Cruces, NM, 2Mississippi State Univ., Mississippi State, MS

9:15 **0268** Effect of collection time and hunger level on the behavioral response to lures in the common bed bug, *Cimex lectularius*. **Desen Wang** (wds830706@163. com)1,2, 1South China Agricultural Univ., Guangzhou, China, 2Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

9:30 **0269** Reproductive compatibility and aggregation fidelity among populations and host-associated lineages of bed bugs, *Cimex lectularius*. **Zachary DeVries** (zcdevrie@ncsu.edu)1, Russell Mick1, Ondrej Balvin2, and Coby Schal1, 1North Carolina State Univ., Raleigh, NC, 2Czech Univ. of Life Sciences, Prague, Czech Republic

9:45 **0270** Evaluation of ingestible pesticides on bed bugs, *Cimex lectularius*. **Angela Sierras** (ajsierra@ncsu.edu) and Coby Schal, North Carolina State Univ., Raleigh, NC

10:00 **0271** The molecular basis of odorant reception in the common bed bug. **Feng Liu** (fzl0009@auburn.edu) and Nannan Liu, Auburn Univ., Auburn, AL

**10:15 BREAK**

10:30 **0272** Is the vector competence of the common bed bug, *Cimex lectularius* L., influenced by their microbiome and endosymbiotic activity? **Michael Fisher** (mlfishe2@ ncsu.edu), Wes Watson, and Coby Schal, North Carolina State Univ., Raleigh, NC

10:45 **0273** Turning a good bug bad: Comparative analysis of salivary proteins and symbioses in blood-feeding kissing bugs (Reduviidae: Triatominae) and their predatory relatives. **Eric Gordon** (erg55@cornell.edu) and Christiane Weirauch, Univ. of California, Riverside, CA

11:00 **0274** Short-range responses of the kissing bug, *Triatoma rubida*, to heat, moisture, and CO .

2 **Andres Indacochea** (aindacoc@nmsu.edu) and

Alvaro Romero, New Mexico State Univ., Las Cruces, NM

**Contributed Papers: Agricultural and Forest Entomology: Behavioral and Chemical Ecology**

***Room W224 F (Convention Center)***

**Moderators:** R. Andrew Hayes1 and Brett Blaauw2, 1Univ. of the Sunshine Coast, Sippy Downs, Australia, 2Rutgers, The State Univ. of New Jersey, Bridgeton, NJ

9:15 **0275** Assessment of beetle diversity, community composition, and potential threats to forestry using kairomone-baited traps at a landscape scale.  
**Sarai Olivier-Espejel** (sarai.olivier@fabi.up.ac.za), Brett Hurley, and Jeff Garnas, Univ. of Pretoria, Pretoria, South Africa

9:30 **0276** When stink bugs react: Host stimuli and the brown marmorated stink bug. **Brett Blaauw** (blaauw@ aesop.rutgers.edu)1, Cesar Rodriguez2, George C. Hamilton3, and Anne Nielsen1, 1Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, 2Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, 3Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

9:45 **0277** *Krüppel homolog 1* (*Kr-h1*) mediates juvenile hormone action during metamorphosis of the oriental fruit fly, *Bactrocera dorsalis*. Ya-Li Li, Hong Liu,  
Dong Wei, Jin-Jun Wang, and **Wei Dou** (weidou9000@ yahoo.com), Southwest Univ., Chongqing, China

10:00 **0278** The nest provisioning behavior of the wasp *Cerceris fumipennis*. **Ellie McCabe** (ellieannmccabe@ gmail.com) and Donald Chandler, Univ. of New Hampshire, Durham, NH

**10:15 BREAK**

10:30 **0279** Predicting potential suitability areas of *Eucryptorrhynchus chinensis* (Olivier) in the world. **Ji Yingchao** (Yingchao2015@bjfu.edu.cn), Beijing Forestry Univ., Beijing, China

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10:45 **0280** Acoustical communication in the remarkable cicada *Subpsaltria yangi* Chen. **Cong Wei** (congwei@ nwsuaf.edu.cn) and Changqing Luo, Northwest A&F Univ., Yangling, China

11:00 **0281** Perturbation of a veterinary anthelmintic compromises multifunctional benefits provided by diverse dung beetle assemblages. **Paul Manning** (paul.manning@zoo.ox.ac.uk)1,2, Owen Lewis1, Sarah Beynon2, and Eleanor Slade1, 1Univ. of Oxford, Oxford, United Kingdom, 2Dr. Beynon’s Bug Farm, St. Davids, United Kingdom

11:15 **0282** Characterizing an Asian longhorned beetle (*Anoplophora glabripennis*) establishment event in an invaded suburban landscape. **Helen Hull-Sanders** (hhullsanders@gmail.com)1 and R. Talbot Trotter2, 1Stevens Institute of Technology, Hoboken, NJ, 2USDA - Forest Service, Hamden, CT

11:30 **0283** Measuring oviposition preference and survival of an invasive stem borer (Lepidoptera: Crambidae) on conventional and bioenergy crops. **Matthew VanWeelden** (mvanweel1@ufl.edu)1, Blake E. Wilson2,

Julien M. Beuzelin3, Thomas E. Reagan3, and M. O. Way4, 1Univ. of Florida, Belle Glade, FL, 2Louisiana State Univ. AgCenter, Baton Rouge, LA, 3Louisiana State Univ., Baton Rouge, LA, 4Texas A&M AgriLife Extension Service, Beaumont, TX

11:45 **0284** Multi-trophic association of olive fruit, yeasts, and olive fruit fly (*Bactrocera oleae* Gmel.) with possible implications for pest management.  
**Elda Vitanovic** (elda@krs.hr)1, Kyria Boundy-Mills2, Hannah Burrack3, Frank Zalom2, and Jeffrey Aldrich4, 1Institute for Adriatic Crops and Karst Reclamation, Split, Croatia, 2Univ. of California, Davis, CA, 3North Carolina State Univ., Raleigh, NC, 4Jeffrey R. Aldrich Consulting, LLC, Santa Cruz, CA

12:00 **0285** Variation in spatial scale of competing polydomous twig-nesting ants in coffee agroecosystems. **Kate Mathis** (kmathis@email.arizona.edu)1, Santiago Ramírez2, and Stacy M. Philpott3, 1Univ. of Arizona, Tucson, AZ, 2Univ. of California, Davis, CA, 3Univ. of California, Santa Cruz, CA

12:15 **0286** Effect of starvation on digestive enzymes of male *H. serrata* Fab. (Coleoptera: Scarabaeidae). **Sakharam Patil** (drsbpatil5576@yahoo.co.in), Savitribai Phule Pune Univ., Rajgurunagar, India

12:30 **0287** Ecology and behavior of brown marmorated stink bug (*Halyomorpha halys*) at the interface between fruit orchards and woodlands in the mid-Atlantic, USA. **Christopher Bergh** (cbergh@vt.edu)1,

Angelita Acebes-Doria1, and Tracy C. Leskey2, 1Virginia Polytechnic Institute and State Univ., Winchester, VA, 2USDA - ARS, Kearneysville, WV

12:45 **0288** The optimal sex pheromone release rate for trapping the codling moth *Cydia pomonella* (Lepidoptera: Tortricidae) in the field. **Jing Xu** (xujing@ioz.ac.cn) and Runzhi Zhang, Chinese Academy of Sciences, Beijing, China

1:00 **0289** Optimizing generic cerambycid pheromone lures for Australian biosecurity and biodiversity monitoring. **R. Andrew Hayes** (rhayes@usc.edu.au)1, Helen Nahrung1, Manon Griffiths2, Pieter Arnold3, Lawrence M. Hanks4, and Jocelyn G. Millar5, 1Univ. of the Sunshine Coast, Sippy Downs, Australia, 2Dept. of Agriculture and Fisheries, Dutton Park, Australia, 3Univ. of Queensland, St. Lucia, Australia, 4Univ. of Illinois, Urbana, IL, 5Univ. of California, Riverside, CA

**Contributed Papers: Biological Control and Insect Pathology: Nematodes, Fungi, and Bt**

***Room W225 A (Convention Center)***

**Moderators:** Timothy Johnson1, Gabriela Lankin-Vega2, and Javad Karimi3, 1Marrone Bio Innovations, Inc., Danville, PA, 2Univ. of Chile, Santiago, Chile, 3Ferdowsi Univ., Mashhad, Iran

9:15 **0290** Research on entomopathogenic *Steinernema* and *Heterorhabditis* nematodes for biological control of chive gnat (*Bradysia odoriphaga,* Yang and Zhang) in China. **Xun Yan** (yanxun@gdei.gd.cn) and Richou Han, Guangdong Academy of Agricultural Sciences, Guangzhou, China

9:30 **0291** Development of two novel microbes for management of insects, mites, and plant parasitic nematodes in North and Central America and Europe. **Timothy Johnson** (tjohnson@marronebio.com)1, Melissa O’Neal1, Bielinski Santos1, Nicholas Vandervort2, Cole Pearson1, and Pamela G. Marrone1, 1Marrone Bio Innovations, Inc., Davis, CA, 2Marrone Bio Innovations, Inc., Cresco, IA

9:45 **0292** *Steinernema* sp. isolate Lican Ray: A good candidate for biological control of cutworms, *Agrotis* sp. **Gabriela Lankin-Vega** (glankin@uchile.cl), Giselle Vidal, Patricia Flores, Geraldine Allende, Eliana Burgos, Andrea Alvarado, Javier Ramírez, and Erwin Aballay, Univ. of Chile, Santiago, Chile

10:00 **0293** Field efficacy of entomopathogenic nematodes against the leopard moth borer, *Zeuzera pyrina* L. (Lepidoptera: Cossidae). **Elham Salari** (salari.elham@ stu-mail.um.ac.ir)1, Javad Karimi1, Hussein Sadeghi- Nameghi1, and Majid Fasihi Harandi2, 1Ferdowsi Univ., Mashhad, Iran, 2Kerman Univ. of Medical Sciences, Kerman, Iran

**10:15 BREAK**

10:30 **0294** Controlling pests in open field eggplant grown in Florida with predatory mites and *Metarhizium anisopliae*. **Barry C. Kostyk** (bkostyk@ufl.edu) and Philip A. Stansly, Univ. of Florida, Immokalee, FL

10:45 **0295** Additive or synergistic interactions between bifenthrin and an emulsifiable formulation of *Beauveria bassiana* against insecticide-resistant annual bluegrass weevil, *Listronotus maculicollis*. **Shaohui Wu** (sw687@rci.rutgers.edu),

Olga Kostromytska, and Albrecht M. Koppenhöfer, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ



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**MONDAY**

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11:00 **0296** Field testing of a novel system for dissemination of an entomopathogenic fungus, *Isaria fumosorosea*, to control the Asian citrus psyllid, *Diaphorina citri*,  
on residential citrus. **Andrew Chow** (andrew.chow@ tamuk.edu)1, Joseph Patt2, and Mamoudou Setamou1, 1Texas A&M Univ., Weslaco, TX, 2USDA - ARS, Ft. Pierce, FL

11:15 **0297** Development of insect pathogen fungi *Beauveria bassiana* (Balsamo) Vuillemin (Ascomycota: Hypocreales) as endophytic fungi and effect on plant growth of upland rice. **Rina Racmawati** (rina\_rachmawati@ yahoo.com), Rizal Rianfauzi, Toto Himawan, and

Sri Karindah, Univ. of Brawijaya, Malang, Indonesia

11:30 **0298** The role of starvation on the synergy between a fungal pathogen and a pesticide. **Joanna Fisher** (jjf236@cornell.edu), Louela Castrillo, and  
Ann E. Hajek, Cornell Univ., Ithaca, NY

11:45 **0299** Insecticidal activities of *Beauveria bassiana* and *Metarhizium* spp. against larval and adult housefly, *Musca domestica* L. Raliat Oyerinde, **Olalekan Soyelu** (jlekan2001@yahoo.co.uk) and Babajide Odu, Obafemi Awolowo Univ., Ile-Ife, Nigeria

12:00 **0300** Entomopathogen fungi as biological control of macadamia felted coccid (*Eriococcus ironsidei*) in Hawaii. **Rosemary Gutierrez** (gr6@hawaii.edu)1 and Mark Wright2, 1Univ. of Hawai’i, Hilo, HI, 2Univ. of Hawai’i, Honolulu, HI

12:15 **0301** Expression of Cry1Fa-toxin receptors during development of fall armyworm, *Spodoptera frugiperda*. **Heba Abdelgaffar** (habdelga@utk.edu), Lucas Hietala, Shivangi Patel, and Juan Luis Jurat-Fuentes, Univ. of Tennessee, Knoxville, TN

12:30 **0302** Research on *Varroa destructor* and viruses of honeybees. **Yi Zhang** (zy3001@163.com), Xun Yan, and Richou Han, Guangdong Academy of Agricultural Sciences, Guangzhou, China

**Contributed Papers: Biological Control and Insect Pathology: Unique Studies I**

***Room W224 D (Convention Center)***

**Moderators:** Keith Stokes1 and John Charles2, 1USDA - ARS, Albany, CA, 2The New Zealand Institute for Plant & Food Research, Ltd., Auckland, New Zealand

9:15 **0303** A meta-analytic comparison of biological control and natural top-down regulation. **Keith Stokes** (keith.stokes@ars.usda.gov)1, Peter Stiling2, and  
Paul Pratt1, 1USDA - ARS, Albany, CA, 2Univ. of South Florida, Tampa, FL

9:30 **0304** Classical and augmentative biological control in host-rich and host-poor environments. **Ernest Delfosse** (delfosse@cns.msu.edu)1 and Paul Ode2, 1Michigan State Univ., East Lansing, MI, 2Colorado State Univ., Fort Collins, CO

9:45 **0305** Biological control of the brown marmorated stink bug, *Halyomorpha halys* (Hemiptera: Pentatomidae), using *Euthyrhynchus floridanus* (Hemiptera: Pentatomidae). **Julio Medal** (julio.medal@freshfromflorida. com), Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

10:00 **0306** Do ecological sieves narrow the field host range of a classical biological control agent candidate for the brown marmorated stink bug? **Paul Botch** (botchpau@ msu.edu) and Ernest Delfosse, Michigan State Univ., East Lansing, MI

**10:15 BREAK**

10:30 **0307** Preemptive assessment of the biosafety of a classical biocontrol agent: Responses of *Trissolcus japonicus* to New Zealand’s native Pentatomidae prior to the arrival of BMSB. **John Charles** (john.charles@ plantandfood.co.nz), Robin Gardner-Gee, Sophie Hunt, Frances MacDonald, and Vicky Davis, The New Zealand Institute for Plant & Food Research, Ltd., Auckland, New Zealand

10:45 **0308** Mass rearing of *Spalgis epius* (Lepidoptera: Lycaenidae), a candidate biocontrol agent of mealybugs (Hemiptera: Pseudococcidae). **Melally Giddegowda Venkatesha** (venkatmelally@gmail.com), Bangalore Univ., Bangalore, India

11:00 **0309** Population fluctuation of Bagrada bug (*Bagrada hilaris*) and its natural enemies in Saltillo, Mexico. **Reyna Torres-Acosta** (rita\_taz84@hotmail. com)1, Veronica Hernandez-Hernandez1, Richard Humber2, Oscar E. Rosales-Escobar1, and Sergio Sanchez-Peña1, 1Antonio Narro Agrarian Autonomous Univ., Saltillo, Mexico, 2USDA - ARS, Ithaca, NY

11:15 **0310** Predator effectiveness and their roles in controlling thrips on lettuce under hydroponic cultivation. **Sopon Uraichuen** (sopon.u@ku.ac.th) and Rattigan Submok, Kasetsart Univ., Nakhon Pathom, Thailand

11:30 **0311** Predatory thrips complex in northern Thailand. **Samaporn Saengyot** (sama\_mju@yahoo.com),  
MaeJo Univ., San Sai, Thailand

11:45 **0312** Using parasitoid data from the native range to predict attack in the invaded range. **Gregory S. Wheeler** (greg.wheeler@ars.usda.gov)1 and Fernando Mc Kay2, 1USDA - ARS, Ft. Lauderdale, FL, 2FuEDEI, Buenos Aires, Argentina

12:00 **0313** Potential Indian anthocorid predators — an overview. **Chandish Ballal** (ballalchandish@gmail. com)1, Kazutaka Yamada2, and Richa Varshney1, 1National Bureau of Agricultural Insect Resources, Bangalore, India, 2Tokushima Prefectural Museum, Tokushima, Japan

**Contributed Papers: Ecology and Population Dynamics: Sampling**

***West Hall F3 (WF3) (Convention Center)***

**Moderators:** Christopher G. Adams1 and Ellen Yerger2, 1Michigan State Univ., East Lansing, MI, 2Indiana Univ. of Pennsylvania, Indiana, PA

9:15 **0314** The life history, behavior, and conservation of the tiger spiketail dragonfly (*Cordulegaster erronea* Hagen) in New Jersey with notes on radiotelemetry studies. **David Moskowitz** (dmoskowitz@ecolsciences. com), Rutgers, The State Univ. of New Jersey, Rockaway, NJ

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9:30 **0315** Using ectoparasites to demonstrate population dynamics. **M. D. Meyer** (michael.meyer@cnu.edu), Kelsey Ekholm, Joseph Danielson, and Richard Sherwin, Christopher Newport Univ., Newport News, VA

9:45 **0316** Automatic detection and counting of rice planthoppers in paddy fields by image processing methods. **Qing Yao** (q-yao@126.com)1, Zheng Wang1, Guote Chen1, Jiang Tang2, and Baojun Yang2, 1Zhejiang Sci-Tech Univ., Hangzhou, China, 2China National Rice Research Institute, Hangzhou, China

10:00 **0317** A sampling program for the white mango  
scale *Aulacaspis tubercularis* Newstead (Hemiptera: Diaspididae). **Mario A. Urías-López** (urias.marioalfonso@ inifap.gob.mx)1, Urbano Nava-Camberos2 and

Luis M. Hernández-Fuentes3, 1National Instute of Forest Research, Agriculture and Livestock, Santiago Ixcuintla, Mexico, 2Juarez Univ. of the State of Durango, Gómez Palacio, Mexico, 3INIFAP, Santiago Ixcuintla, Mexico

**10:15 BREAK**

10:30 **0318** Presentation withdrawn

10:45 **0319** Trapping of biological random walkers Part 1: Predictions for single-trap, multiple-release outcomes based on computer simulations. James Miller1,  
Paul A. Weston2, Christopher Adams1, Jeffrey Schenker1, and **Peter S. McGhee** (mcghee@msu.edu)1, 1Michigan State Univ., East Lansing, MI, 2Charles Sturt Univ., Wagga Wagga, Australia

11:00 **0320** Trapping of biological random walkers Part 2: Field results of single-trap, multiple-release experiments with codling moth, *Cydia pomonella*. **Christopher G. Adams** (adamsch@msu.edu), Larry Gut, Jeffrey Schenker, and James R. Miller, Michigan State Univ., East Lansing, MI

11:15 **0321** Trapping of biological random walkers Part 3: Two-dimensional heat equation as the foundation for translating catch number into absolute pest density. James R. Miller, **Jeffrey Schenker** (jeffrey@math.msu. edu), and Christopher G. Adams, Michigan State Univ., East Lansing, MI

11:30 **0322** A method to determine leaf area eaten by insect herbivores, with novel software that computes missing leaf portions. **Ellen Yerger** (ellen.yerger@iup.edu) and H. Edward Donley, Indiana Univ. of Pennsylvania, Indiana, PA

11:45 **0323** Visualizing age-specific daily activity levels and cohort survival in *D. melanogaster*: A minute-by- minute analysis. **Congwei Yu** (cowyu@ucdavis.edu)1, Sarah Silverman2, Xiongkui He1, Ed Lewis2, and James R. Carey2, 1China Agricultural Univ., Beijing, China, 2Univ. of California, Davis, CA

**Contributed Papers: Entomological Effects of Global Warming in Agriculture and Medical Entomology**

***Room W314 A (Convention Center)***

**Moderators:** Joon-Ho Lee1, Byju N. Govindan2, and  
Osama Seidahmed3, 1Seoul National Univ., Seoul, South Korea, 2Washington State Univ., Pullman, WA, 3Massachusetts Institute of Technology, Cambridge, MA

9:15 **0324** A mechanistic model for dengue under the coexistence of *Aedes aegypti* and *Aedes albopictus* in endemic areas. **Osama Seidahmed** (omekki@mit.edu) and Elfatih Eltahir, Massachusetts Institute of Technology, Cambridge, MA

9:30 **0325** *Cotesia vestalis* (Haliday) reduced basal and plastic responses to temperature may compromise efficacy of *Plutella xylostella* (L.) biological control under climate change. **Honest Machekano** (honest. machekano@studentmail.biust.ac.bw) and Casper Nyamukondiwa, Botswana International Univ. of Science and Technology, Palapye, Botswana

9:45 **0326** Predicting climate change impacts on the phenology of the bean bug *Riptortus pedestris* using simulation models in Korea. Hyoseok Lee, Hyoeun Kim, and **Joon-Ho Lee** (jh7lee@snu.ac.kr), Seoul National Univ., Seoul, South Korea

10:00 **0327** CLIMEX based potential distribution of *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) under climate change. **Vaddi Sridhar** (vsridhar@iihr.res.in)1, L. S. Vinesh2, M. Jayashankar2, and R. Ashokan2, 1Indian Institute of Horticultural Research, Bangalore, India, 2Indian Council of Agricultural Research, Bangalore, India

**10:15 BREAK**

10:30 **0328** Simulated effects of CO2 and warming on cereal leaf beetle (*Oulema melanopus*) induced crop loss on winter wheat in the Pacific Northwest USA. **Byju N. Govindan** (ngbyju@gmail.com)1,

Sanford D. Eigenbrode2, and Claudio Stockle1, 1Washington State Univ., Pullman, WA, 2Univ. of Idaho, Moscow, ID

**Contributed Papers: Entomology Around the World**

***Room W224 A (Convention Center)***

**Moderators:** Nannan Liu and Ming Li, Auburn Univ., Auburn, AL

9:15 **0329** Cold disinfestation for fruit flies – 100 years of research, regulation, and trade. **Caitano De Lima** (cpfdelima@hotmail.com)1 and Joanne Wilson2, 1AgHort Solutions, Perth, Australia, 2Ministry for Primary Industries, Wellington, New Zealand

9:30 **0330** National moth week: A growing global event. **John Cambridge** (john.cambridge000@gmail.com)1, David Moskowitz2, and George C. Hamilton1, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2Rutgers, The State Univ. of New Jersey, Rockaway, NJ

9:45 **0331** Beetles, bugs, and butterflies — reflections  
on 25 years of bug camp. **Steven Murphree** (steve. murphree@belmont.edu), Belmont Univ., Nashville, TN

10:00 **0332** Eating larvae of *Pachymerus nucleorum* (Coleoptera: Chrysomelidae): An endangered traditional practice in the north of Tocantins, Brazil.  
**Vivian Sandoval Gómez** (vivian.sandoval@gmail.com) and Virginia Sousa Soares, Federal Univ. of Tocantins, Araguaína, Brazil

**10:15 BREAK**

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10:30 **0333** Insects and the public: Engagement, education, and outreach. **Luke Tilley** (luke@royensoc.co.uk), Royal Entomological Society, St. Albans, United Kingdom

10:45 **0334** Ecological engineering for rice insect pest management via biodiversity technology — approaches for up-scaling. **Zeng-Rong Zhu** (zrzhu2005@sina.com)1, Kong Luen Heong1,2, Monina Escalada3, and Jiaan Cheng1, 1Zhejiang Univ., Hangzhou, China, 2CABI, Selangor, Malaysia, 3Visayas State Univ., Baybay City, Philippines

11:00 **0335** Early detection of pink bollworm (*Pectinophora gossypiella* (Saunders)) using remote sensing technologies. **Mona Yones** (monayones@yahoo.  
com)1, Hassan Dahi2, Eslam Farag2, Walaa Gamil2, and Mohamed Aboelghar2, 1National Authority for Remote Sensing and Space Sciences, Cairo, Egypt, 2Cairo Univ., Cairo, Egypt

11:15 **0336** Progress in developing an international grand challenge agenda for global entomology programming. **Phillip G. Mulder** (phil.mulder@okstate.edu)1,  
C. David Gammel2, Frank Zalom3, and Grayson Brown4, 1Oklahoma State Univ., Stillwater, OK, 2Entomological Society of America, Annapolis, MD, 3Univ. of California, Davis, CA, 4Univ. of Kentucky, Lexington, KY

11:30 **0337** Taxonomic review of the tribe Eucosmini (Lepidoptera: Tortricidae) in the Korean peninsula. Bong-Kyu Byun and **Da-Som Kim** (n4311@hanmail. net), Hannam Univ., Daejeon, South Korea

11:45 **0338** Vinsectos: A survey of insects depicted on wine labels. **Jack Jenkins** (jackjenkins@qwestoffice.net), Pacific BioControl Corporation, Litchfield, AZ

10:00 **0345** World’s first automated mass digitization  
line for pinned insects. **Hannu Saarenmaa** (hannu. saarenmaa@uef.fi), Janne Karppinen, Riitta Tegelberg, and Zhengzhe Wu, Univ. of Eastern Finland, Joensuu, Finland

**10:15 BREAK**

10:30 **0346** Quantifying insect movement and behavior. **Michael Guidi** (michael.guidi@noldus.com), Noldus Information Technology, Asheville, NC

10:45 **0347** Quantifying functional diversity of insect communities. **Jeffrey Holland** (jdhollan@purdue.edu) and Ashley Kissick, Purdue Univ., West Lafayette, IN

11:00 **0348** Effects of radio transmitter attachment on flying insects: A case study using *Bombus terrestris*. **Brian Cutting** (brian.cutting@plantandfood.co.nz)1, Lisa Evans1, Ashleigh Weatherall2, Anita Pearson2, Nadège Goëbau3, and David Pattemore1, 1The New Zealand Institute for Plant & Food Research, Ltd., Hamilton, New Zealand, 2Univ. of Waikato, Hamilton, New Zealand, 3Agrocampus-Ouest, Rennes, France

11:15 **0349** DNA barcoding for the identification of North American Pyraustinae (Lepidoptera: Pyraloidea: Crambidae). **Zhaofu Yang** (zfy6511@gmail.com)1, Jean-François Landry2, Yalin Zhang1, and Paul Hebert3, 1Northwest A&F Univ., Yangling, China, 2Agriculture and Agri-Food Canada, Ottawa, ON, Canada, 3Univ. of Guelph, Guelph, ON, Canada

11:30 **0350** Ode-omatic ID: A system for automatically identifying dragonflies and damselflies (Odonata) from wings. **William R. Kuhn** (willkuhn@vt.edu)1, Gareth Russell2, and Jessica Ware1, 1Rutgers, The State Univ. of New Jersey, Newark, NJ, 2New Jersey Institute of Technology, Newark, NJ

11:45 **0351** Exploiting plant DNA barcoding to determine nectar sources of Rift Valley fever, dengue, and malaria mosquito vectors. **Vincent Nyasembe** (vnyasembe@icipe. org), David Tchouassi, and Baldwyn Torto, International Centre of Insect Physiology and Ecology, Nairobi, Kenya

12:00 **0352** A tale of two datasets: Consilient approaches toward detailing the evolutionary history of ants (Hymenoptera: Formicidae). **Phillip Barden** (pbarden@ amnh.org) and Jessica Ware, Rutgers, The State Univ. of New Jersey, Newark, NJ

12:15 **0353** Frontiers in live Strepsiptera collection: The *Elenchus koebelei* (Pierce) and *Triozocera mexicana* (Pierce) connection. **Marisano James** (mjajames@ ucdavis.edu), Univ. of California, Davis, CA

**Contributed Papers: Insect Chemical Ecology: Physiology**

***Room W224 B (Convention Center)***

**Moderators:** Julien Pelletier1 and Jing-Jiang Zhou2, 1Keele Univ., Keele, United Kingdom, 2Rothamsted Research, Harpenden, United Kingdom

9:15 **0354** Sublethal effects of larval exposure to phosphine on reproductive activities of *Liposcelis entomophila* (Enderlein). **Yujie Lu** (luyujie1971@163. com), Henan Univ. of Technology, Zhengzhou, China

12:00 **0339**

12:15 **0340**

Presentation withdrawn  
Presentation withdrawn  
Biogeography of hyperdiverse flightless

12:30 **0341**  
weevils reflects the complex geological history of the Sunda Arc revealed through biogeographic model selection. **Matthew Van Dam** (matthewhvandam@ gmail.com), Bavarian State Collection of Zoology, Munich, Germany

**Contributed Papers: Frontiers in Entomology: Tools and Methods**

***Room W224 G (Convention Center)***

**Moderators:** Nikos Papadopoulos1 and Pierre Martin2, 1Univ. of Thessaly, Nea Ionia, Greece, 2CIRAD, Montpellier, France

9:15 **0342** Innovation under pressure: New tools and methods in systemic injection. Joseph Doccola and **Don Grosman** (dgrosman@arborjet.com), Arborjet, Inc., Woburn, MA

9:30 **0343** Knowledge management for a wonderful (computerized) world. **Pierre Martin** (pierre.martin@ cirad.fr)1, Pierre Silvie2 and François-Régis Goebel1, 1CIRAD, Montpellier, France, 2IRD/CIRAD, Montpellier, France

9:45 **0344** *Morpho* morphometrics: Shared ancestry and selection drive the evolution of wing size and shape in *Morpho* butterflies. **Vincent Debat** (debat@mnhn.fr), National Museum of Natural History, Paris, France

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9:30 **0355** Odorant receptor-based discovery of natural repellents of human lice. **Julien Pelletier** (j.pelletier@ keele.ac.uk)1, Pingxi Xu2, Kyong Sup Yoon3, John M. Clark3, and Walter S. Leal2, 1Keele Univ., Keele, United Kingdom, 2Univ. of California, Davis, CA, 3Univ. of Massachusetts, Amherst, MA

9:45 **0356** Effects of overexpressing individual lignin biosynthetic enzymes on feeding and growth of corn earworms (*Helicoverpa zea*) and fall armyworms (*Spodoptera frugiperda*). **Patrick Dowd** (patrick.dowd@ ars.usda.gov)1, Thomas Clemente2, and Scott E. Sattler3, 1USDA - ARS, Peoria, IL, 2Univ. of Nebraska, Lincoln, NE, 3USDA - ARS, Lincoln, NE

10:00 **0357** Crystal structures and binding dynamics of odorant-binding protein 3 from two aphid species *Megoura viciae* and *Nasonovia ribisnigri*. Tom Northey1, Herbert Venthur2, Filomena De Biasio3,

Francois-Xavier Chauviac1, Ambrose Cole1, Karlos Ribeiro4, Gerarda Grossi3, Patrizia Falabella3, Lin Field4,  
Nicholas Keep1, and **Jing-Jiang Zhou** (jing-jiang.zhou@ rothamsted.ac.uk)4, 1Univ. of London, London, United Kingdom, 2Univ. of La Frontera, Temuco, Chile, 3Univ.

of Basilicata, Potenza, Italy, 4Rothamsted Research, Harpenden, United Kingdom

**10:15 BREAK**

10:30 **0358** Evolution of the frontal gland in termites (Isoptera) and its role in alarm communication.  
**Jan Sobotnik** (Sobotnik@seznam.cz)1,  
David Sillam-Dussès2,3, Jitka Pflegerová1,  
Valeria Palma Onetto1, Barbora Krizkova1, Petr Stiblik1, František Jůna1, Kristýna Hošková1, Cecilia Dahlsjö1, and Thomas Bourguignon4, 1Czech Univ. of Life Sciences, Prague, Czech Republic, 2Univ. of Paris 13, Villetaneuse, France, 3IRD, Bondy, France, 4The Univ. of Sydney, Camperdown, Australia

10:45 **0359** The sexy smell of sickness: Establishing a link between metabolic, immune, and pheromone pathways in *Drosophila*. **Ian Keesey** (ikeesey@ice.mpg.de)1,  
Sarah Koerte1, Nicolas Buchon2, Markus Knaden1, and Bill Hansson1, 1Max Planck Institute for Chemical Ecology, Jena, Germany, 2Cornell Univ., Ithaca, NY

11:00 **0360** Function of pheromone binding proteins in olfactory recognition of two sympatric *Dendrolimus*. **Sufang Zhang** (zhangsf@caf.ac.cn), Xiangbo Kong, Hongbin Wang, and Zhen Zhang, Chinese Academy of Forestry, Beijing, China

11:15 **0361** Electrophysiological and behavioral responses of tomato-potato psyllid, *Bactericera cockerelli*, to olfactory and visual stimuli. **Kye Chung Park** (kpark@ plantandfood.co.nz), The New Zealand Institute for Plant & Food Research, Ltd., Christchurch, New Zealand

11:30 **0362** Analysis of polar cuticular lipids and their roles in semiochemical signaling. **Robert Renthal** (robert. renthal@utsa.edu), The Univ. of Texas, San Antonio, TX

11:45 **0363** Candidate chemosensory protein genes in whitefly *Bemisia tabaci* by transcriptome analysis.  
Ran Wang, Cheng Qu, **Fengqi Li** (pandit@163.com), and Chen Luo, Beijing Academy of Agriculture and Forestry Sciences, Beijing, China

12:00 **0364** Lock-in amplified gas chromatography — electroantennography implemented using a Deans switch. **Andrew Myrick** (ajm25@psu.edu) and Thomas C. Baker, Pennsylvania State Univ., University Park, PA

12:15 **0365** Linking ecological adaptations in olfaction-based reproductive behaviors in a phytophagous and a bloodsucking insect species. **Muhammad Binyameen** (mbinyameen@bzu.edu.pk)1, Sarfraz Shad1,

Raheel Qadeer1, Muhammad Khan1, Rizwan Shah1, Muhammad Imran1, Mehboob Alam1, Qasim Ali1, Shahid Majeed2, and Zahid Sarwar1, 1Bahauddin Zakariya Univ., Multan, Pakistan, 2Univ. of Agriculture, Faisalabad, Pakistan

**Contributed Papers: Insect Chemical Ecology: Plant Protection**

***West Hall F1 (WF1) (Convention Center)***

**Moderators:** Amanuel Tamiru Abamo1 and Joseph Patt2, 1International Centre of Insect Physiology and Ecology, Mbita, Kenya, 2USDA - ARS, Ft. Pierce, FL

9:15 **0366** Effects of exogenous application of methyl jasmonate on foliar volatile emission in sweet orange (*Citrus sinensis*) and aggregation behavior of Asian citrus psyllid (*Diaphorina citri*). **Joseph Patt** (joseph. patt@ars.usda.gov), Paul S. Robbins, Rocco Alessandro, and Greg McCollum, USDA - ARS, Ft. Pierce, FL

9:30 **0367** Plant signalling: Opportunities for management of cereal stemborers in sub-Saharan Africa.  
**Tigist Tolosa** (ttolosa@icipe.org)1,2, Charles Midega1, Johnnie van den Berg2, Michael Birkett3,

Christine Woodcock3, Toby Bruce3, John Pickett3, and Zeyaur Khan1, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2North-West Univ., Potchefstroom, South Africa, 3Rothamsted Research, Harpenden, United Kingdom

9:45 **0368** Efforts to identify the major sex pheromone component of the mushroom sciarid fly, *Lycoriella ingenua*. **Stefanos Andreadis** (ssa18@psu.edu)1,  
Kevin Cloonan1, Andrew Myrick1, Haibin Chen2, and Thomas C. Baker1, 1Pennsylvania State Univ., University Park, PA, 2Wenzhou Medical Univ., Wenzhou, China

10:00 **0369** Repellency of phylogenetically diverse plant odors to *Contarinia nasturtii* (Diptera: Cecidomyiidae). **Chase Stratton** (castratt@uvm.edu)1, Cesar Rodriguez- Saona2, Elisabeth Hodgdon1, and Yolanda Chen1,

1Univ. of Vermont, Burlington, VT, 2Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

**10:15 BREAK**

10:30 **0370** Sulcatone and sulcatol as pheromone components of cerambycid beetles in the subfamily

Lamiinae. **Linnea R. Meier** (linrmeier@gmail.com)1, Judy A. Mongold-Diers1, Yunfan Zou2, Jocelyn G. Millar2, and Lawrence M. Hanks3, 1Univ. of Illinois, Champaign, IL, 2Univ. of California, Riverside, CA, 3Univ. of Illinois, Urbana, IL



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10:45 **0371** Triterpenoids as determinants of birch chemical defense against gypsy moth (*Lymantria dispar*).  
Irina Belousova1, Elena Chernyak2, Sergey Morozov2, and **Vyacheslav Martemyanov** (martemyanov79@ yahoo.com)1, 1Institute of Systematics and Ecology of Animals, Novosibirsk, Russia, 2Novosibirsk Institute of Organic Chemistry, Novosibirsk, Russia

11:00 **0372** Laboratory and field assessment of candidate pheromone blends for mating disruption of the swede midge, *Contarinia nasturtii* (Diptera: Cecidomyiidae). **Elisabeth Hodgdon** (ehodgdon@uvm.edu)1,

Rebecca Hallett2 and Yolanda Chen1, 1Univ. of Vermont, Burlington, VT, 2Univ. of Guelph, Guelph, ON, Canada

11:15 **0373** Two noctuiid herbivores exhibit species-specific differences in survival, body development, muscle gene expression, and adult flight capacity in response to variation in host plant induced defenses. **Scott Portman** (slportman37@gmail.com)1, Michelle Peiffer2,

Gary Felton2, and James H. Marden2, 1Montana State Univ., Conrad, MT, 2Pennsylvania State Univ., University Park, PA

11:30 **0374** Role of caterpillar saliva in mediating transcripts encoding proteins for synthesis of plant secondary metabolites. **Ching-Wen Tan** (czt5069@psu.edu), Michelle Peiffer, and Gary Felton, Pennsylvania State Univ., University Park, PA

11:45 **0375** A rocky road to success — the sex pheromone of *Dendrolimus pini*. Dorota Staszek1, Krzysztof Rudzinski1, **Lidia Sukovata** (lsoukovata@ibles.waw.pl)2,  
Monika Asztemborska1, Rafal Szmigielski1,

Piotr Wawrzyniak1, Marek Cieslak1, Andrzej Kolk2, and Jerzy Raczko1, 1Institute of Physical Chemistry, Warsaw, Poland, 2Forest Research Institute, Raszyn, Poland

12:00 **0376** A maize landrace with a novel indirect defense signaling trait possesses a strongly inducible (*E*)-caryophyllene synthase gene. **Amanuel Tamiru** (atamiru@icipe.org)1, Annett Richter2, Toby Bruce3, Christine Woodcock3, John Pickett3, Segenet Kelemu1, Jörg Degenhardt2, and Zeyaur Khan1, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Martin Luther Univ., Halle, Germany, 3Rothamsted Research, Harpenden, United Kingdom

**Contributed Papers: Insect Immunology: Molecular**

***Room W315 A (Convention Center)***

**Moderators:** Germain Chevignon1 and Fleur Ponton2, 1Univ. of Georgia, Athens, GA, 2Macquarie Univ., Marsfield, Australia

9:15 **0377** *In vitro* transcriptomic analyses of the  
aphid’s secondary symbiont, *Hamiltonella defensa*. **Germain Chevignon** (gchevign@uga.edu), Kerry M. Oliver, and Michael Strand, Univ. of Georgia, Athens, GA

9:30 **0378** Transferrin-1 as an immune protein in *Manduca sexta* and *Drosophila melanogaster*. **Maureen Gorman** (mgorman@ksu.edu), Lisa Brummett, and Michael Kanost, Kansas State Univ., Manhattan, KS

9:45 **0379** Mutualism meltdown between intracellular symbiotic bacteria and whitefly under high temperature stress. **Hong-Wei Shan** (hwshan2008@163.com),

Wen-Hao Deng, Min-Jing Zhang, Zhen Zhang, Shu-Sheng Liu, and Yin-Quan Liu, Zhejiang Univ., Hangzhou, China

10:00 **0380** Regulation of antimicrobial genes via insulin- like signaling pathway in silkworm, *Bombyx mori*. **Xiao-Juan Deng** (dengxj@scau.edu.cn), South China Agricultural Univ., Guangzhou, China

**10:15 BREAK**

10:30 **0381** Regulation and function of thioester-containing proteins in the *Drosophila* immune response against the pathogen *Photorhabdus*. **Ioannis Eleftherianos** (ioannise@gwu.edu), The George Washington Univ., Washington, DC

10:45 **0382** Transcriptional inhibition of BmToll9-1 by dsRNA in the silkworm larval midgut. **Jisheng Liu** (jisheng.liu@gzhu.edu.cn)1, Wenli Liao1, Guy Smagghe2, and Luc Swevers3, 1Guangzhou Univ., Guangzhou, China, 2Ghent Univ., Ghent, Belgium, 3Institute of Biosciences & Applications, Athens, Greece

11:00 **0383** Toward understanding the molecular and structural basis of the initiation of a serine protease cascade for insect immune responses. **Daisuke Takahashi**, Brandon Garcia, Brian Geisbrecht, and Michael Kanost (kanost@ksu.edu), Kansas State Univ., Manhattan, KS

11:15 **0384** Molecular changes in *Manduca sexta* accompanying enhanced immune competency across generations. **Wendy Smith** (w.smith@neu.edu), Rebeca B. Rosengaus, Steve Vollmer, and Chuck Roesel, Northeastern Univ., Boston, MA

11:30 **0385** The molecular basis of nutrient exchange in the whitefly symbiosis with two intracellular bacteria. **Junbo Luan** (jl2957@cornell.edu)1, Wenbo Chen1, Daniel Hasegawa1, Alvin M. Simmons2, Kai-Shu Ling2, William Wintermantel3, Zhangjun Fei1, Shu-Sheng Liu4, and Angela E. Douglas1, 1Cornell Univ., Ithaca, NY, 2USDA - ARS, Charleston, SC, 3USDA - ARS, Salinas, CA, 4Zhejiang Univ., Hangzhou, China

11:45 **0386** Vaccination *à la* honey bees (*Apis mellifera)*. **Dalial Freitak** (dalial.freitak@helsinki.fi)1, Heli Salmela1, and Gro V. Amdam2, 1Univ. of Helsinki, Helsinki, Finland, 2Arizona State Univ., Tempe, AZ

12:00 **0387** How nutrition affects immunity and resistance in *Drosophila melanogaster*. **Fleur Ponton** (fleur. ponton@sydney.edu.au), Macquarie Univ., Marsfield, Australia

**Contributed Papers: Insect-Plant Interactions in a Changing Climate: Abiotic Factors, Pollinators, and Pathogens**

***West Hall F4 (WF4) (Convention Center)***

**Moderators:** Louis Nottingham1 and Amanda Winters2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Bowling Green State Univ., Bowling Green, OH

9:15 **0388** Consequences of land-use intensification on insect pollinator diversity and pollination services. **Jamie Stavert** (jamie.stavert@gmail.com)1,  
Ignasi Bartomeus2, David Pattemore3, Anne Gaskett1, and Jacqueline Beggs1, 1Univ. of Auckland, Auckland,

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New Zealand, 2Biological Station of Doñana, Sevilla, Spain, 3The New Zealand Institute for Plant & Food Research, Ltd., Hamilton, New Zealand

9:30 **0389** Honeybee condition in urban ecosystems:  
Are cities hostile environments for insect pollinators? **Manuel Lequerica** (manuel.lequerica@sydney.edu.au), Paula Salonen, Tanya Latty, Caragh Threlfall, and Dieter Hochuli, The Univ. of Sydney, Sydney, Australia

9:45 **0390** Bee-flower interactions in relation to climate changes, foraging activity, and floral rewards of some Indian tree species. **Sunanda Dola** (drsunanda@gvptc. edu.in), Gayatri Vidya Parishad College for Degree and P. G. Courses, Visakhapatnam, India

10:00 **0391** Fungal endophyte can affect host selection behavior of cotton aphid (*Aphis gossypii*). **Wenqing Zhou** (alicia.wenqing@gmail.com)1, Janice Krumm2, James Starr1, and Gregory Sword1, 1Texas A&M Univ., College Station, TX, 2Widener Univ., Chester, PA

**10:15 BREAK**

10:30 **0392** Parthenium weed (*Parthenium hysterophorus* L.) associated phyllody phytoplasma and insect vector: A big threat for major agricultural crops. **Jam Ahmad** (jamnazire@yahoo.com) and Samina Ahmad, Univ. of Agriculture, Faisalabad, Pakistan

10:45 **0393** Assessing potential use of novel endophytes for insect pest control in tall fescue in Uruguay. **Ximena Cibils-Stewart** (xcibils@inia.org.uy)1 and Alison Popay2, 1National Instute of Agricultural Research, Colonia, Uruguay, 2AgResearch, Ltd., Hamilton, New Zealand

11:00 **0394** Phytoplasma diseases in cassava.  
**Elizabeth Alvarez** (e.alvarez@cgiar.org), International Center for Tropical Agriculture, Cali, Colombia

11:15 **0395** Direct and indirect effects of predation and warming on herbivory and ecosystem processes. **Amanda Winters** (winteam@bgsu.edu) and Shannon Pelini, Bowling Green State Univ., Bowling Green, OH

11:30 **0396** Effect of atmospheric CO2 rise on population size, development, and gene expression is different between populations of a seed beetle. **Midori Tuda** (tuda@grt.kyushu-u.ac.jp), Than Lin Aung, Than Htway Lwin, Kumiko Kagoshima, Kazuki Mori, and Kosuke Tashiro, Kyushu Univ., Fukuoka, Japan

11:45 **0397** Appearance of a new species increases community stability. **Zoltán László** (laszlozoltan@ gmail.com)1, Hunor Prázsmári1, Tünde-Ilona Kelemen1, Katalin Sólyom2, and Béla Tóthmérész3, 1Babeș Bolyai Univ., Cluj-Napoca, Romania, 2Univ. of Debrecen, Debrecen, Hungary, 3MTA-DE, Debrecen, Hungary

12:00 **0398** Future climate: Its effects on insect vectors and spread of plant diseases. **Piotr Trebicki** (piotr.trebicki@ ecodev.vic.gov.au)1, Rebecca Vandegeer2, Nilsa A. Bosque-Pérez3, Kevin Powell4, Beatriz Dader5, Angela Freeman1, Alan Yen2, Glenn Fitzgerald1, and Jo Luck6, 1Dept. of Economic Development, Horsham, Australia, 2La Trobe Univ., Bundoora, Australia, 3Univ. of Idaho, Moscow, ID, 4Dept. of Economic Development, Rutherglen, Australia, 5Institute of Agricultural Sciences, Madrid, Spain, 6Plant Biosecurity Cooperative Research Centre, Bruce, Australia

12:15 **0399** Feared to forgotten: Did culture and climate subdue the Mexican bean beetle, *Epilachna varivestis*? **Louis Nottingham** (louisn@vt.edu) and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

12:30 **0400** Elevated CO2 condition reduces the cabbage foliage quality and allelochemicals that consequently affect the performance of the herbivorous insect *Spodoptera litura (*Fab.). **Pham Anh Tuan** (tuan.nipp@gmail.com), Teakwood Papitchaya, and Shaw-Yhi Hwang, National Chung Hsing Univ., Taichung, Taiwan

12:45 **0401** Effect of climatic factors on pest incidence in chickpea (*Cicer arietinum* L.) across different sowing dates. Pavani Thatikonda1, **Ramesh Babu** (tatinenir@yahoo.com)2, Hari Sharma3, and Radhika K.4, 1Professor Jayashankar Telangana State Agricultural Univ., Khammam, India, 2Acharya N. G. Ranga Agricultural Univ., Hyderabad, India, 3Dr. YS Parmar Univ. of Horticulture & Forestry, Nauni, Solan, India 4Acharya N. G. Ranga Agricultural Univ., Guntur, India

1:00 **0402** Impacts of elevated atmospheric CO2 and O3 on canopy defoliation in a northern temperate forest system. **Richard L. Lindroth** (richard.lindroth@wisc. edu), John Couture, Timothy D. Meehan, and

Eric Kruger, Univ. of Wisconsin, Madison, WI

**Contributed Papers: Integrated Pest Management and Sustainable Agriculture: Agronomic Crops**

***Room W230 A (Convention Center)***

**Moderators:** Julien M. Beuzelin1 and Luis Espino2, 1Louisiana State Univ., Baton Rouge, LA, 2Univ. of California Cooperative Extension, Colusa, CA

9:15 **0403** Effects of defoliation on Mississippi soybean yields. **Benjamin Thrash** (bct157@msstate.edu)1, Angus Catchot1, Jeff Gore2, Don Cook2, Fred Musser1, Trent Irby1, and Jason Krutz2, 1Mississippi State Univ., Mississippi State, MS, 2Mississippi State Univ., Stoneville, MS

9:30 **0404** Using remote sensing to improve the management of stink bugs in cotton in South Carolina. **Francis Reay-Jones** (freayjo@clemson.edu)1,  
Jeremy Greene2, Joe Maja2, and Phil Bauer3, 1Clemson Univ., Florence, SC, 2Clemson Univ., Blackville, SC, 3USDA - ARS, Florence, SC

9:45 **0405** Effects of foliar-applied jasmonic acid and seed-applied imidacloprid on phytohormone expression and twospotted spider mite populations  
in cotton. **Sebe Brown** (sbrown@agcenter.lsu.edu)1, David Kerns1 and Michael Stout2, 1Louisiana State Univ., Winnsboro, LA, 2Louisiana State Univ. AgCenter, Baton Rouge, LA

10:00 **0406** Phylogeography of a wheat pest (*Cephus cinctus)* revisited: Management implications. **Marie-Claude Bon** (mcbon@ars-ebcl.org)1, Vincent Lesieur1,2, Jean François Martin2, Kim A. Hoelmer3, David K. Weaver4 and Terri Randolph5, 1USDA - ARS, Montferrier-sur-Lez, France, 2Biological Center for the Management of Populations, Montferrier-le-Lez, France, 3USDA - ARS, Newark, DE, 4Montana State Univ., Bozeman, MT, 5Colorado State Univ., Fort Collins, CO



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**10:15 BREAK**

10:30 **0407** Effectiveness of monoterpenes as grain protectants against *Sitophilus oryzae* in stored wheat. **Samir Abdelgaleil** (samirabdelgaleil@gmail.com) and Mona Saad, Alexandria Univ., Alexandria, Egypt

10:45 **0408** Nutritional ecology of slug populations in Mid-Atlantic no-till grain fields. **Marion Le Gall** (marionlegall314@gmail.com) and John Tooker, Pennsylvania State Univ., University Park, PA

11:00 **0409** Does landscape structure influence cereal leaf beetle populations through enhancing the abundance of its specific parasitoid *Tetrastichus julis* in wheat fields? **Arash Kheirodin** (kheiroda@myumanitoba.ca)1, Héctor A. Cárcamo2, and Alejandro Costamagna1, 1Univ. of Manitoba, Winnipeg, MB, Canada, 2Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

11:15 **0410** A dynamic action threshold calculator for aphid management in cereal crops and its development into a mobile app. **Tyler Wist** (tyler.wist@agr.gc.ca)1, Chrystel Olivier1, Erl Svendsen1, John Gavloski2,

Joan van Baaren3, and Owen Olfert1, 1Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, 2Manitoba Agriculture, Food and Rural Initiatives, Carman, MB, Canada, 3Univ. of Rennes, Rennes, France

11:30 **0411** Interactive effects of soil silicon amendment and nitrogen fertilization on rice insect pest complex. **James Michael Villegas** (jamesvillegas12@gmail.com)1, M. O. Way2, and Michael Stout3, 1Louisiana State Univ., Baton Rouge, LA, 2Texas A&M Univ., Beaumont, TX, 3Louisiana State Univ. AgCenter, Baton Rouge, LA

11:45 **0412** Developing a monitoring protocol using geostatistical Kriging to characterize the spatial distribution of tadpole shrimp (*Triops longicaudatus*) in California rice fields. **Joanna Bloese** (jbbloese@ ucdavis.edu)1, Luis Espino2, Kevin Goding1, Stacey Rice1, and Larry Godfrey1, 1Univ. of California, Davis, CA, 2Univ. of California Cooperative Extension, Colusa, CA

12:00 **0413** Performance of Bt corn technologies in the Mid-South. **Don Cook** (dcook@drec.msstate.edu)1, Angus Catchot2, Nathan Little3, Nicholas Seiter4,  
Julien M. Beuzelin5, David Kerns6, Scott Stewart7,  
Gus Lorenz8, Larry Falconer1, and Jeff Gore1, 1Mississippi State Univ., Stoneville, MS, 2Mississippi State Univ., Mississippi State, MS, 3USDA - ARS, Stoneville, MS, 4Univ. of Arkansas, Monticello, AR, 5Louisiana State Univ., Baton Rouge, LA, 6Louisiana State Univ., Winnsboro, LA, 7Univ. of Tennessee, Jackson, TN, 8Univ. of Arkansas, Lonoke, AR

12:15 **0414** Effects of corn grown in organically and conventionally managed soil on *Ostrinia nubilalis* behavior and populations. **Rebecca Schmidt-Jeffris** (schmidt-jeffris@cornell.edu) and Brian A. Nault, Cornell Univ., Geneva, NY

12:30 **0415** Dow Agrosciences transgenic corn strategy and field efficacy. **Kevin Johnson** (kdjohnson@dow.com)1, Bradley W. Hopkins2, Laura Campbell3, and  
Dwain M. Rule2, 1Dow AgroSciences, Danville, IL,

2Dow AgroSciences, Indianapolis, IN, 3Dow AgroSciences, Carbondale, IL

12:45 **0416** The reproductive ecology of female western corn rootworms (*Diabrotica virgifera virgifera* LeConte). **Sarah Hughson** (sahughson@gmail.com) and Joseph Spencer, Univ. of Illinois, Champaign, IL

**Contributed Papers: Integrated Pest Management and Sustainable Agriculture: Insecticides**

***Room W224 E (Convention Center)***

**Moderators:** Alejandro Calixto1, Mahbuba Jahan2, and K. S. Islam2, 1Dow AgroSciences, Wesley Chapel, FL, 2Bangladesh Agricultural Univ., Mymensingh, Bangladesh

9:15 **0417** Impacts of novel insecticides to three opiine braconid parasitoids *Fopius arisanus* (Sonan), *Diachasmimorpha longicaudata* (Ashmead), and *Psyttalia fletcheri* (Silvestri) based on adult mortality under foliar cover spray application. **Steven Souder** (steven.souder@ars.usda.gov)1,2, Jaime Pinero3, Trevor Smith4, and Roger Vargas1, 1USDA - ARS, Hilo, HI, 2Univ. of Hawai’i, Honolulu, HI, 3Lincoln Univ., Jefferson City, MO, 4Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

9:30 **0418** IsoclastTM Active (Sulfoxaflor) for control  
of sap feeding insects in U.S. specialty crops.  
**Alejandro Calixto** (aacalixto@dow.com)1,  
Melissa Willrich Siebert2, Alistair McKay3, C. Kuniyoshi4, Jesse M. Richardson5, and James P. Mueller6, 1Dow AgroSciences, Wesley Chapel, FL, 2Dow AgroSciences, Greenville, MS, 3Dow AgroSciences, Clovis, CA, 4Dow AgroSciences, Fresno, CA, 5Dow AgroSciences, Hesperia, CA, 6Dow AgroSciences, Brentwood, CA

9:45 **0419** Temporal profile of neonicotinoid concentrations in cotton, corn, and soybean resulting from insecticide seed treatments. **Adam Whalen** (daw153@msstate. edu)1, Angus Catchot1, Jeff Gore2, Scott Stewart3,

Gus Lorenz4, Don Cook2, Fred Musser1, Jeffrey Harris5, and Natraj Krishnan1, 1Mississippi State Univ., Mississippi State, MS, 2Mississippi State Univ., Stoneville, MS, 3Univ. of Tennessee, Jackson, TN, 4Univ. of Arkansas, Lonoke, AR, 5USDA - ARS, Baton Rouge, LA

10:00 **0420** Relative toxicity of some neonicotinoids insecticides and two common predators in controlling brown planthopper, *Nilaparvata lugens* (Stal). **Mahbuba Jahan** (jahan-bau@bau.edu.bd) and

K. S. Islam, Bangladesh Agricultural Univ., Mymensingh, Bangladesh

**10:15 BREAK**

10:30 **0421** Effectiveness of insecticides against soybean stink bugs and side effects on *Telenomus podisi* and generalist predators. **Silvana Abbate** (silabbate@gmail. com)1, Adela Ribeiro1, Horacio Silva1, Oscar Bentancur1, and Enrique Castiglioni2, 1Univ. of the Republic, Paysandú, Uruguay, 2Univ. of the Republic, Rocha, Uruguay

10:45 **0422** Mode of action of triflumezopyrim (PyraxaltTM): A novel mesoionic insecticide for control of planthoppers in rice. **Luis Teixeira** (luis.a.teixeira@dupont.com)1, Daniel Cordova1, Eric Benner1, Mark Schroeder1,

Daniel Vincent1, Vineet Singh2, Caleb Holyoke1, Wenming Zhang1, and Thomas Pahutski1, 1DuPont Crop Protection, Newark, DE, 2DuPont, Vadodara, Gujarat, India

**0423** Triflumezopyrim (PyraxaltTM) — A new approach to rice plant hopper management in Asia Pacific. **Vineet Singh** (vineet.singh@dupont.com)1, Luis Teixeira2, Robert Leighty2, Daniel Vincent2, Daniel Cordova2, Rameshwar Rattan1, Gurulingappa Pampapathy3, Budi Irfan4, Iskandar Zulkarnain4, Pan Ya-Fei5, Haidern Zheng6, Quang Nguyen7,

Wen Wu8, Sanjay Sharma9, Daisuke Yanagisawa10, Haruya Ogawa10, and Ung Park11, 1DuPont, Vadodara, India, 2DuPont Crop Protection, Newark, DE, 3DuPont, Bangalore, India, 4DuPont Agricultural Products, Jakarta, Indonesia, 5DuPont China Holding Company, Ltd., Shanghai, China, 6DuPont China Holding Company, Ltd., Wuhan, China, 7DuPont Vietnam Limited, Ho Chi Minh City, Viet Nam, 8DuPont China Holding Company, Ltd., Beijing, China, 9DuPont, Gurgaon, India, 10DuPont Kabushiki Kaisha, Tokyo, Japan, 11DuPont, Seoul,

South Korea

11:15 **0424** Effects of Nealta® miticide on beneficial mites. **Katherine Walker** (katherine.walker@basf.com)1, Surendra Dara2, and Anna Howell3, 1BASF, Research Triangle Park, NC, 2Univ. of California, San Luis Obispo, CA, 3Univ. of California, Ventura, CA

11:30 **0425** Nealta® miticide knows the good from the bad and the ugly. **Christa Ellers-Kirk** (christa.kirk@basf.com), Steve Broscious, Teresia Nyoike, Rianna Guethling, and Daniel O’Byrne, BASF, Research Triangle Park, NC

11:45 **0426** Nealta® miticide, a novel mode of action for spider mite control. **Anil Menon** (anil.menon@basf.com) and William Baxter, BASF, Research Triangle Park, NC

12:00 **0427** BASF Insecticides: A growing portfolio for North America and beyond. **Rebecca Willis** (rebecca. willis@basf.com), Daniel O’Byrne, Tommy Wofford, H. Alejandro Arevalo, Mark Peacock, and Christa Ellers-Kirk, BASF, Research Triangle Park, NC

12:15 **0428** InscalisTM: A new insecticide for piercing- sucking pest management. **Joe Stout** (joseph.stout@ basf.com)1, Teresia Nyoike2, Tommy Wofford1, Christa Ellers-Kirk1, and H. Alejandro Arevalo1,

1BASF, Research Triangle Park, NC, 2Univ. of Florida, Gainesville, FL

12:30 **0429** Sivanto Prime: Protecting sorghum and alfalfa from sugarcane aphid and blue alfalfa aphid while preserving beneficial insects. **Amanda Beaudoin** (amanda.beaudoin@bayer.com) and Frank Rittemann, Bayer CropScience, Research Triangle Park, NC

12:45 **0430** Sivanto Prime: Protecting fruit and vegetable crops through a flexible fit in IPM programs. Amanda Beaudoin, **Adrian Duehl** (adrian.duehl@bayer.com), and Frank Rittemann, Bayer CropScience, Research Triangle Park, NC

1:00 **0431** Evaluation of insecticides and horticultural oils against scale insects in blueberries. **Bal Gautam** (bkgautam@uga.edu), Brian Little, and Ashfaq Sial, Univ. of Georgia, Athens, GA

**Contributed Papers: Medical and Veterinary Entomology: *Anopheles* Vectors of Malaria**

***West Hall F2 (WF2) (Convention Center)***

**Moderators:** Shune Oliver1 and Brandyce St. Laurent2, 1Wits Research Institute for Malaria, Johannesburg, South Africa, 2National Institutes of Health, Rockville, MD

9:15 **0432** The effects of heavy metal pollution on the life history and expression of insecticide resistance in the major malaria vector *Anopheles arabiensis* (Diptera: Culicidae). **Shune Oliver** (shuneo@nicd.ac.za)1,2 and Basil Brooke1, 1Wits Research Institute for Malaria, Johannesburg, South Africa, 2National Institute for Communicable Diseases, Johannesburg, South Africa

9:30 **0433** Size doesn’t matter: Why using mosquito wing length and body size as a proxy for vector competence doesn’t work under variable conditions. **Lillian Shapiro** (llmjacobs23@gmail.com), Rachel Thomas, and Matthew B. Thomas, Pennsylvania State Univ., University Park, PA

9:45 **0434** Adaptation to an inducible tissue-specific  
cell death system in the malaria vector, *Anopheles stephensi*: A case of the salivary gland.  
**Daisuke Yamamoto** (daisukey@jichi.ac.jp)1,  
Megumi Sumitani2, Katsumi Kasashima1, Hideki Sezutsu2, and Hiroyuki Matsuoka1, 1Jichi Medical Univ., Shimotsuke, Japan, 2National Institute of Agrobiological Sciences, Tsukuba, Japan

10:00 **0435** A case for employing functional education in the management of malaria in Ghana. Andreas Kudom and **Benjamin Mensah** (bmensah@ucc.edu.gh), Univ. of Cape Coast, Cape Coast, Ghana

**10:15 BREAK**

10:30 **0436** Increasing outdoor host seeking in *Anopheles gambiae* s.l. over six years of vector control on Bioko Island. **Jacob Meyers** (jacob.i.meyers@gmail.com)1, Sharmila Pathikonda1, Zachary Popkin-Hall1,  
Matthew Medeiros1, Godwin Fuseini2, Abrahan Matias3, Guillermo Garcia3, Hans J Overgaard4, Vani Kulkarni1, Vamsi Reddy1, Christopher Schwabe2, Jo Lines5,

Immo Kleinschmidt5, and Michel A. Slotman1, 1Texas A&M Univ., College Station, TX, 2Medical Care Development International, Silver Spring, MD, 3Medical Care Development International, Malabo, Equatorial Guinea, 4Norwegian Univ. of Life Sciences, Ås, Norway, 5London School of Hygiene and Tropical Medicine, London, United Kingdom

10:45 **0437** Delivery of insecticidal wall lining by community- based teams: Installation methods and acceptability in Bomi County, Liberia. Tuwuyor Belleh1, **Jonas Ecke** (j\_ecke@yahoo.com)2, David Giesbrecht3, Julie Pontarollo1, Oliver Pratt4, Victor Koko4, Sajid Kemal1, Richard Allan5, and Levi Hinneh4, 1The Mentor Initiative, Monrovia, Liberia, 2Purdue Univ., West Lafayette, IN, 3Univ. of Manitoba, Winnipeg, MB, Canada, 4National Malaria Control Program Liberia, Monrovia, Liberia, 5The Mentor Initiative, Crawley, United Kingdom

11:00 **0438** Cow-baited tents as a tool to monitor and control malaria vectors in Cambodia. **Brandyce St. Laurent** (brandyce.stlaurent@nih.gov), National Institutes of Health, Rockville, MD

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11:15 **0439** Examination of the Nrf2 regulatory network in the Asian malaria mosquito, *Anopheles stephensi*. AEM Rubayet Elahi1, Rebekah Ward2, Hayden Roys2, Sinthia Jahan2, and **Helen Benes** (beneshelen@uams.edu)2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Univ. of Arkansas, Little Rock, AR

11:30 **0440** Assessing the ecological risks of a hypothetical escape of genetically modified mosquitoes (*Anopheles gambiae*) from African insectaries. **Keith Hayes** (keith.hayes@csiro.au)1, David Peel1, Jessica Ford1, Geoffrey Hosack1, Anders Goncalves da Silva2,

Jeffrey Dambacher1, Scott Foster1, Ronald Thresher1, Scott Ferson3, Nigel Beebe4, Simon Barry1, and  
Paul de Barro5, 1CSIRO, Hobart, Australia, 2Monash Univ., Melbourne, Australia, 3Applied Biomathematics, Setauket, NY, 4Univ. of Queensland, Brisbane, Australia, 5CSIRO, Brisbane, Australia

11:45 **0441** Distribution and abundance of *Anopheles* larvae in Toro Local Government Area, Bauchi State, Northeast Nigeria. **Akwashiki Ombugadu** (akwash24@ gmail.com)1,2, Luka Isah3, Nannim Nanvyat1, Mahanan Mafuyai1, and Hasley Njila1, 1Entomological Society of Nigeria, Abuja, Nigeria, 2Ecological Society of Nigeria, Jos, Nigeria, 3Univ. of Jos, Jos, Nigeria

12:00 **0442** Presentation withdrawn

12:15 **0443** Impact of mass drug administration on the transmission of *Plasmodium falciparum* along the Thai-Myanmar border. **Victor Chaumeau** (victor. chaumeau@ird.fr)1,2, Phabele Phatharakokordbun3, Nithipa Kwansomboon4, Céline Montazeau1,  
Bénédicte Fustec1, Selma Metanne1, Chiara Andolina5, Phubeth Ya-Umphan1, Dominique Cerqueira3, Theeraphap Chareonviriyaphap4, Gilles Delmas3, François Nosten3, and Vincent Corbel1, 1Institute of Research for Development, Montpellier, France, 2Centre Hospitalier Univ., Montpellier, France, 3Shoklo Malaria Research Unit, Mae Sot, Thailand, 4Kasetsart Univ., Bangkok, Thailand, 5Shoklo Malaria Research Unit, Bangkok, Thailand

**Contributed Papers: Medical and Veterinary Entomology: Forensic Entomology**

***Room W224 H (Convention Center)***

**Moderators:** Kim Hung1, Sibyl Bucheli2, and Neal Haskell3, 1North Carolina State Univ., Raleigh, NC, 2Sam Houston State Univ., Huntsville, TX, 3Forensic Entomology Investigations, Rensselaer, IN

9:15 **0444** Responses of three filth fly families (Calliphoridae, Muscidae, and Sarcophagidae) to different odors. **Kim Hung** (kyhung@ncsu.edu), Steven Denning, Wes Watson, and Michael Reiskind, North Carolina State Univ., Raleigh, NC

9:30 **0445** Fly-bacteria interactions on human cadavers during decomposition. **Sibyl Bucheli** (bucheli@shsu. edu), Keli King, Lauren Smith, Daniel Haarmann, Raymond Berry, and Aaron Lynne, Sam Houston State Univ., Huntsville, TX

9:45 **0446** Factors affecting diurnal flight and oviposition activity of blow flies (Diptera: Calliphoridae) in Indiana. **Neal Haskell** (blowfly@technologist.com), Forensic Entomology Investigations, Rensselaer, IN

10:00 **0447** Nocturnal oviposition in forensically important flies (Diptera: Calliphoridae) in South Africa.  
**Kirstin Williams** (kirstin.williams@durban.gov.za)1 and Martin Villet2, 1Durban Natural Science Museum, Durban, South Africa, 2Rhodes Univ., Grahamstown, South Africa

**10:15 BREAK**

10:30 **0448** Human myiasis in rural South Africa.  
**Simon Kuria** (kkuria@wsu.ac.za)1, Howard Kingu1, Adupa Dhaffala1, and Martin Villet2, 1Walter Sisulu Univ., Mthatha, South Africa, 2Rhodes Univ., Grahamstown, South Africa

10:45 **0449** Using micro-computed tomography in forensic entomology: A novel, non-destructive method for aging blow fly pupae. **Daniel Martín-Vega** (danielmvega@ gmail.com)1, Thomas Simonsen2, and Martin Hall1, 1The Natural History Museum, London, United Kingdom, 2Natural History Museum, Aarhus, Denmark

11:00 **0450** Bacterial diversity and location within the internal organs of the blowfly *Lucilia sericata* (Meigen). **Natalie Gasz** (ngasz@deakin.edu.au) and Michelle Harvey, Deakin Univ. Australia, Geelong, Australia

11:15 **0451** Presentation withdrawn  
**Contributed Papers: Stored Products Entomology:**

***Room W224 C (Convention Center)***

**Moderators:** Nazife Eroglu1, Olajumoke Alabi2, and Muhammad Saeed3, 1Turkish Scientific and Technological Research Council of Turkey, Kocaeli, Turkey, 2Univ. of Ibadan, Ibadan, Nigeria, 3Univ. of Haripur, Haripur, Pakistan

9:15 **0452** Potency of *Citrus paradisi* rind essential oil against the maize weevil, *Sitophilus zeamais*. Olufisayo Aina and **Olajumoke Alabi** (jmkalabi@yahoo.com), Univ. of Ibadan, Ibadan, Nigeria

9:30 **0453** Effect of powder preparation of clove, ginger, garad, and galangal on the infestation of chickpea grains caused by adult cow pea weevil, *Callosobruchus maculatus*. **Faiza Salah** (faizaruba@yahoo.com), Univ. of Gezira, Wad Medani, Sudan

9:45 **0454** Potent Indian medicinal plant *Ixora coccinea*  
L. for the effective management of *Sitophilus oryzae*  
L. **P. Lakshmi Soujanya** (soujanyak.scientist@gmail. com)1, J. C. Sekhar1, Pradyumn Kumar2, V. Dhanalaxmi3, P. Sravanthi3, and U. V. Mallavadhani3, 1Indian Council of Agricultural Research, Hyderabad, India, 2Indian Council of Agricultural Research, New Delhi, India, 3Council of Scientific and Industrial Research, Secunderabad, India

10:00 **0455** Insecticidal potential of Detia Diatomaceous Earth (DDE) against *Lasioderma serricorni* (Fabricius) (Coleoptera: Anobiidae). **Muhammad Saeed** (drsaeedhu@gmail.com)1, Abid Farid1, Sher Aslam Khan1, Muhammad Liaquat1, Naushad Ali1, Usman Shakir1, Imtiaz Ali Khan2, Tahir Badshah1, Ayub Khan1, Zia ur Rehman1, and Shah Masaud Khan1, 1Univ. of Haripur, Haripur, Pakistan, 2Univ. of Agriculture, Peshawar, Pakistan

**10:15 BREAK**



**Novel Strategies I**

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10:30 **0456** Effect of grain types on the insecticidal efficacy of *Beauveria bassiana* (Balsamo) Vuillemin mixed with diatomaceous earth against four field strains of *Rhyzopertha dominica* (F.). **Tahira Riasat** (tahirariasat@ yahoo.com), Government College Univ., Faisalabad, Pakistan

10:45 **0457** Toxicity of Turkish zeolites (Clinoptilolite) combined with food grade silico aerogel against adults of *Tribolium confusum* on malting barley. **Nazife Eroglu** (nazifeeroglu@hotmail.com)1 and Mevlut Emekci2, 1Turkish Scientific and Technological Research Council of Turkey, Kocaeli, Turkey, 2Ankara Univ., Ankara, Turkey

11:00 **0458** Evaluation of deltamethrin (KObiol) against major storage insect species. **Kimondo Mutambuki** (mutambukikimo@yahoo.com)1, John Mbugua1, and Christopher Ngatia2, 1Kenya Agricultural and Livestock Research Organization, Nairobi, Kenya, 2Kenya

11:15 **0459** Toxic effect of mixtures of selected fixed oils and synthetic insecticides on the control of maize weevil *Sitophilus zeamais* (Motschulsky).  
**Samuel Babarinde** (sababarinde@lautech.edu.ng)1, Oladele Olaniran1, Adeola Odewole1, Adetayo Adeleye1, and Ebenezer Esan2, 1Ladoke Akintola Univ. of Technology, Ogbomoso, Nigeria, 2Obafemi Awolowo Univ., Ibadan, Nigeria

11:30 **0460** Bioefficacy of phytosanitary irradiation against the various ontogenic stages of the solenopsis mealybug, *Phenacoccus solenopsis* (Homoptera: Pseudococcidae). **Mahtab Zarin** (mahtabzarin1@yahoo. co.in), Ranjana Seth, and Rakesh Kumar Seth, Univ. of Delhi, New Delhi, India

11:45 **0461** Biology and biointensive management of *Callosobruchus theobromae* Linnaeus (Coleoptera: Bruchidae). **D. R. Thakur** (drdr4@rediffmail.com), Himachal Pradesh Univ., Shimla, India

12:00 **0462** Potential of microwave irradiation on the postharvest control of cowpea weevil and the proximate composition of cowpea seeds.  
**Christopher Echereobia** (echereobia@yahoo.com)1, Elechi Asawalam2, Kingsley Emeasor2, and  
Kitherian Sahayaraj3, 1Federal Univ. of Technology, Owerri, Nigeria, 2Michael Okpara Univ. of Agriculture, Umuahia, Nigeria, 3St. Xavier’s College, Palayamkottai, India

12:15 **0463** Integrated release of predatory anthocorid *Xylocoris flavipes* (Reuter) and a parasitoid *Bracon hebetor* Say against three moth pests of stored grains. **Tripti Gupta** (tripti123gupta@gmail.com), Pest Control India Pvt., Ltd., Bangalore, India

12:30 **0464** Bioinsecticidal effect of *Ailanthus excelsa* Roxb. bark against *Tribolium castaneum* (Herbst) (Coleoptera: Tenebrionidae). **Imamoddin Ustad** (imamoddin\_94@ yahoo.com)1 and Anilkumar Pardeshi2, 1Marathwada Univ., Aurangabad, IN, India, 2M. S. P. Mandal’s Deogiri College, Aurangabad, India

**Contributed Papers: Urban Entomology in a Changing Environment: Bed Bugs, Cockroaches, and Flies**

***Room W331 A (Convention Center)***

**Moderators:** Shujuan Li1, Eric Benson2, and Katlyn Amos3, 1Univ. of Arizona, Maricopa, AZ, 2Clemson Univ., Clemson, SC, 3Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:15 **0465** Life quality impacts of bed bug (*Cimex lectularius* L.) infestations. **Shujuan Li** (lisj@cals.arizona.edu)1, Dawn Gouge1, Al Fournier1, Tim Stock2, Alvaro Romero3, Shaku Nair1, Carrie Foss4, Ruth Kerzee5, David Stone2, Megan Dunn6, and Deborah Young7, 1Univ. of Arizona, Maricopa, AZ, 2Oregon State Univ., Corvallis, OR, 3New Mexico State Univ., Las Cruces, NM, 4Washington State Univ., Puyallup, WA, 5Midwest Pesticide Action Center, Chicago, IL, 6Northwest Center for Alternatives to Pesticides, Eugene, OR, 7Colorado State Univ., Fort Collins, CO

9:30 **0466** Proactive, inspection-based bed bug management programs demonstrate efficacy and savings in California’s multi-unit housing environments.  
**Andrew Sutherland** (amsutherland@ucanr.edu)1, Dong-Hwan Choe2, and Vernard Lewis3, 1Univ. of California Cooperative Extension, Hayward, CA,

2Univ. of California, Riverside, CA, 3Univ. of California, Richmond, CA

9:45 **0467** The use of proteomics in creating a new detection method for the common bed bug, *Cimex lectularius*. **Natasha Gordon** (ngordon@airmidhealthgroup.com)1, Luke O’Shaughnessy1, David Fitzpatrick2, Sean Doyle2, and Bruce Mitchell1, 1Airmid Healthgroup, Ltd., Dublin, Ireland, 2Maynooth Univ., Kildare, Ireland

10:00 **0468** Bed bug egg hatch rate and nymph survival using four commercially-available insecticides applied as direct sprays. Kevin Hinson, **Eric Benson** (ebenson@ clemson.edu), Patricia Zungoli, William Bridges, and Brittany Ellis, Clemson Univ., Clemson, SC

**10:15 BREAK**

10:30 **0469** Vacuuming bed bugs from naturally and artificially infested furniture. **Karen M. Vail** (kvail@utk. edu), Jennifer G. Chandler, John Glafenhein, and Rachel Harmon, Univ. of Tennessee, Knoxville, TN

10:45 **0470** Extreme pesticide use in response to bed bugs (*Cimex lectularius*) and German cockroach (*Blattella germanica*) infestations. **Dawn Gouge** (dhgouge@cals. arizona.edu)1, Shujuan Li1, Shaku Nair1, Michael Wierda1, Kevin Drake2, Tim Stock3, and Al Fournier1, 1Univ. of Arizona, Maricopa, AZ, 2Arizona Dept. of Agriculture, Phoenix, AZ, 3Oregon State Univ., Corvallis, OR

11:00 **0471** Use of time-lapse photography (GoProTM Cameras; GoPro, Inc., San Mateo, CA) to evaluate at- tractiveness of a novel fly bait in the field. **Katlyn Amos** (kamos@vt.edu)1, Dini Miller1, Molly L. Stedfast1, and Nicola T. Gallagher2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Syngenta, Greensboro, NC

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11:15 **0472** Novel house fly (*Musca domestica*) bioassay for assessing an early onset of behavioral change from bait intoxication. **David L. Cox** (david.cox@syngenta.com)1 and Bob Cartwright2, 1Syngenta Crop Protection, Madera, CA, 2Syngenta Crop Protection, Greensboro, NC

11:30 **0473** Remote monitoring of urban insect pests. **Neil Spomer** (naspomer@dow.com)1, Joe DeMark2, and Ameya D. Gondhalekar3, 1Dow AgroSciences, Indianapolis, IN, 2Dow AgroSciences, Fayetteville, AR, 3Purdue Univ., West Lafayette, IN

11:45 **0474** Mechanisms of the reduced cuticular penetration contributing high insecticide resistance  
in the common bed bug, *Cimex lectularius* L.  
**Reina Koganemaru** (rkoganemaru@gmail.com)1,  
W. Ray2, Richard Helm2, Zach Adelman2, and  
Dini Miller2, 1Sumitomo Chemical Co., Ltd., Takarazuka, Japan, 2Virginia Polytechnic Institute and State Univ., Blacksburg, VA

12:00 **0475** Using microsatellite markers and social network analysis to understand the dispersal of bed bugs in a multiunit dwelling. **Alexis M. Barbarin** (alexis\_barbarin@ncsu.edu)1, Edward Vargo2, and Coby Schal1, 1North Carolina State Univ., Raleigh, NC, 2Texas A&M Univ., College Station, TX

12:15 **0476** Testing insecticide deployment strategies for German cockroach (*Blattella germanica* (L.)) resistance management. **Mahsa Fardisi** (mfardisi@purdue.edu), Michael Scharf, and Ameya D. Gondhalekar, Purdue Univ., West Lafayette, IN

**Contributed Papers: Arthropod Vectors of Animal and Plant Disease: Insect Endosymbionts and Microbiota**

***Room W314 A (Convention Center)***

**Moderators:** Hagus Tarno1, Harpreet Raina2, and Vince Martinson3, 1Univ. of Brawijaya, Malang, Indonesia, 2Univ. of Delhi, New Delhi, India, 3Univ. of Rochester, Rochester, NY

11:00 **0477** Understanding the role of bacterial endosymbionts in transmission of tomato yellow leaf curl virus disease by *Bemisia tabaci*. **Harpreet Raina** (hsraina007@gmail.com), Sonam Popli, and  
Raman Rajagopal, Univ. of Delhi, New Delhi, India

11:15 **0478** Ecological characterization of bacterial endosymbionts in field populations of the Asian citrus psyllid (*Diaphorina citri* Kuwayama). **Chia-Ching Chu** (merquisie@hotmail.com)1, Torrence Gill1, Mark Hoffmann2, and Kirsten S. Pelz-Stelinski1, 1Univ. of Florida, Lake Alfred, FL, 2Univ. of California, Salinas, CA

11:30 **0479** Microbial community associated with ambrosia beetle (*Euplatypus parallelus*) on sonokembang (*Pterocarpus indicus*) in Malang. **Hagus Tarno** (h\_gustarno@ub.ac.id), Erfan Septia, and Luqman Aini, Univ. of Brawijaya, Malang, Indonesia

11:45 **0480** Peptidoglycan Recognition Protein (PGRP) expression in the Asian citrus psyllid (*Diaphorina citri* Kuwayama) and implications for immune response to gram-negative bacteria. **Torrence Gill** (gilltorrence@ hotmail.com), Alex Arp, and Kirsten Pelz-Stelinski, Univ. of Florida, Lake Alfred, FL

12:00 **0481** The structure of gut communities in wild *Drosophila*. **Vince Martinson** (v.martinson@rochester. edu)1, Angela Douglas2, and John Jaenike1, 1Univ. of Rochester, Rochester, NY, 2Cornell Univ., Ithaca, NY

12:15 **0482** Fungi associated with the grey-brown stinkbug (*Coenomorpha nervosa* Dallas) in pecan orchards in South Africa. **Vaughn Swart** (swartvr@ufs.ac.za)1,  
Gert Marais1, and Jaco Saaiman2, 1Univ. of the Free State, Bloemfontein, South Africa, 2Rijk Zwaan South Africa (Pty.), Ltd., Krugersdorp, South Africa

**Monday, September 26, 2016 • AFTERNOON**

**Symposium: Pest Shifting, Invasive Species, and Resistance Development in Key Growing Areas of the World and the Need for New Technology to Manage Insect Pests**

***Room W314 B (Convention Center)***

**Moderators and Organizers:** Melissa Siebert1 and Luis E. Gomez2, 1Dow AgroSciences, Greenville, MS, 2Dow AgroSciences,

Indianapolis, IN

*This symposium is generously sponsored by Dow AgroSciences. .*

1:30 **0483** Case study 1: From introduction to IPM — history of the invasion of spotted wing drosophila (*Drosophila suzukii*) in the western United States. **David R. Haviland** (dhaviland@ucdavis.edu)1, Robert A. Van Steenwyk2, Elizabeth Beers3, Vaughn Walton4, and Jana Lee5, 1Univ. of California Cooperative Extension, Bakersfield, CA, 2Univ. of California, Berkeley, CA, 3Washington State Univ., Wenatchee, WA, 4Oregon State Univ., Corvallis, OR, 5USDA - ARS, Corvallis, OR

2:00 **0484** Case study 2: Sugarcane aphid on grain sorghum. **David L. Kerns** (dkerns@agcenter.lsu.edu)1, Michael Brewer2, Robert Bowling3, and Mayra Aviles Gonzalez4, 1Louisiana State Univ., Winnsboro, LA, 2Texas A&M AgriLife Research, Corpus Christi, TX, 3Texas A&M AgriLife Extension Service, Corpus Christi, TX, 4Autonomous Univ. of Sinaloa, Costa Rica, Mexico

2:15 **0485** Case study 3: *Tuta absoluta* — field management and history of the invasion in southern Europe. **Antonio Monserrat** (antonio.monserrat@carm.es)1,  
M. Andreu Ortin2, and A. Castano Villar2, 1IMIDA,

La Alberca-Murcia, Spain, 2Ministry of Agriculture and Water of the Region of Murcia, Murcia, Spain

2:30 **0486** Case study 4: *Tuta absoluta* — insecticide resistance management of this invasive species.  
**Pablo Bielza** (pablo.bielza@upct.es), Lidia Garcia-Vidal, and M. Martinez-Aguirre, Polytechnic Univ., Cartagena, Spain

2:45 **0487** Case study 5: *Helicoverpa armigera* — field management and history of invasion in Brazil. Paulo Degrande1 and **Celso Omoto** (celso.omoto@usp.br)2, 1Federal Univ. of Grande Dourados, Dourados, Brazil, 2Univ. of São Paulo, Piracicaba, Brazil

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**MONDAY**

**Monday, September 26 • MORNING/AFTERNOON •**

**3:00 BREAK**

3:15 **0488** Case study 6: Managing neonicotinoid target site resistant *Myzus persicae* (Sulzer) and *Aphis gossypii* Glover in Europe and South Korea.  
**Maria Torne** (mtorne@dow.com)1, Luis E. Gomez2, Imre Mezei3, Raquel Abad Moyano1, Jee Yi4, and  
Pablo Bielza5, 1Dow AgroSciences, Madrid, Spain,  
2Dow AgroSciences, Indianapolis, IN, 3Dow AgroSciences, Budapest, Hungary, 4Dow AgroSciences, Seoul, South Korea, 5Polytechnic Univ., Cartagena, Spain

3:30 **0489** Case study 7: Sweet potato whitefly (*Bemisia tabaci*) in high value crops from Central America and Mexico. **Mariana Lastres Schindler** (lorenalastres@ yahoo.es)1, Mayra Aviles Gonzalez2, Eswin Castañeda3, and Leonel Aviles4, 1Independent Consultant, Choluteca, Honduras, 2Autonomous Univ. of Sinaloa, Costa Rica, Mexico, 3Dow AgroSciences, Mixco, Guatemala, 4Dow AgroSciences, Culiacan, Mexico

3:45 **0490** Case study 8: Managing the challenges of the Asian citrus psyllid*, Diaphorina citri,* vector of the huanglongbing in Florida citrus: A mix of conventional and non-conventional approaches. **Harold Browning** (hwbr@citrusrdf.org), Univ. of Florida, Lake Alfred, FL

4:00 **0491** Emergency use authorizations — how regulators can help growers. **Nick Simmons** (nsimmons2@dow.com)1, Paulo Milanezi2, Valdirene Reno2, Sheridawn Schoeman3, and Jamey Thomas1, 1Dow AgroSciences, Indianapolis, IN, 2Dow AgroSciences, São Paulo, Brazil, 3Dow Agro- Sciences, Hitchin, United Kingdom

4:15 **0492** Pooling global resources to address regulatory requirements for managing emerging insect pests: A global approach for minor uses. **Daniel Kunkel** (kunkel@aesop.rutgers.edu), Keith Dorschner,

Bill Barney, and Jerry Baron, IR-4 Project, Princeton, NJ

**Symposium: Profiles of Forest Pests Ready to Cross Borders and Invade New Areas**

***Room W224 A (Convention Center)***

**Moderators and Organizers:** Melody A. Keena1, Alain Roques2, and Yuri Baranchikov3, 1USDA - Forest Service, Hamden, CT, 2INRA, Orléans, France, 3Siberian Branch of Russian Academy of Sciences, Krasnoyarsk, Russia

1:30 **0493** Nun moth, *Lymantria monacha* (Lepidoptera: Erebidae). **Melody A. Keena** (mkeena@fs.fed.us), USDA - Forest Service, Hamden, CT

1:45 **0494** Siberian moth, *Dendrolimus sibiricus* (Lepidoptera: Lasiocampidae). **Yuri Baranchikov** (baranchikov\_yuri@yahoo.com), Siberian Branch of Russian Academy of Sciences, Krasnoyarsk, Russia

2:00 **0495** Pine processionary moth, *Thaumetopoea pityoccampa* (Lepidoptera: Notodontidae). **Alain Roques** (alain.roques@orleans.inra.fr), Jérôme Rousselet, and Christelle Robinet, INRA, Orléans, France

2:15 **0496** Emerald ash borer, *Agrilus planipennis* (Coleoptera: Buprestidae). **Therese Poland** (tpoland@ fs.fed.us)1, Deborah G. McCullough2, and Leah S. Bauer1, 1USDA - Forest Service, Lansing, MI, 2Michigan State Univ., East Lansing, MI

2:30 **0497** Spotted lanternfly, *Lycorma delicatula* (Hemiptera: Fulgoridae). **Lawrence Barringer** (lbarringer@pa.gov), Bureau of Plant Industry, Harrisburg, PA

2:45 **0498** Mountain pine beetle, *Dendroctonus ponderosae* (Coleoptera: Curculionidae). **Christopher J. Fettig** (cfettig@fs.fed.us), USDA - Forest Service, Davis, CA

**3:00 BREAK**

3:15 **0499** European spruce bark beetle, *Ips typographus* (Coleoptera: Curculionidae). **Martin Schroeder** (martin.schroeder@slu.se)1 and Bjørn Økland2, 1Swedish Univ. of Agricultural Sciences, Uppsala, Sweden, 2Norwegian Institute of Bioeconomy Research, Ås, Norway

3:30 **0500** Four-eyed fir bark beetle, *Polygraphus proximus* (Coleoptera: Curculionidae). **Ivan Kerchev** (ikea86@mail.ru), Russian Academy of Sciences, Tomsk, Russia

3:45 **0501** Pine sawyer beetle, *Monochamus galloprovincialis* (Coleoptera: Cerambycidae). **Géraldine Roux** (geraldine.roux@orleans.inra.fr), Julien Haran, Alain Roques, and Christelle Robinet, INRA, Orléans, France

4:00 **0502** Western conifer seed bug, *Leptoglossus occidentalis* (Hemiptera: Coreidae). **Marie-Anne Auger-Rozenberg** (marie-anne.auger-rozenberg@ orleans.inra.fr)1, Vincent Lesieur2, Ana Farinha3, and Alain Roques1, 1INRA, Orléans, France, 2USDA - ARS, Montferrier-sur-Lez, France, 3Univ. of Lisbon, Lisbon, Portugal

4:15 **0503** Citrus longhorned beetle, *Anoplophora chinensis* (Coleoptera: Cerambycidae). **Jacob D. Wickham** (wickham@iccas.ac.cn), Chinese Academy of Sciences, Zhongguancun, China

4:30 **0504** Bronze birch borer, *Agrilus anxius* (Coleoptera: Buprestidae). **Claire E. Rutledge** (claire.rutledge@ ct.gov), Connecticut Agricultural Experiment Station, New Haven, CT

**SD0505** Asian longhorned beetle, *Anoplophora glabripennis* (Coleoptera: Cerambycidae). **Maya Nehme** (mnehme@ lri-lb.org)1, Peter S. Meng2, Kelli Hoover2, and  
Melody A. Keena3, 1American Univ., Beirut, Lebanon, 2Pennsylvania State Univ., University Park, PA, 3USDA - Forest Service, Hamden, CT

**SD0506** Gypsy moth, *Lymantria dispar* (Lepidoptera: Erebidae). **Steve Munson** (smunson@fs.fed.us)1, Victor Mastro2, and William Wesela3, 1USDA - Forest Service, Ogden, UT, 2USDA - APHIS, Buzzards Bay, MA, 3USDA - APHIS, Riverdale, MD

**SD0507** Namangan longhorned beetle, *Xylotrechus namanganensis* (Coleoptera: Cerambycidae). **Adil Sattar** (adl1968@126.com), Xinjiang Agricultural Univ., Urumqi, China

**SD0508** Sirexwoodwasp,*Sirexnoctilio*(Hymenoptera:Siricidae). **Stephanie Sopow** (stephanie.sopow@scionresearch. com)1, Cecilia Romo2, and John Bain3, 1Scion, Rotorua, New Zealand, 2Scion, Christchurch, New Zealand, 3Springfield Associates, Rotorua, New Zealand



4:45 **Discussion and Poster Session** ICE 2016 XXV International Congress of Entomology | September 25–30 | Orlando, Florida

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**MONDAY**

**Monday, September 26 • AFTERNOON •**

**Symposium: Insights into the Biology of Wild and Managed Native Bees**

***Room W224 C (Convention Center)***

**Moderators and Organizers:** Hollis Woodard1, Quinn McFrederick1, and Theresa L. Pitts-Singer2, 1Univ. of California, Riverside, CA, 2USDA - ARS, Logan, UT

1:30 **0509** Pesticide impacts on bees: From individual behaviour to pollination services. **Nigel E. Raine** (nraine@uoguelph.ca)1, Gemma Baron2, Richard Gill3, Karen Smith2, and Dara Stanley2,4, 1Univ. of Guelph, Guelph, ON, Canada, 2Royal Holloway, Univ. of London, Egham, United Kingdom, 3Imperial College London, Ascot, United Kingdom, 4National Univ. of Ireland, Galway, Ireland

1:45 **0510** Bee foraging patterns across dynamic resource landscapes. **Shalene Jha** (sjha@austin.utexas.edu) and Nathaniel Pope, The Univ. of Texas, Austin, TX

2:00 **0511** Understanding land-use drivers of pollinator community composition in an agricultural lanscape. **Sarah Cusser** (sarah.cusser@gmail.com) and Shalene Jha, The Univ. of Texas, Austin, TX

2:15 **0512** Mason bee pollination in Switzerland — Recent successes and future challenges. **Claudio Sedivy** (c.sedivy@wildbieneundpartner.ch), Wildbiene + Partner, Ltd., Switzerland

2:30 **0513** Temperature effects on the development  
and emergence of *Osmia* bees: Implications for their management as orchard pollinators. **Jordi Bosch** (jordi.bosch@uab.es)1, William Kemp2, and Fabio Sgolastra3, 1Autonomous Univ. of Barcelona, Bellaterra, Spain, 2USDA - ARS, Fargo, ND, 3Univ. of Bologna, Bologna, Italy

2:45 **0514** Dietary pollen needs of adult female solitary bees for reproduction. **James H. Cane** (jim.cane@ars. usda.gov), USDA - ARS, Logan, UT

**3:00 BREAK**

3:15 **0515** Potential use of Brazilian native bees for crop pollination. **Breno Freitas** (freitas@ufc.br), Federal Univ. of Ceará, Fortaleza, Brazil

3:30 **0516** Pollinating California almonds with *Osmia lignaria*, the blue orchard bee. **Theresa L. Pitts-Singer** (theresa.pitts-singer@ars.usda.gov), USDA - ARS, Logan, UT

3:45 **0517** Bee community restoration and maintenance: Assessing differences in nesting to better understand bee diversity. **Alexandra Harmon-Threatt** (aht@illinois. edu), Univ. of Illinois, Champaign, IL

4:00 **0518** Measuring partner choice in plant — pollinator networks: Separating “rewiring” and “fidelity” from chance with a null model approach. **Mark Genung** (mark.a.genung@rutgers.edu), Rachael Winfree, and Molly MacLeod, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

4:15 **0519** Evaluating native perennial flowering strips for enhancing native bees and pollination services on farmlands in Montana. **Casey Delphia** (casey.delphia@ montana.edu), Laura Burkle, and Kevin O’Neill, Montana State Univ., Bozeman, MT

4:30 **0520** Red Listing America’s bumble bees: Status  
and trends among *Bombus* spp. in the Western Hemisphere. **Rich Hatfield** (rich@xerces.org)1,  
Sheila R. Colla2, Sarina Jepsen1, Leif Richardson3, Robbin W. Thorp4, Paul Williams5, Marina Arbetman6, Michelle A. Duennes7, Natalia Escobedo-Kenefic8, Elaine Evans9, Sarah Foltz-Jordan1, Aline Martins10, Oscar Martínez11, Jorge Merida11, Jose Montalva12, Carolina Morales13, Esteban Pineda11, Claus Rasmussen14, Philippe Sagot11, Yamila Sasal13, Remy Vandame11, and Soledad Villamil15, 1The Xerces Society for Invertebrate Conservation, Portland, OR, 2York Univ., Toronto, ON, Canada, 3Univ. of Vermont, Burlington, VT, 4Univ. of California, Davis, CA, 5The Natural History Museum, London, United Kingdom, 6National Univ. of Comahue, Neuquén, Argentina, 7Univ. of California, Riverside, CA, 8San Carlos Univ. of Guatemala, Guatemala, 9Univ. of Minnesota, St. Paul, MN, 10Federal Univ. of Paraná, Brazil, 11The College of the Southern Border, San Cristóbal de las Casas, Mexico, 12Salvemos Nuestro Abejorro, Chile, 13National Univ. of Comahue, Argentina, 14Aarhus Univ., Aarhus, Denmark, 15National Univ. of Sur, BahíasBlanca, Argentina

4:45 **0521** Effects of urbanization on pathogens levels and immune function of native bees. **Margarita López-Uribe** (mmlopezu@ncsu.edu), Rob R. Dunn, Steven Frank, and David Tarpy, North Carolina State Univ., Raleigh, NC

5:00 **0522** Seasonal patterns of resource abundance and parasitism influence bumblebee (*Bombus impatiens*) colony success. **Rosemary Malfi** (rlmalfi@ucdavis. edu)1, Jonathan Walter2, and T’ai Roulston3, 1Univ. of California, Davis, CA, 2Virginia Commonwealth Univ., Richmond, VA, 3Univ. of Virginia, Boyce, VA

5:15 **0523** Genetic susceptibility of wild bees to parasite infection? **Peter Graystock** (peter@graystock.info)1, Quinn McFrederick1, Claire Carvell2, Andrew Bourke3, Matt Heard2, Mark Beaumont4, and Seirian Sumner4, 1Univ. of California, Riverside, CA, 2National Environment Research Council, Oxfordshire, United Kingdom, 3Univ. of East Anglia, Norwich, United Kingdom, 4Univ. of Bristol, Bristol, United Kingdom

**Symposium: In Honor of Past ESA President Donald L. McLean: Electropenetrography (EPG) Without Borders: Plant Pathogen Vector Re- search Inspiring Novel Animal Disease Studies**

***West Hall F3 (WF3) (Convention Center)***

**Moderators and Organizers:** Elaine Backus1 and Andrew Li2, 1USDA - ARS, Parlier, CA, 2USDA - ARS, Beltsville, MD

1:30 **0524** How electropenetrography (EPG) can benefit animal-disease vector research: Overview of EPG history, principles, and applications. **Elaine Backus** (elaine.backus@ars.usda.gov), USDA - ARS, Parlier, CA

2:00 **0525** Identifying the mechanism of transmission of *Xylella fastidiosa* by sharpshooters via EPG research. **Holly Shugart** (hshugart@ufl.edu)1 and Elaine Backus2, 1Univ. of Florida, Lake Alfred, FL, 2USDA - ARS, Parlier, CA

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**MONDAY**

**Monday, September 26 • AFTERNOON •**

2:15 **0526** Aphid feeding activities linked to non-circulative virus transmission. **Jeffrey A. Davis** (jeffdavis@ agcenter.lsu.edu)1, Everlyne Wosula2, and Christopher Clark3, 1Louisiana State Univ. AgCenter, Baton Rouge, LA, 2Univ. of Nebraska, Lincoln, NE, 3Louisiana State Univ., Baton Rouge, LA

2:30 **0527** Sand fly feeding physiology and potential for breakthroughs using electropenetrography. **Justin Talley** (justin.talley@okstate.edu) and Astri Wayadande, Oklahoma State Univ., Stillwater, OK

2:45 **0528** Modification of thrips feeding behaviors by tomato spotted wilt virus. **Diane E. Ullman** (deullman@ ucdavis.edu) and Candice Stafford-Banks, Univ. of California, Davis, CA

* **SD0529**A2EPG: New pattern recognition software for rapid analysis of electropenetrograms to study stylet probing behavior of aphids. **Francisco Adasme-Carreño** (francisco.adasme@gmail.com), Camila Muñoz-Gutieìrrez, Josselyn Salinas-Cornejo, and Claudio Ramirez, Univ. of Talca, Talca, Chile
* **SD0530**Laser surgery of cornicles of the brown citrus aphid, *Toxoptera citricida* (Kirk), alters their fitness and stylet probing behavior. **Serine Alfaress** (serine@ufl.edu), Timothy Ebert, Michael Rogers, and Nabil Killiny, Univ. of Florida, Lake Alfred, FL
* **SD0531**Methods of correlating electropenetrography waveform data to hemipteran probing behavior and pathogen transmission. **Eldesouky Ammar** (eldammar@hotmail. com)1, Holly Shugart2, Michael Rogers2, David Hall1, and Robert Shatters1, 1USDA - ARS, Ft. Pierce, FL, 2Univ. of Florida, Lake Alfred, FL
* **SD0532**Below-ground sweet potato storage root herbivory by *Cylas formicarius* alters above-ground *Myzus persicae* stylet probing behavior and population dynamics.  
  **Jie Chen** (jchen31@lsu.edu), Jeffrey Davis, Julien Beuzelin, and Michael Stout, Louisiana State Univ. AgCenter, Baton Rouge, LA
* **SD0533**Capabilities of the new “Universal” AC-DC monitor for electropenetrography (EPG). **Andrew Dowell** (andygator3@ gmail.com)1, Elaine Backus2, Felix Cervantes2, Jane Todd3, and Margaret (Peg) Redinbaugh3, 1EPG Technologies, Inc., Gainesville, FL, 2USDA - ARS, Parlier, CA, 3USDA - ARS, Wooster, OH
* **SD0534**High applied voltage during electropenetrography has no effect on stylet probing in *Diaphorina citri* (Hemiptera: Liviidae): Should we be surprised? **Timothy Ebert** (tebert@ufl.edu) and Michael Rogers, Univ. of Florida, Lake Alfred, FL
* **SD0535**Evaluation of novel aphid resistance genes in black raspberry using electropenetrography. Danielle Lightle1, Michael Dossett2, Chad Finn3 and **Jana Lee** (jana.lee@ ars.usda.gov)3, 1Univ. of California, Orland, CA, 2Agriculture and Agri-Food Canada, Agassiz, BC, Canada, 3USDA - ARS, Corvallis, OR
* **SD0536**Assessing the effects of temperature on stylet probing behaviors of the potato psyllid, *Bactericera cock- erelli*, and transmission of ‘*Candidatus* Liberibacter solanacearum’, using EPG technology. **Tariq Mustafa** (tariq.mustafa@wsu.edu), Christian Carlos, and Joseph Munyaneza, USDA - ARS, Wapato, WA

**SD0537** EPG as a tool to unravel the unusual stylet penetration behavior of a galling aphid. **Sophie Pointeau** (sophie. pointeau@laposte.net)1, France Dardeau1, Stephanie Bankhead-Dronnet1, Anas Cherqui2, François Lieutier1, Arnaud Ameline2, and Aurelien Salle1, 1Univ. of Orléans, Orléans, France, 2Univ. of Picardie Jules Verne, Amiens, France

**SD0538** Stylet probing behaviors of the invasive kudzu bug, *Megacopta cribraria,* using electropenetrography. **Francesca Stubbins** (sstubbi@clemson.edu)1,  
Paula Mitchell2, Francis Reay-Jones3, and Jeremy Greene1, 1Clemson Univ., Blackville, SC, 2Winthrop Univ., Rock Hill, SC, 3Clemson Univ., Florence, SC

**SD0539** Electropenetrography of leafhoppers (Hemiptera: Cicadellidae) feeding on cultivated grapevines.  
**Charles Vincent** (charles.vincent@agr.gc.ca)1,  
Philippe Giordanengo2, Pierre Lemoyne1,  
Chrystel Olivier3, Jacques Lasnier4, Yves Mauffette5, and Julien Saguez6, 1Agriculture and Agri-Food  
Canada, Saint-Jean-sur-Richelieu, QC, Canada, 2Univ. of Picardie Jules Verne, Amiens, France, 3Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, 4Ag-Cord, Inc., Granby, QC, Canada, 5Univ. of Québec, Montréal, QC, Canada, 6Entomological Society of Québec, Saint-Jean-sur-Richelieu, QC, Canada

**3:00 BREAK & POSTER SESSION**

3:15 **0540** Biting the hand that feeds you: Mosquito stylet-probing behavior revealed by EPG.  
**Astri Wayadande** (a.wayadande@okstate.edu) and Bruce Noden, Oklahoma State Univ., Stillwater, OK

3:30 **0541** Characterization of *Lygus* spp. feeding behavior on cotton using EPG and histology. **Felix Cervantes** (felix.cervantes@ars.usda.gov), USDA - ARS, Parlier, CA

3:45 **0542** EPG (electropenetrography) studies with neotropical pentatomids: Waveforms and feeding sites. **Tiago Lucini** (tiago\_lucini@hotmail.com)1 and Antônio Panizzi2, 1Federal Univ. of Paraná, Curitiba, Brazil, 2National Wheat Research Center, Passo Fundo, Brazil

4:00 **0543** Chemical ecology of virus-infected Brassicaceae and impact on aphid vector feeding and colonization. **Arnaud Ameline** (arnaud.ameline@u-picardie.fr), Quentin Chesnais, D. Halter, Q. Fouche, Anas Cherqui, Aude Couty, P. Hugueney, V. Ziegler Graff, and Veronique Brault, Univ. of Picardie Jules Verne, Amiens, France

4:15 **0544** EPG applications in studies of chemical ecology and interactions among *Bemisia tabaci*, *Cucurbit chlorotic* yellows virus, and cucumber. **Feng-Ming Yan** (fmyan@henau.edu.cn), Jing-Jing Li, Shao-Hua Lu, Xue-Li Wang, and Xiang-Zhi Liang, Henan Agricultural Univ., Zhengzhou, China

4:30 **0545** EPG as a tool for improving management of an insect-associated plant pathogen: Asian citrus psyllid and huanglongbing. **Michael Rogers** (mrgrs@ufl.edu)1, Timothy Ebert1, and Rosana Serikawa2, 1Univ. of Florida, Lake Alfred, FL, 2DuPont do Brazil S.A., Ferro, Brazil

4:45 **0546** Use of EMG, EPG, and *in vitro* tick feeding systems to study mechanisms of blood feeding and effects of acaricides and pharmacological agents on blood feeding in ixodid ticks. **Andrew Li** (andrew.li@ars. usda.gov), USDA - ARS, Beltsville, MD

5:00 **Panel Discussion**  
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**MONDAY**

**Monday, September 26 • AFTERNOON •**

**Symposium: Biodiversity, Distribution, Behavior, and Activity of Forensically Important Entomofauna and Microbiota in Different Ecoregions**

***Room W224 D (Convention Center)***

**Moderators and Organizers:** M. Denise Gemmellaro, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

1:30 **0547** Diversity and seasonality of entomofauna succession on decomposing pigs *(Sus scrofa* Linn*.*) in two biogeoclimatic zones of Nigeria. **Isaac Adeyemi** (winitel@yahoo.co.uk), River State Univ. of Science and Technology, Port Harcourt, Nigeria

1:45 **0548** A comparison of blow fly abundance and oviposition on carrion exposed in woodlots and cornfields? **Rebecca Stock** (becajstock@yahoo.co.uk), Saint Joseph’s College, Rensselaer, IN

2:00 **0549** Seasonal and geographic variation in biodiversity of forensically important blowflies (Diptera: Calliphoridae) in New Jersey, USA. **Lauren M. Weidner** (laurenmweidner@gmail.com), Purdue Univ., West Lafayette, IN

2:15 **0550** First survey of forensically important insects in Sicily with a particular focus on volcanic caves.  
**M. Denise Gemmellaro** (denise.gemmellaro@rutgers. edu)1, Claudia Maria Sollami2, Carmelo Bucolo3,

Elisa Musumeci3, and Lauren M. Weidner4, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2Univ. Consortium, Caltanissetta, Italy, 3Gruppo Grotte Catania del Club Alpino Italiano Sezione dell’Etna, Catania, Italy, 4Purdue Univ., West Lafayette, IN

2:30 **0551** Effect of temperature on development of *Lucilia sericata* (Meigen) (Diptera: Calliphoridae) and its forensic application in Korea. **Sang Shin** (shinfbr@nate. com), Ji Hye Park, Su Jeong Jeon, Kwang Soo Ko, and Seong Hwan Park, Korea Univ., Seoul, South Korea

2:45 **0552** Electrophysiological responses of *Chrysomya rufifacies* (Diptera: Calliphoridae) to active volatile organic compounds released by human decomposition. **Stephanie Kolodij** (helene.leblanc@uoit.ca) and Helene N. LeBlanc, Univ. of Ontario, Oshawa, ON, Canada

**3:00 BREAK**

3:15 **0553** Interaction of abiotic and biotic mechanisms influence blow fly coexistence on carrion patches.

**Sherah VanLaerhoven** (vanlaerh@uwindsor.ca), Vincenzo A. Pacheco, and Krystal R. Hans, Univ. of Windsor, Windsor, ON, Canada

3:30 **0554** Nested biodiversity: The importance of the insect microbiome in carrion food webs and implications for the forensic sciences. **Courtney Watherbee** (weath108@msu.edu), Jennifer L. Pechal, Courtney Larson, McKinley Brewer, and M. Eric Benbow, Michigan State Univ., East Lansing, MI

3:45 **0555** Megadiversity gets into the CSI room: Barcoding forensically important flies in Ecuador. **Emilia Moreno** (emiliamorenoc@gmail.com)1, David Donoso2, and Alvaro Barragán1, 1Pontifical Catholic Univ., Quito, Ecuador, 2Univ. of Cuenca, Cuenca, Ecuador

4:00 **0556** Molecular ecology in forensic entomology. **Meaghan Pimsler** (mlpimsler@gmail.com), Univ. of Alabama, Tuscaloosa, AL

4:15 **0557** Genetic variation in blow fly life history traits. **Aaron Tarone** (amtarone@ag.tamu.edu), Texas A&M Univ., College Station, TX

4:30 **0558** Blow fly genomics: Past, present, and future. **Christine Picard** (cpicard@iupui.edu), Indiana Univ.-Purdue Univ., Indianapolis, IN

4:45 **0559** Spatio-temporal and sampling effects on carrion insect communities: Considerations for generating a large forensic dataset. **Anne Perez** (aperez2@saintjoe.edu), Saint Joseph’s College, Rensselaer, IN

5:00 **0560** The role of a PMI-prediction model in evaluating forensic entomology experimental design, the importance of covariates, and the utility of response variables for estimating time since death. **Jeffrey Wells** (jedwell@fiu.edu), Florida International Univ., Miami, FL

**Symposium: Building the Biodiversity Knowledge Graph for Insects - Components, Progress, and Challenges**

***West Hall F4 (WF4) (Convention Center)***

**Moderators and Organizers:** Nico Franz1 and Katja C. Seltmann2, 1Arizona State Univ., Tempe, AZ, 2Univ. of California, Santa Barbara, CA

1:30 **0561** Towards a global virtual natural history collection: GBIF and access to entomological specimens. **Donald Hobern** (dhobern@gbif.org), Global Biodiversity Information Facility, Copenhagen, Denmark

1:45 **0562** Biodiversity informatics at the Instituto de Ciencias Naturales: Experiences and perspectives from a megadiverse Latin American country. **Lauren Raz** (lraz.icn@gmail.com), National Univ. of Colombia, Bogotä, Colombia

2:00 **0563** Entomological outputs from The Natural History Museum (NHM) digitization programme. **Vincent Smith** (vince@vsmith.info), The Natural History Museum, London, United Kingdom

2:15 **0564** Biodiversity storytelling through digitization: Highlighting institution-based research. **Vaughn Shirey** (vmshirey@gmail.com), Drexel Univ., Philadelphia, PA

2:30 **0565** Extracting linked open data from taxonomic publications. **Terry Catapano** (catapanoth@gmail.com), New York, NY

2:45 **0566** Mobilizing historical literature and specimen data to study host plant associations in weevils (Curculionoidea). **Guanyang Zhang** (guanyang.zhang@ asu.edu), Natalia Rahman, Sean Noudali, and Nico Franz, Arizona State Univ., Tempe, AZ

**3:00 BREAK**

3:15 **0567** TraitBank: An open digital repository for organism traits. **Katja Schulz** (schulzk@si.edu), Jennifer Hammock, and Sarah Miller, Smithsonian Institution National Museum of Natural History, Washington, DC

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**MONDAY**

**Monday, September 26 • AFTERNOON •**

3:30 **0568** From catalogs to phenotypes: The evolution and current status of TaxonWorks with emphasis on its utility for entomologists. **Matthew J. Yoder** (diapriid@ gmail.com), Univ. of Illinois, Champaign, IL

3:45 **0569** Addressing the name:meaning drift challenge in open-ended biodiversity information environments. **Nico Franz** (nico.franz@asu.edu)1, Salvatore S. Anzaldo1, Edward Gilbert1, Michael Andrew Jansen1,

M. Andrew Johnston1, and Bertram Ludäscher2, 1Arizona State Univ., Tempe, AZ, 2Univ. of Illinois, Champaign, IL

4:00 **0570** Genomic tools for all entomologists: aTRAM and its use in insect phylogenomics. **Julie Allen** (juliema@illinois.edu)1, Kevin P. Johnson1, and  
Bret M. Boyd2, 1Univ. of Illinois, Champaign, IL, 2Univ. of Florida, Gainesville, FL

4:15 **0571** Natural history collections in support of conservation and ecological restoration.  
**Katja C. Seltmann** (seltmann@ccber.ucsb.edu),  
Lisa Stratton, and Mireia Beas-Moix, Univ. of California, Santa Barbara, CA

4:30 **0572** Exploring patterns of darkling beetle distributions in the genus *Eleodes* (Coleoptera: Tenebrionidae), from the specimen up.

**M. Andrew Johnston** (ajohnston@asu.edu) and Edward Gilbert, Arizona State Univ., Tempe, AZ

4:45 **Discussion**

**Symposium: Data without Borders: Collecting, Digitizing, Using, and Re-using Biological Specimen Data**

***Room W224 E (Convention Center)***

**Moderators and Organizers:** Deborah Paul1, Pamela Soltis2,3, Paul Flemons4, and Nicole Fisher5, 1Integrated Digitized Biological Collections (iDigBio), Tallahassee, FL, 2Integrated Digitized Biological Collections (iDigBio), Gainesville, FL, 3Univ. of Florida, Gainesville, FL, 4Atlas of Living Australia, Sydney, Australia, 5Australian National Insect Collection, Canberra, Australia

1:30 **0573** Specimen data in integrated biodiversity research. **Pamela Soltis** (psoltis@flmnh.ufl.edu), Integrated Digitized Biological Collections (iDigBio), Gainesville, FL

1:45 **0574** Like blood from that stone we always hear about: A quest to extract meaningful data from historical grasshopper specimens. **Derek Woller** (asilid@gmail.com) and Hojun Song, Texas A&M Univ., College Station, TX

2:00 **0575** Acquisition, management, and analysis of historical and contemporary data to discern legacy effects of ecological extinction on insect biodiversity. **Robert Kula** (robert.kula@ars.usda.gov)1, John Lill2, Eugenio Nearns3, and Harmony Dalgleish4, 1USDA - ARS, Washington, DC, 2The George Washington Univ., Washington, DC, 3Purdue Univ., West Lafayette, IN, 4College of William and Mary, Williamsburg, VA

2:15 **0576** Using digital natural history collection specimen data to investigate the future of bee conservation. **Jonathan Koch** (jonathan.b.koch@gmail. com)1, Joan M. Meiners2, and Amber D. Tripodi3, 1Univ. of Hawai’i, Hilo, HI, 2Univ. of Florida, Gainesville, FL, 3USDA - ARS, Logan, UT

2:30 **0577** Viewing specimen data through the prism of collection events: Benefits of a collecting event first approach. **Sarah Schmits** (scschmits@ku.edu) and Andrew Short, Univ. of Kansas, Lawrence, KS

2:45 **0578** The usefulness of DNA-barcoding databases for routine taxonomic research and identification of Lepidoptera. **Andrei Sourakov** (asourakov@flmnh.ufl. edu), Univ. of Florida, Gainesville, FL

**3:00 BREAK**

3:15 **0579** The intersection of data domains underlying insect systematics: Case studies in parasitic Hymenoptera. **Norman Johnson** (johnson.2@osu.edu), The Ohio State Univ., Columbus, OH

3:30 **0580** Preventing bugs in data analysis: Data skills  
to improve the reliability and effectiveness of entomological research. **Tracy Teal** (tkteal@datacarpentry. org), Univ. of California, Davis, CA

3:45 **0581** Developing best practices for data management across all stages of the data life cycle. **Amber Budden** (aebudden@dataone.unm.edu), DataONE, Albuquerque, NM

4:00 **0582** Data capture methodologies in digitisation of bee pollinators. **Nicole Fisher** (nicole.fisher@csiro.au), Australian National Insect Collection, Canberra, Australia

4:15 **0583** Arthropod collection digitization and networking across the new world. **Neil Cobb** (neil.cobb@nau.edu)1, Edward Gilbert2, Nico Franz2 and Katja C. Seltmann3, 1Northern Arizona Univ., Flagstaff, AZ, 2Arizona State Univ., Tempe, AZ, 3Univ. of California, Santa Barbara, CA

4:30 **0584** Database before you label — the key to a digitized collections future. **Derek S. Sikes** (dssikes@ alaska.edu), Univ. of Alaska, Fairbanks, AK

4:45 **0585** Troubleshooting industrial insect digitisation. **Vladimir Blagoderov** (vlab@nhm.ac.uk) and Laurence Livermore, The Natural History Museum, London, United Kingdom

5:00 **0586** DAMmed if you do or don’t: Life cycles of digital assets. **Lawrence Gall** (lawrence.gall@yale.edu), Yale Univ., New Haven, CT

5:15 **0587** Involving undergraduates in the digital community: Leveraging collections preservation, research, and outreach through a network of natural history collections clubs. **Kari Harris** (kari.panhorst@ smail.astate.edu), Arkansas State Univ., Jonesboro, AR



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**MONDAY**

**Monday, September 26 • AFTERNOON •**

**Symposium: From Diet Breadth to Diversification: Understanding Host Shifts in Phytophagous Insects**

***Room W340 B (Convention Center)***

**Moderators and Organizers:** Peri Mason1, Angela Smilanich2, and M. Deane Bowers1, 1Univ. of Colorado, Boulder, CO, 2Univ. of Nevada, Reno, NV

1:30 **0588** Phytophagous insects: Adaptation, constraint, and diversity. **Douglas J. Futuyma** (douglas.futuyma@ stonybrook.edu), Stony Brook Univ., Stony Brook, NY

2:00 **0589** Ecological factors promoting host shifts in  
the silver-spotted skipper. **Martha Weiss** (weissm@ georgetown.edu)1, John Lill2, and Eric Lind3, 1Georgetown Univ., Washington, DC, 2The George Washington Univ., Washington, DC, 3Univ. of Minnesota, St. Paul, MN

2:15 **0590** Insects do not colonize Latin binomials: Exploring contingency, intraspecific variation, and multi-species interactions with *Lycaeides melissa* (Lepidoptera: Lycaenidae) and Great Basin host plants. **Matthew L. Forister** (mforister@unr.edu)1,

Joshua Harrison1, Su’ad Yoon1, Alex Buerkle2,  
James A. Fordyce3, Zachariah Gompert2, Lauren Lucas4, and Chris Nice5, 1Univ. of Nevada, Reno, NV, 2Univ. of Wyoming, Laramie, WY, 3Univ. of Tennessee, Knoxville, TN, 4Utah State Univ., Logan, UT, 5Texas State Univ., San Marcos, TX

2:30 **0591** Host range expansion and the insect immune response. **Angela Smilanich** (asmilanich@unr.edu)1, Peri Mason2, Carmen Mo1, Nadya Muchoney1,  
Tara Langus1, Su’ad Yoon1, and M. Deane Bowers2, 1Univ. of Nevada, Reno, NV, 2Univ. of Colorado, Boulder, CO

2:45 **0592** Do gut microbiota mediate host shifts in leaf-feeding caterpillars? **Tobin Hammer** (tobin.hammer@ colorado.edu), Univ. of Colorado, Boulder, CO

**3:00 BREAK**

3:15 **0593** Host shifts and the geographic mosaic of coevolution. **Timothy P. Craig** (tcraig@d.umn.edu), Univ. of Minnesota, Duluth, MN

3:30 **0594** Predicting novel interactions between plants and herbivorous insects. **Ian S. Pearse** (ianspearse@ gmail.com)1 and Florian Altermatt2, 1Illinois Natural History Survey, Champaign, IL, 2Eawag, Dübendorf, Switzerland

3:45 **0595** Resolving the parasite paradox: Ecological fitting facilitates host switching in sloppy fitness space. **Salvatore Agosta** (sagosta@vcu.edu), Virginia Commonwealth Univ., Richmond, VA

4:00 **0596** Does variation in host traits promote host shifting and diversification in goldenrod-insect communities? **Chandra Moffat** (chandra.moffat@gmail. com) and Stephen Heard, Univ. of New Brunswick, Fredericton, NB, Canada

4:15 **0597** The plastic bridge hypothesis: Does plant plasticity promote host shifts in phytophagous insects? **Peri Mason** (peri.mason@colorado.edu), Univ. of Colorado, Boulder, CO

4:30 **0598** Host use evolves and affects taxonomic diversification differently across plant-feeding insects. **Nate Hardy** (nbhardy@gmail.com), Auburn Univ., Auburn, AL

4:45 **0599** Repeatability of host-associated genetic divergence in plant-feeding insects. **Tommi Nyman** (tommi.nyman@uef.fi)1, Sanna Leppänen1, Kaisa Värri2, and Tobias Malm3, 1Univ. of Eastern Finland, Joensuu, Finland, 2Univ. of Eastern Finland, Kuopio, Finland, 3Swedish Museum of Natural History, Stockholm, Sweden

5:00 **0600** Host breadth, host shifts, and herbivore diversification. **James Fordyce** (battusboy@gmail. com)1 and Christopher Hamm2, 1Univ. of Tennessee, Knoxville, TN, 2Univ. of Kansas, Lawrence, KS

5:15 **0601** What is host range? **Niklas Janz** (niklas.janz@ zoologi.su.se), Stockholm Univ., Stockholm, Sweden

**Symposium: Biological Control of the Invasive Brown Marmorated Stink Bug, *Halyomorpha halys*, by Exotic and Native Parasitoids and Predators: A Global Perspective**

***Room W315 A (Convention Center)***

**Moderators and Organizers:** Paula Shrewsbury1 and Tim Haye2, 1Univ. of Maryland, College Park, MD, 2CABI, Delémont, Switzerland

1:30 **Panel Discussion: An introduction to *Halyomorpha halys*, an invasive global pest**

1:45 **0602** Systematics of holarctic *Trissolcus* Ashmead, natural enemies of BMSB. **Elijah Talamas** (elijah.talamas@ ars.usda.gov)1, Matthew L. Buffington1,  
Norman Johnson2, and Marie-Claude Bon3, 1USDA - ARS, Washington, DC, 2The Ohio State Univ., Columbus, OH, 3USDA - ARS, Montferrier-sur-Lez, France

2:00 **0603** Survey and impact of native natural enemies on the invasive brown marmorated stink bug, *Haly- omorpha halys*, in ornamental nurseries in the eastern United States. **Paula Shrewsbury** (pshrewsbury@umd. edu), Ashley L. Jones, Cerruti Hooks, Michael J. Raupp, and David E. Jennings, Univ. of Maryland, College Park, MD

2:15 **0604** Impact of native natural enemies on brown marmorated stink bug in eastern U.S. tree fruit and vegetable ecosystems. **James F. Walgenbach** (jim\_walgenbach@ncsu.edu) and Emily Ogburn, North Carolina State Univ., Mills River, NC

2:30 **0605** A survey of native parasitoids of *Halyomorpha halys* in Northern Italy and Switzerland. **Elena Costi** (costi.elena@yahoo.it)1, Lara Maistrello1, Marco Pansa2, Tim Haye3, and Luciana Tavella2, 1University of Modena and Reggio Emilia, Reggio Emilia, Italy, 2Univ. of Torino, Grugliasco, Italy, 3CABI, Delémont, Switzerland

2:45 **0606** *Halyomorpha halys* as an evolutionary trap: Implications for biological control. **Paul Abram** (paul-abram@hotmail.com)1, Tara Gariepy2, Tim Haye3, Victor Burte4, Guy Boivin5, and Jacques Brodeur1,

1Univ. of Montréal, Montréal, QC, Canada, 2Agriculture and Agri-Food Canada, London, ON, Canada, 3CABI, Delémont, Switzerland, 4Sophia Institute of Agrobio- technology, Sophia Antipolis, France, 5Agriculture and Agri-Food Canada, Québec, QC, Canada

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**MONDAY**

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**3:00 BREAK**

3:15 **0607** Competitive interactions of native and exotic parasitoids on *Halyomorpha halys* host eggs.  
**Joanna Konopka** (jkonopk@uwo.ca)1, Tim Haye2,  
Tara Gariepy3, Danny Poinapen1, David Holdsworth1, and Jeremy McNeil1, 1Western Univ., London, ON, Canada, 2CABI, Delémont, Switzerland, 3Agriculture and Agri-Food Canada, London, ON, Canada

3:30 **0608** What lies beyond traditional host range testing: Host choice behavior in *Trissolcus japonicus* (Hymenoptera: Scelionidae), a classical biological control agent of *Halyomorpha halys*. **Christine Dieckhoff** (christine.dieckhoff@ars.usda.gov), Kathy Tatman, and Kim A. Hoelmer, USDA - ARS, Newark, DE

3:45 **0609** Biological control of brown marmorated stink bug in California: Status and prospects. **Ricky Lara** (jlara007@ucr.edu)1, Mark S. Hoddle1, and Charles H. Pickett2, 1Univ. of California, Riverside, CA, 2California Dept. of Food and Agriculture, Sacramento, CA

4:00 **0610** Habitat specialization of exotic and native parasitoids: Complexity in biocontrol of a polyphagous, mobile host. **Megan Herlihy** (megan.herlihy@ars.usda. gov)1, Elijah Talamas2, and Donald Weber1, 1USDA - ARS, Beltsville, MD, 2USDA - ARS, Washington, DC

4:15 **0611** Using gut content analysis to identify predators of *Halyomorpha halys*. **John Pote** (pote30@gmail. com)1, Anne Nielsen1, and Dina M. Fonseca2, 1Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, 2Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

**Symposium: Status and Prospects for Biological Control in the 21st Century (IOBC)**

***Room W232 A (Convention Center)***

**Moderators and Organizers:** Russell Messing1 and Jacques Brodeur2, 1Univ. of Hawai’i, Kapaa, HI, 2Univ. of Montréal, Montréal, QC, Canada

1:30 **0612** Public perception and the loss of biocontrol cachet. **Mark Wright** (markwrig@hawaii.edu)1 and Russell Messing2, 1Univ. of Hawai’i, Honolulu, HI, 2Univ. of Hawai’i, Kapaa, HI

1:45 **0613** Biological control in a historical context: Shifting paradigms in classical biological control. **George Heimpel** (heimp001@umn.edu), Univ. of Minnesota, St. Paul, MN

2:00 **0614** Classical biological control successes and socio-economic impact: A brief history and outlook to the future. **Ulrich Kuhlmann** (u.kuhlmann@cabi.org)1 and Matthew Cock2, 1CABI, Delémont, Switzerland, 2CABI, Wallingford, United Kingdom

2:15 **0615** Augmentative biological control: We can do much better! **Joop van Lenteren** (joop.vanlenteren@ wur.nl), Wageningen Univ. and Research Centre, Wageningen, Netherlands

2:30 **0616** Biological control as a conservation tool in  
the Everglades. **Ellen C. Lake** (ellen.lake@ars.usda. gov)1, Melissa Smith1, Hillary Cooley2, LeRoy Rodgers3, and Philip Tipping1, 1USDA - ARS, Ft. Lauderdale, FL, 2National Park Service, Homestead, FL, 3South Florida Water Management District, West Palm Beach, FL

2:45 **0617** The genetics of biocontrol agents in the age of omics. **Richard Stouthamer** (richard.stouthamer@ucr. edu), Univ. of California, Riverside, CA

**3:00 BREAK**

3:15 **0618** Economic value of biological control in integrated pest management. **George Frisvold** (frisvold@cals. arizona.edu)1, Steven Naranjo2, and Peter Ellsworth3, 1Univ. of Arizona, Tucson, AZ, 2USDA - ARS, Maricopa, AZ, 3Univ. of Arizona, Maricopa, AZ

3:30 **0619** Accounting for rapid evolution in weed biocontrol agents: A step towards increasing predictability. **Linda Buergi** (buergil@onid.oregonstate. edu)1, Peter McEvoy1, and Evrim Karacetin2, 1Oregon State Univ., Corvallis, OR, 2Erciyes Univ., Kayseri, Turkey

3:45 **0620** Trading biodiversity for pest problems: The role of complex communities in reducing pests. **Jonathan Lundgren** (jgl.entomology@gmail.com)1 and Scott Fausti2, 1Ecdysis Foundation, Estelline, SD, 2South Dakota State Univ., Brookings, SD

4:00 **0621** Future directions in biological control. Jacques Brodeur1, Russell Messing2 and

**Barbara Barratt** (barbara.barratt@agresearch.co.nz)3, 1Univ. of Montréal, Montréal, QC, Canada, 2Univ. of Hawai'i, Kapaa, HI, 3AgResearch Ltd, Mosgiel,  
New Zealand

**Symposium: New Tools and Strategies for Integrated Pest Management (IPM) on Transgenic (Bt) and Non-Transgenic (Conventional) Cotton Crops**

***Room W330 C (Convention Center)***

**Moderators and Organizers:** Robert Mensah1, Lewis Wilson2,  
and Megha N. Parajulee3, 1New South Wales Dept. of Primary Industries, Narrabri, Australia, 2CSIRO, Narrabri, Australia, 3Texas A&M AgriLife Research, Lubbock, TX

1:30 **0622** Integrated pest management in Ethiopia: Development and use of a supplementary food spray  
to manage pests and beneficial insects on conventional cotton crops. **Tadesse Amera** (atadesse2002@yahoo. com)1, Robert Mensah2, and Atalo Belay3, 1Swedish Univ. of Agricultural Sciences, Uppsala, Sweden, 2New South Wales Dept. of Primary Industries, Narrabri, Australia, 3Pesticide Action Nexus Association, Addis Ababa, Ethiopia

1:45 **0623** Biosafety of transgenic crops to the non-target arthropods. **Hari Sharma** (vcuhf@yahoo.com), Dr. YS Parmar Univ. of Horticulture & Forestry, Nauni, Solan, India

2:00 **0624** Cotton pest management in Bt cotton system in northern China. **Feng Ge** (gef@ioz.ac.cn)1, Fang Ouyang1, and Xingyuan Men2, 1Chinese Academy of Sciences, Beijing, China, 2Shandong Academy of Agricultural Sciences, Jinan, China

2:15 **0625** Revised targets and tools in IPM for insect pests of cotton in India. **Shashikant Udikeri** (ssudikeri@ rediffmail.com), Indian Ministry of Agriculture, Bangalore, India

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2:30 **0626** Cotton IPM in the Texas High Plains: Host-plant mediated management system. **Megha N. Parajulee** (m-parajulee@tamu.edu), Texas A&M AgriLife Research, Lubbock, TX

2:45 **0627** IPM in cotton cropping systems: Development and exploitation of a new semiochemical product for cotton IPM. **Robert Mensah** (robert.mensah@dpi.nsw. gov.au)1, David Leach2, Alison Young1, and Nick Watts3, 1New South Wales Dept. of Primary Industries, Narrabri, Australia, 2Southern Cross Univ., Lismore, Australia, 3Growth Agriculture Pty, Ltd., Wee Waa, Australia

**3:00 BREAK**

3:15 **0628** Strategies to manage emergent pests in GM-cotton: A case study with *Nezara viridula*. **Simone Heimoana** (simone.heimoana@csiro.au), CSIRO, Narrabri, Australia

3:30 **0629** EPG investigation of feeding behavioral response of cotton aphid, *Aphis gossypii* (Glover), to elevated CO2. **Fajun Chen** (fajunchen@njau.edu.cn)1, Shoulin Jiang1, Guijun Wan1, and Megha N. Parajulee2, 1Nanjing Agricultural Univ., Nanjing, China, 2Texas A&M AgriLife Research, Lubbock, TX

3:45 **0630** Habitat management and biological control in Bt cotton. **Fang Ouyang** (ouyangf@ioz.ac.cn)1, Quanfeng Yang1, and Yongsheng Zhang2, 1Chinese Academy of Sciences, Beijing, China, 2Hunan Agricultural Univ., Changsha, China

4:00 **0631** Integrated regional thrips management in southwestern United States cotton. **Robert Bowling** (robert.bowling@ag.tamu.edu)1, Megha N. Parajulee2, and Michael Brewer3, 1Texas A&M AgriLife Extension Service, Corpus Christi, TX, 2Texas A&M AgriLife Research, Lubbock, TX, 3Texas A&M AgriLife Research, Corpus Christi, TX

**Symposium: Population Consequences of Pest Management Tactics on Non-Target Species**

***Room W222 A (Convention Center)***

**Moderator and Organizer:** David A. Andow, Univ. of Minnesota, St. Paul, MN

1:30 **Introduction**

1:45 **0632** Source, movement, and exposure levels for neonics in a maize/soybean/wheat-dominated ecosystem. **Arthur W. Schaafsma** (aschaafs@ uoguelph.ca)1, Victor Limay-Rios1, Yingen Xue1, Jocelyn L. Smith1, Luis Forero1, and Tracey Baute2, 1Univ. of Guelph, Ridgetown, ON, Canada, 2Ontario Ministry of Agriculture, Food and Rural Affairs, Ridgetown, ON, Canada

2:00 **0633** Neonicotinoid insecticides alter plant defenses and drive changes in arthropod communities in crop plants. **Ada Szczepaniec** (ada.szczepaniec@ag.tamu. edu)1, Jason Wulff2, and Micky Eubanks2, 1Texas A&M Univ., Amarillo, TX, 2Texas A&M Univ., College Station, TX

2:15 **0634** Transfer of entomotoxins to non-target insect eggs and potential population and community effects. **Debora Pires Paula** (debora.pires@embrapa.br), Embrapa Cenargen, Brasília, Brazil

2:30 **0635** Mirid outbreaks associated with Bt cotton in China. **Yanhui Lu** (yhlu@ippcaas.cn) and Kongming Wu, Chinese Academy of Agricultural Sciences, Beijing, China

2:45 **0636** The role of biotic interactions in non-target pest outbreaks in transgenic Bt cotton. **Adam Zeilinger** (arz@berkeley.edu)1, Dawn Olson2, and David A. Andow3, 1Univ. of California, Berkeley, CA, 2USDA - ARS, Tifton, GA, 3Univ. of Minnesota, St. Paul, MN

**3:00 BREAK**

3:15 **0637** Southeastern USA Regional landscape patterns and population dynamics of the stink bug *Euchistus servus*. **Dawn Olson** (dawn.olson@ars.usda.gov)1, Kristina Prescott2, Adam Zeilinger3, Suqin Hou4, Alisa Coffin1, John Ruberson5, and David A. Andow2, 1USDA

- ARS, Tifton, GA, 2Univ. of Minnesota, St. Paul, MN, 3Univ. of California, Berkeley, CA, 4Harvard Univ., Boston, MA, 5Kansas State Univ., Manhattan, KS

3:30 **0638** Population dynamics of stink bugs in landscapes with Bt cotton. **David A. Andow** (dandow@umn.edu)1, Dawn Olson2, and John Ruberson3, 1Univ. of Minnesota, St. Paul, MN, 2USDA - ARS, Tifton, GA, 3Kansas State Univ., Manhattan, KS

3:45 **0639** Population modeling to estimate the viability of endangered butterflies exposed to stress. **John Stark** (starkj@wsu.edu)1, Catherine Johnson2, and Xuedong Chen3, 1Washington State Univ., Puyallup, WA, 2U.S. Fish and Wildlife Service, Sacramento, CA, 3Univ. of Florida, Lake Alfred, FL

4:00 **0640** Non-target effects of neonicotinoid insecticides on honey bee (*Apis mellifera* L.) and bumble bee (*Bombus impatiens* Cresson) queens and colony development. **Judy Wu-Smart** (jwu-smart@unl.edu)1 and Marla Spivak2, 1Univ. of Nebraska, Lincoln, NE, 2Univ. of Minnesota, St. Paul, MN

4:15 **0641** Impact of cropping systems on bee community and colony fitness in water-limited agroecosystems. **Fabian Menalled** (menalled@montana.edu),  
Subodh Adhikari, Laura Burkle, Kevin O’Neill, and David K. Weaver, Montana State Univ., Bozeman, MT

4:30 **0642** Cascading effects of neonicotinoids on biological control in a soil food chain. **Margaret Douglas** (mrd276@psu.edu) and John Tooker, Pennsylvania State Univ., University Park, PA

4:45 **0643** Life history approach to the protection of ecosystem services. **John Banks** (jebanks@csumb. edu)1, Azmy Ackleh2, Roger Vargas3, and John Stark4, 1California State Univ., Seaside, CA, 2Univ. of Louisiana, Lafayette, LA, 3USDA - ARS, Hilo, HI, 4Washington State Univ., Puyallup, WA



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**MONDAY**

**Monday, September 26 • AFTERNOON •**

**Symposium: Entomology Around the World: Past, Present, and Future Challenges**

***Room W240 A (Convention Center)***

**Moderators and Organizers:** Michelle Samuel-Foo1, Mamoudou Setamou2, Simon Zebelo3, and Joseph Munyaneza4, 1Univ. of Florida, Gainesville, FL, 2Texas A&M Univ., Weslaco, TX, 3Auburn Univ., Auburn, AL, 4USDA - ARS, Wapato, WA

1:30 **0644** From biocontrol to precision-IPM in Africa: Challenges and opportunities. **Manuele Tamo** (m.tamo@cgiar.org)1, Barry R. Pittendrigh2,  
Saber Miresmailli3, Victor Font2, Ben Blalock2,

Elie Dannon1, Benjamin Datinon1, Michael Agyekum4, Cynthia Donavan4, and Eustache Biaou5, 1International Institute of Tropical Agriculture, Cotonou, Benin,  
2Univ. of Illinois, Champaign, IL, 3Ecoation Innovative Solutions, Inc., North Vancouver, BC, Canada, 4Michigan State Univ., East Lansing, MI, 5INRA, Cotonou, Benin

2:00 **0645** Psyllids and *Liberibacter*: An emerging and global challenge for the tree fruit and vegetable

industry. **Joseph Munyaneza** (joseph.munyaneza@ ars.usda.gov)1 and Mamoudou Setamou2, 1USDA - ARS, Wapato, WA, 2Texas A&M Univ., Weslaco, TX

2:30 **0646** The IR-4 Project and Agriculture and Agri-Food Canada: Working together to serve specialty crops across borders. Michelle Samuel-Foo1,  
Shirley Archambault2, and **Tamika Garrick** (tgarrick09@ufl.edu)1, 1Univ. of Florida, Gainesville,

FL, 2Agriculture and Agri-Food Canada, Gatineau, QC, Canada

2:45 **0647** Fruit fly biological control in the Pacific and technology transfer to Africa. **Luc Leblanc** (leblancl@ ctahr.hawaii.edu)1, Ernest Harris2, Kemo Badji3, and Roger Vargas2, 1Univ. of Idaho, Moscow, ID, 2USDA

- ARS, Hilo, HI, 3Crop Protection Directorate, Dakar, Senegal

**3:00 BREAK**

3:15 **0648** Applying quantative ecology and integrated management on smallholders’ farms: An example of maize stores in the Republic of Benin. **William Meikle** (william.meikle@ars.usda.gov)1, Niels Holst2, and Richard Markham3, 1USDA - ARS, Tucson, AZ, 2Aarhus Univ., Slagelse, Denmark, 3Australian Centre for International Agricultural Research, Bruce, Australia

3:30 **0649** Malaria and kwashiorkor: Working with western culture scientists. **Florence Dunkel** (fdunkel@montana. edu)1 and Sarah Halvorson2, 1Montana State Univ., Bozeman, MT, 2Univ. of Montana, Missoula, MT

3:45 **0650** New threats to soybeans in the Americas from Old World bollworm. **Fikru Haile** (fikru.haile@pioneer. com), DuPont Pioneer, Johnston, IA

4:00 **0651** Pest management of major invasive pest species: Varroa mite and scale insects in the Caribbean islands. **Lambert Kanga** (lambert.kanga@famu.edu)1, Walker A. Jones2, and James Rish3, 1Florida A&M Univ., Tallahassee, FL, 2USDA - ARS, Stoneville, MS, 3Tupelo Honey, Inc., Wewahitchka, FL

**Symposium: Global Status, Acceptance, and Challenges of GM Crops**

***Room W224 H (Convention Center)***

**Moderators and Organizers:** Murugesan Rangasamy1, Nandi Nagaraj1, and Srinivas Parimi2, 1Dow AgroSciences, Indianapolis, IN, 2Mahyco, Jalna, India

*This symposium is generously sponsored by the CropLife International Plant Biotech Product Stewardship Project Team and Excellence Through Stewardship.*

1:30 **0652**  
food security in the face of anticipated global climate change. **Channapatna Prakash** (prakash@mytu. tuskegee.edu), Tuskegee Univ., Tuskegee, AL

1:45 **0653** Genetically modified crops: An African perspective. **Jennifer Thomson** (jennifer.thomson@uct. ac.za), Univ. of Cape Town, Rondebosch, South Africa

2:00 **0654** Biosafety regulatory framework for genetically modified organisms in Brazil. **Alda Lerayer** (alda. lerayer@gmail.com) and Marcelo Moraes, Council for Information on Biotechnology, São Paulo, Brazil

2:15 **0655** The role of biotechnology and new breeding technologies for global food security. **Maurice Moloney** (gifs.director@usask.ca), Global Insitute for Food Security, Saskatoon, SK, Canada

2:30 **0656** Plant transgenic technology, regulatory environment, and public response — Indian experience in the last three decades. **S. Raghavendra Rao** (srraodbt@yahoo.com)1 and V. Siva Reddy2, 1National Certification System for Tissue Culture Raised Plants, New Delhi, India, 2Regional Centre of Biotechnology, New Delhi, India

2:45 **0657** Experience with GM IR Crops in Argentina. Martin Lema1,2, Agustina Whelan1,2, and **Patricia Gramuglia** (pgramuglia@magyp.gob.ar)1, 1Ministry of AgroIndustry, Buenos Aires, Argentina, 2National Univ. of Quilmes, Buenos Aires, Argentina

**3:00 BREAK**

3:15 **0658** GM technologies for staple crops in Africa — the case of R&D in Uganda regulations and public perceptions. **Andrew Kiggundu** (akiggundu@gmail.com), National Agricultural Research Organisation, Kampala, Uganda

3:30 **0659** Talking to a concerned public about genetic engineering. **Kevin Folta** (kfolta@ufl.edu), Univ. of Florida, Gainesville, FL

3:45 **0660** Status, acceptance, challenges of GM crops — China perspective. **Zhihong Lang** (langzhihong@ caas.cn), Jie Zhang, and Dafang Huang, Chinese Academy of Agricultural Sciences, Beijing, China

4:00 **0661** Stewarding GM crops for product integrity, durability, and acceptance. **Chris Holdgreve** (choldgreve@ets.bio), Excellence Through Stewardship, Washington, DC

Relevance of biotech crops in enhancing global

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**MONDAY**

**Monday, September 26 • AFTERNOON •**

**Symposium: Where are the Six Legs of Advanced Entomology Publishing Taking Us?**

***Room W224 F (Convention Center)***

**Moderators and Organizers:** Frank Krell1 and Lyubomir Penev2, 1Denver Museum of Nature and Science, Denver, CO, 2Bulgarian Academy of Sciences and Pensoft Publishers, Sofia, Bulgaria

1:30 **0662** New opportunities and trends in scholarly publishing. Michiel Thijssen1, Frank Krell2, and  
**Marti Huetink** (huetink@brill.com)1, 1Brill, Leiden, Netherlands, 2Denver Museum of Nature and Science, Denver, CO

1:45 **0663** How to get your paper published — from a publisher’s perspective. **Violeta Ribarska** (vribarsk@wiley.com)1 and Lin Field2, 1Wiley, Oxford, United Kingdom, 2Rothamsted Research, Harpenden, United Kingdom

2:00 **0664** Journal choice in a crowded world.  
**Fiona Williams** (fiona.williams@oup.com)1,  
Matthew Jozwiak2, Ian Sherman3, and Lauren Godwin1, 1Oxford Univ. Press USA, Cary, NC, 2Oxford Univ. Press USA, New York, NY, 3Oxford Univ. Press, Oxford, United Kingdom

2:15 **0665** Adding value in journal publishing: Your paper is more than a paper at Springer. **Zuzana Bernhart** (zuzana.bernhart@springer.com), Springer Science + Business Media B.V., Dordrecht, Netherlands

2:30 **0666** Open Science: A publishing perspective from PLOS. **Catriona MacCallum** (cmaccallum@plos.org), PLOS, Cambridge, United Kingdom

2:45 **0667** How PeerJ improves the publishing process and author experience. **Peter Binfield** (pete@peerj.com), PeerJ, Inc., Corte Madera, CA

**3:00 BREAK**

3:15 **0668** Invertebrate Systematics: Current and future directions of a phylogenetics journal with a global perspective. **Jennifer Forster** (jenny.foster@csiro.au)1 and Andrew Austin2, 1CSIRO, Clayton, Australia, 2Univ. of Adelaide, Adelaide, Australia

3:30 **0669** Zootaxa: A mega-journal for biodiveristy discovery and publication. **Zhi-Qiang Zhang** (zhangz@ landcareresearch.co.nz), Landcare Research, Auckland, New Zealand

3:45 **0670** ZooBank and the publishing world. **Richard Pyle** (deepreef@bishopmuseum.org), Bishop Museum, Honolulu, HI

4:00 **0671** Biodiversity publishing becomes part of  
the research process: Integrated narrative and data publication in the ARPHA platform. **Lyubomir Penev** (penev@pensoft.net), Bulgarian Academy of Sciences and Pensoft Publishers, Sofia, Bulgaria

4:15 **0672** Legal and ethical reasons for free and open biodiversity information. **Willi Egloff** (egloff\_bader@ bluewin.ch) and Donat Agosti, Plazi GmbH, Bern, Switzerland

**Symposium: An Emerging Food Supply: Edible Insects**

***Room W230 B (Convention Center)***

**Moderator and Organizer:** Marianne Shockley, Univ. of Georgia, Athens, GA

1:30 **0673** Transparency in the fledgling insects for food and feed industry: How open source philosophy could sink or save the entomophagy movement. **Robert Allen** (rna@aspirefg.com), Aspire, Buda, TX

1:45 **0674** Why don’t we eat bugs in Western culture: The anthropology perspective. **Julie Lesnik** (julie.lesnik@ gmail.com), Wayne State Univ., Detroit, MI

2:00 **0675** The greatest opportunities to drive forward entomophagy. **Kaison Tanabe** (kaisontanabe@gmail. com), EntoBento, San Diego, CA

2:15 **0676** Entomophagy in Thailand and beyond: Rearing practices of *Acheta domesticus* and *Teloegryllus testaceus* in Thailand, a model for entomophagy education presented to western audiences, identifying needed improvements in entomophagy education. **Kiah Brash** (kiah.brasch@gmail.com), Rustle Up Some Grub, Minneapolis, MN; Univ. of Minnesota, Minneapolis, MN

2:30 **0677** Mainstreaming edible insects: The next steps. **Kevin Bachhuber** (kevin@bigcricketfarms.com), Big Cricket Farms, Youngstown, OH

2:45 **0678** Bring insexy back: Hopping cricket bars into the mainstream. **Patrick Crowley** (pat@chapul.com), Chapul, Salt Lake City, UT

**3:00 BREAK**

3:15 **0679** Health safety and nutritional value of black soldier flies driven-feed. **Marwa Abdel Hamid Shumo** (mshummo@hotmail.com), Univ. of Bonn, Bonn, Germany

3:30 **0680** Entomophagy from a humanities perspective. **David Gracer** (david\_gracer@hotmail.com), Community College of Rhode Island, Warwick, RI

3:45 **0681** Advances in the scaling of human grade edible insect farming. **Jarrod Goldin** (jarrod@entomofarms. com), Entomo Farms, Norwood, ON, Canada

4:00 **0682** Insect allergy? No, not from bites and stings this time. **Louis N. Sorkin** (sorkin@amnh.org), American Museum of Natural History, New York, NY

4:15 **0683** Cultural and economic uses of insects in Oaxaca, Mexico. **Marianne Shockley** (entomolo@uga. edu)1, Alicia Fonseca Muñoz2, Liliana Robles Bautista3, Paulina Alejandra Flores Rios2, Jeffery K. Tomberlin4, and Rafael Perez Pacheco2, 1Univ. of Georgia, Athens, GA, 2National Polytechnic Institute, Oaxaca, Mexico, 3Benito Juárez Autonomous Univ., Oaxaca, Mexico, 4Texas A&M Univ., College Station, TX

4:30 **Discussion** 4:45 **Tasting**

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**MONDAY**

**Monday, September 26 • AFTERNOON •**

**Symposium: In the Light of Morphometrics: Frontiers in Ecology and Evolution of Insect Morphology**

***Room W314 A (Convention Center)***

**Moderators and Organizers:** Kazuo Takahashi1, Chris Klingenberg2, and Haruki Tatsuta3, 1Okayama Univ., Okayama, Japan, 2The Univ. of Manchester, Manchester, United Kingdom, 3Univ. of the Ryukyus, Nishihara, Japan

1:30 **0684** Insect morphometrics: New developments and applications. **Chris Klingenberg** (cpk@manchester. ac.uk), The Univ. of Manchester, Manchester, United Kingdom

2:00 **0685** Hidden biodiversity in hoverflies assessed by wing geometric morphometrics: Conservation implications. **Vesna Milankov** (vesna.milankov@dbe. uns.ac.rs), Jasmina Ludoški, Ljubinka Francuski, and Marko Djurakic, Univ. of Novi Sad, Novi Sad, Serbia

2:15 **0686** Inferring phylogenetic origins of dimorphic sexual trait in a beetle *Oedemera sexualis*. **Haruki Tatsuta** (htatsuta@agr.u-ryukyu.ac.jp)1, Wataru Ogasa1, Daisuke Satomi2, Shin-ichi Kudo3, and Chiharu Koshio3, 1Univ.

of the Ryukyus, Nishihara, Japan, 2Kobe Univ., Kobe, Japan, 3Naruto Univ. of Education, Naruto, Japan

2:30 **0687** Detecting divergent sexual selection operating upon divergent genital morphologies. **Yasuoki Takami** (takami@people.kobe-u.ac.jp) and Sogo Takahashi, Kobe Univ., Kobe, Japan

2:45 **0688** Ecological adaptation and morphological divergence in the snail feeding carabid beetle *Damaster blaptoides*. **Junji Konuma** (junji.konuma@sci.toho-u. ac.jp), Toho Univ., Chiba, Japan

**3:00 BREAK**

3:15 **0689** Through the looking-glass: Morphological diversity pattern of ants is reflected in the sympatric ant-mimicking spiders or not? **Yoshiaki Hashimoto** (yoshiaki@hitohaku.jp), Univ. of Hyogo Museum of Nature and Human Activities, Sanda, Japan

3:30 **0690** On the importance of shape in a ménage à trois among an orchid, a female bee, and a male bee. **Yannick Staedler** (yannick.staedler@univie.ac.at)1, Jürg Schönenberger1, Philipp Schlüter2,

Susanne Pamperl1, and Sara Manafzadeh2, 1Univ. of Vienna, Vienna, Austria, 2Univ. of Zürich, Zürich, Switzerland

3:45 **0691** Interspecific variation of wing asymmetry in Syrphidae. **Adam Tofilski** (rotofils@cyf-kr.edu.pl), Agricultural Univ. of Krakow, Krakow, Poland

4:00 **0692** HSP90 as a global genetic modulator for male genital morphology in *Drosophila melanogaster*. **Kazuo Takahashi** (kaz\_tak@cc.okayama-u.ac.jp)1 and Hiroyoshi Iwata2, 1Okayama Univ., Okayama, Japan, 2The Univ. of Tokyo, Tokyo, Japan

4:15 **0693** Morphometrics meets network theory: Modularity and the origin of camouflage patterns of butterfly and moth wings. **Takao Suzuki** (homaresuzuki@ gmail.com), National Institute of Agrobiological Sciences, Tsukuba, Japan

4:30 **0694** Understanding the evolution of *Drosophila* wing shape: An integrative approach using geometric morphometrics. **Hugo Benitez** (hugobenitezd@gmail. com)1 and Chris Klingenberg2, 1Univ. of Tarapacá, Arica, Chile, 2The Univ. of Manchester, Manchester, United Kingdom

4:45 **0695** Quantitative morphological study of Scarabaeoidea. **Xing-Ke Yang** (yangxk@ioz.ac.cn) and Ming Bai, Chinese Academy of Sciences, Beijing, China

5:00 **0696** Landmarks, semilandmarks, and outlines in medical entomology. **Jean-Pierre Dujardin** (dujardinbe@ gmail.com), IRD, Montpellier, France

**Symposium: What Constitutes Responsible Field Release of Transgenic Insects?**

***Room W414 C (Convention Center)***

**Moderator and Organizer:** Fred Gould, North Carolina State Univ., Raleigh, NC

1:30 **0697** Creating a responsible development pathway for mosquitoes with engineered drive. **Stephanie James** (sjames@fnih.org), Foundation for the National Institutes of Health, Bethesda, MD

1:45 **0698** Engineered and natural gene drives: Examining the risks. **Jason Rasgon** (jlr54@psu.edu), Pennsylvania State Univ., University Park, PA

2:00 **0699** Anticipatory governance of gene drive systems. **Jennifer Kuzma** (jkuzma@ncsu.edu), North Carolina State Univ., Raleigh, NC

2:15 **0700** Pre-release engagement with the public: The case of *Aedes aegypti*. **Beth Ranson** (branson@ keysmosquito.org) and Michael Doyle, Florida Keys Mosquito Control District, Key West, FL

2:30 **0701** Diverse approaches for public engagement. **Jason Delborne** (jadelbor@ncsu.edu), North Carolina State Univ., Raleigh, NC

2:45 **0702** Towards responsible field testing of transgenic new world screwworm fly in Panama. **Carolina Concha** (carolacmcl@yahoo.com), Smithsonian Tropical Research Institute, Panama City, Panama

**3:00 BREAK**

3:15 **0703** An African perspective on release of engineered *Anopheles*. **Mamadou Coulibaly** (doudou@icermali.org), Malaria Research and Training Center, Bamako, Mali

3:30 **0704** The Brazilian experience with Projecto *Aedes* Transgenico. **Margareth Capurro** (mcapurro@icb.usp. br), Univ. of São Paulo, São Paulo, Brazil

3:45 **Discussion**  
**Symposium: Workshop on Gene Editing**

***Room W414 A (Convention Center)***

**Moderators and Organizers:** Anjiang Tan1 and Subba Reddy Palli2, 1Chinese Academy of Sciences, Shanghai, China, 2Univ. of Kentucky, Lexington, KY

1:30 **0705** A primer on genome editing technologies and their use in insects. **Nicholas M. Teets** (n.teets@ufl. edu), Univ. of Kentucky, Lexington, KY

**Technologies**

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**MONDAY**

**Monday, September 26 • AFTERNOON •**

2:00 **0706** Development of genome editing tools and their applications in the silkworm, *Bombyx mori*. **Hideki Sezutsu** (hsezutsu@affrc.go.jp), National Institute of Agrobiological Sciences, Tsukuba, Japan

2:30 **0707** Genetic control of Lepidoptera using genome editing tools. **Yong Ping Huang** (yphuang@sibs.ac.cn), Chinese Academy of Sciences, Shanghai, China

2:45 **0708** Genome editing in the cricket *Gryllus bimaculatus*. **Taro Mito** (mito.taro@tokushima-u.ac.jp), Tokushima Univ., Tokushima, Japan

**3:00 BREAK**

3:15 **0709** Blocking malaria transmission with genetically engineered symbiotic bacteria from vector mosquitoes. **Sibao Wang** (sibaowang@sibs.ac.cn), Shanghai Institute of Plant Physiology and Ecology, Shanghai, China

3:30 **0710** Functional genomic analysis of *Ras*-promoted silk production. **Li Ma** (lima@gmail.com), Chinese Academy of Sciences, Shanghai, China

3:45 **0711** Sex regulation of *Bombyx mori* by editing doublesex. **Jun Xu** (xujun@sibs.ac.cn)1, Anthony James2, Yongping Huang1, and Anjiang Tan1, 1Chinese Academy of Sciences, Shanghai, China, 2Univ. of California, Irvine, CA

4:00 **0712** Mutation of an imaginal disc-derived wing morphogenesis gene in *Bombyx mori*. **Muwang Li** (mwli@just.edu.cn), Xiaojing Liu, and  
Chengxiang Hou, Jiangsu Univ. of Science and Technology, Zhenjiang, China

4:15 **0713** Applications of transgenesis and genome editing in lepidopteran functional genomics.  
**Anjiang Tan** (ajtan01@sibs.ac.cn)1, Taichu Wang2,  
and Baosheng Zeng3, 1Shanghai Institute of Plant Physiology and Ecology, Shanghai, China, 2Anhui Academy of Agriculural Science, Hefei, China, 3Chinese Academy of Sciences, Shanghai, China

**Symposium: Novel Contributions of Chemical Ecology to Global IPM**

***Room W223 A (Convention Center)***

**Moderators and Organizers:** Baldwyn Torto1 and Christian Borgemeister2, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Univ. of Bonn, Bonn, Germany

1:30 **0714** Potential of chemical ecology for application in IPM. **James H. Tumlinson** (jht2@psu.edu), Pennsylvania State Univ., University Park, PA

2:00 **0715** Role of leguminous plants in sandfly chemical ecology. **David Tchouassi** (dtchouassi@icipe.org)1, Julia Wanjiru1, Christian Borgemeister2, and  
Baldwyn Torto1, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Univ. of Bonn, Bonn, Germany

2:15 **0716** Below ground chemical ecology and IPM. **Hans T. Alborn** (hans.alborn@ars.usda.gov), USDA - ARS, Gainesville, FL

2:30 **0717** Choices have consequences for a specialist spider mite attracted to edible nightshades.  
**Lucy Murungi** (lucykananu@yahoo.com) and  
Baldwyn Torto, International Centre of Insect Physiology and Ecology, Nairobi, Kenya

2:45 **0718** Chemical communication in the Chilean leafroller species *Proeulia auraria* and *P. triquetra*. **Jan Bergmann** (bergmann05@gmail.com)1, María Fernanda Flores2, Alda Romero3, M. Oyarzun4, and Tania Zaviezo5, 1Pontifical Catholic Univ., Valapariso, Chile, 2Institute

of Chemistry, Valparaíso, Chile, 3Catholic Univ. of  
Chile, Santiago, Chile, 4Pontifical Catholic Univ., Vicuña Mackenna, Chile, 5Pontifical Catholic Univ., Santiago, Chile

**3:00 BREAK**

3:15 **0719** Presentation withdrawn

3:30 **0720** Chemical ecology of leaf miners in east Africa. **Komi Fiaboe** (kfiaboe@icipe.org)1, Caroline Foba1, Komivi Akutse1, Samuel Muchemi1, Lucy Murungi1, Robert Musundire2, Ayuka Fombong1, David Tchouassi1, Sunday Ekesi1, and Baldwyn Torto1, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Chinhoyi Univ. of Technology, Chinhoyi, Zimbabwe

3:45 **0721** Contribution of chemical ecology towards developing IPM strategies for vegetable legumes and brassicas in tropical Asia. **Srinivasan Ramasamy** (srini. ramasamy@worldveg.org)1 and Krm Bhanu2, 1AVRDC- The World Vegetable Center, Tainan, Taiwan, 2Biocontrol Research Laboratories, Mumbai, India

**Symposium: Sex and Drugs and Bee Control: The Chemical Ecology of Pollination**

***Room W224 B (Convention Center)***

**Moderators and Organizers:** Lynn S. Adler1, Phil Stevenson2, and Rebecca E. Irwin3, 1Univ. of Massachusetts, Amherst, MA, 2Royal Botanic Gardens, Surrey, United Kingdom, 3Dartmouth College, Hanover, NH

1:30 **0722** How it takes honey to make a honey bee — and pollen and nectar to make a pollinator. **May R. Berenbaum** (maybe@illinois.edu), Univ. of Illinois, Champaign, IL

2:00 **0723** Chemical information structuring the plant interaction network. **André Kessler** (ak357@cornell. edu), Cornell Univ., Ithaca, NY

2:15 **0724** Connecting floral advertisement and reward: Probing the hidden chemistry of nectar. Robert Raguso and **Geoffrey Broadhead** (gtb49@cornell.edu), Cornell Univ., Ithaca, NY

2:30 **0725** Scented sweets: Exploring the multifaceted roles of nectar volatiles. **Amy Parachnowitsch** (amy.parachnowitsch@ebc.uu.se)1, Rosie Burdon1, Robert Gegear2, Robert Junker3, André Kessler4, and Robert Raguso4, 1Uppsala Univ. , Uppsala, Sweden, 2Worcester Polytechnic Institute, Worcester, MA, 3Univ. of Salzburg, Salzburg, Austria, 4Cornell Univ., Ithaca, NY

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**MONDAY**

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2:45 **0726** From orchids to monkeyflowers: How floral volatiles shape pollinator behavior. **Kelsey Byers** (kelsey.byers@systbot.uzh.ch)1, H. Bradshaw Jr.2,  
Jeff Riffell2, Roman Kellenberger1, and Philipp Schlüter1, 1Univ. of Zürich, Zürich, Switzerland, 2Univ. of Washington, Seattle, WA

**3:00 BREAK**

3:15 **0727** How pollen affects learning in bees.  
**Natalie Hempel de Ibarra** (n.hempel@exeter.ac.uk)1 and Elizabeth Nicholls2, 1Univ. of Exeter, Exeter, United Kingdom, 2Univ. of Sussex, Sussex, United Kingdom

3:30 **0728** Mycorrhizal fungi alter floral traits important to pollination, bee fitness, and crop yield. **Leif Richardson** (leifr7@gmail.com), Alison Brody, and Taylor Ricketts, Univ. of Vermont, Burlington, VT

3:45 **0729** Floral scent mimicry by a pollinator-vectored plant pathogen. **Scott McArt** (shm33@cornell.edu)1, Timothy Miles2, Cesar Rodriguez3, Annamiek Schilder4, Lynn S. Adler5, and Matthew Grieshop4, 1Cornell Univ., Ithaca, NY, 2California State Univ., Seaside, CA, 3Rutgers, The State Univ. of New Jersey, Chatsworth, NJ,

4Michigan State Univ., East Lansing, MI, 5Univ. of Massachusetts, Amherst, MA

4:00 **0730** Specialist flowers face a trade-off between rewarding pollinators and defense against nectar robbery. **Phil Stevenson** (p.stevenson@kew.org)1, S. Barlow1, Sebastien Kessler2, Geraldine A. Wright2, Marta Barberis2, and Iain Farrell1, 1Royal Botanic Gardens, Surrey, United Kingdom, 2Newcastle Univ., Newcastle upon Tyne, United Kingdom

4:15 **0731** Nicotine and the honey bee. **Susan Nicolson** (swnicolson@zoology.up.ac.za)1 and Ezette Durand2, 1Univ. of Pretoria, Hatfield, South Africa, 2Univ. of Pretoria, Pretoria, South Africa

4:30 **0732** Sipping from a poisoned chalice: How do  
plant drugs, toxins, and pesticides in nectar affect bee behaviour? **Geraldine A. Wright** (jeri.wright@newcastle. ac.uk), Newcastle Univ., Newcastle upon Tyne, United Kingdom

4:45 **0733** Pharmacy bee hive — use of natural drugs to increase pollinator health. **Silvio Erler** (erler.silvio@ gmail.com), Martin Luther Univ., Halle, Germany

5:00 **0734** The self-medicating bee? Impacts of nectar secondary compounds on bee foraging and disease **Rebecca E. Irwin** (reirwin@ncsu.edu)1, Dash Donnelly1, Leif Richardson2, Phil Stevenson3, and Lynn S. Adler4, 1North Carolina State Univ., Raleigh, NC, 2Univ. of Vermont, Burlington, VT, 3Univ. of Greenwich, Kent, United Kingdom, 4Univ. of Massachusetts, Amherst, MA

5:15 **0735** Getting sick and getting healthy: The impact  
of plant species on *Crithidia* infection in bumble bees. **Lynn S. Adler** (lsadler@ent.umass.edu)1,  
Philip Stevenson2, and Rebecca E. Irwin3, 1Univ. of Massachusetts, Amherst, MA, 2Univ. of Greenwich, Chatham, United Kingdom, 3North Carolina State Univ., Raleigh, NC

**Symposium: Social Insect Pathobiology**

***Room W224 G (Convention Center)***

**Moderators and Organizers:** Rebeca B. Rosengaus1 and  
Elke Genersch2, 1Northeastern Univ., Boston, MA, 2Institute for Bee Research, Hohen Neuendorf, Germany

1:30 **0736** Worms that sterilize queens: Dynamics and mechanisms. **Mark Brown** (mark.brown@rhul.ac.uk), Royal Holloway, Univ. of London, Egham, United Kingdom

1:45 **0737** Fungal pathogen adaptations in social insects — Pandora’s Box. **Annette Bruun Jensen** (abj@plen. ku.dk), Univ. of Copenhagen, Copenhagen, Denmark

2:00 **0738** Pathobiology of *Paenibacillus larvae*, a deathly bacterial pathogen of honey bees (*Apis mellifera*). **Elke Genersch** (elke.genersch@hu-berlin.de), Institute for Bee Research, Hohen Neuendorf, Germany;

Freie Univ., Berlin, Germany

2:15 **0739** Zombie ants: Precise manipulation of social insect behavior by a microbe. David Hughes and **Colleen Mangold** (cav154@psu.edu), Pennsylvania State Univ., University Park, PA

2:30 **0740** Immunocompetence in a social wasp: A special tool for testing ecological and evolutionary hypotheses. **Fabio Manfredini** (fmanfredini79@gmail.com), Pennsylvania State Univ., University Park, PA

2:45 **0741** Pathogen-induced transgenerational effects  
in termites. **Rebeca B. Rosengaus** (r.rosengaus@neu. edu)1, Erin Cole1, and Graham Thompson2, 1Northeastern Univ., Boston, MA, 2Univ. of Western Ontario, London, ON, Canada

**3:00 BREAK**

3:15 **0742** Royal decree: Gene expression in transgenerationally immune primed bumblebee workers mimics a primary immune response.  
Ben Sadd1, **Seth M. Barribeau** (barribeaus14@ecu.edu)2, and Paul Schmid-Hempel3, 1Illinois State Univ., Normal, IL, 2East Carolina Univ., Greenville, NC, 3ETH Zürich, Zürich, Switzerland

3:30 **0743** Honey bee social immunity: Resin collection. **Marla Spivak** (spiva001@umn.edu)1, Renata Borba1, and Michael Wilson2, 1Univ. of Minnesota, St. Paul, MN, 2Univ. of Minnesota, Minneapolis, MN

3:45 **0744** Benefits and costs of social immunization in ants. Matthias Konrad and **Sylvia Cremer** (sylvia.cremer@ist.ac.at), Institute of Science and Technology Austria, Klosterneuburg, Austria

4:00 **0745** Defending the hive: Social mechanisms complement individual immunity in honey bees. **Michael Simone-Finstrom** (michael.simonefinstrom@ ars.usda.gov), USDA - ARS, Baton Rouge, LA

**Symposium: The Biochemical Signaling Interface Between Invaders and Their Insect Hosts**

***Room W330 A (Convention Center)***

**Moderators and Organizers:** Qisheng Song1, David W. Stanley2, Yonggyun Kim3, and Gongyin Ye4, 1Univ. of Missouri, Columbia, MO, 2USDA - ARS, Columbia, MO, 3Andong National Univ., Andong, South Korea, 4Zhejiang Univ., Hangzhou, China

1:30 **0746** Eicosanoid signaling in insect immunity.  
**David W. Stanley** (stanleyd@missouri.edu)1,  
Lei Zhang2, Cynthia Goodman1, and Joseph Ringbauer1, 1USDA - ARS, Columbia, MO, 2Chinese Academy of Agricultural Sciences, Beijing, China

1:45 **0747** Eicosanoid signaling involved in expression of NADPH-dependent oxidase in insect cellular immunity. **Youngjin Park** (happy2pyj@gmail.com)1, David Stanley2, and Yonggyun Kim1, 1Andong National Univ., Andong, South Korea, 2USDA - ARS, Columbia, MO

2:00 **0748** Molecular and functional characterization of a prostaglandin E2 synthase in the blacklegged tick, *Ixodes scapularis* Say. **Joshua R. Urban** (josurb@ksu. edu) and Yoonseong Park, Kansas State Univ., Manhattan, KS

2:15 **0749** Immunity function against the entomopathogenic fungi *Beauveria bassiana* by insect molting fluids.  
**Jie Zhang** (zhangjie01@sibs.ac.cn), Bing Yang, Jingmin Guan, Qiaoli Zhang, and Erjun Ling, Chinese Academy of Sciences, Shanghai, China

2:30 **0750** High throughput profiling of the cotton bollworm, *Helicoverpa armigera,* immunotranscriptome.  
**Zhen Zou** (zouzhen@ioz.ac.cn), Chinese Academy of Sciences, Beijing, China

2:45 **0751** Immunity during insect development: Endocrine regulation. **Qisheng Song** (songq@missouri. edu), Hongwei Zhang, and Shengzhang Dong, Univ. of Missouri, Columbia, MO

**3:00 BREAK**

3:15 **0752** Bursicon homodimer actions in the immune response of *Helicoverpa armigera*. Mengfang Du1, Xiaoguang Liu1, Xinming Yin1, Qisheng Song2, and **Shiheng An** (anshiheng@aliyun.com)1, 1Henan Agriculture Univ., Zhengzhou, China, 2Univ. of Missouri, Columbia, MO

3:30 **0753** Effects of the endoparasitoid *Cotesia chilonis* parasitism, venom, and calyx fluid on immunity of its host *Chilo suppressalis* larvae. **Qi Fang** (fangqi@zju. edu.cn), Ziwen Teng, Gang Xu, Shiyu Gan, Xuan Chen, and Gongyin Ye, Zhejiang Univ., Hangzhou, China

3:45 **0754** A venom serpin isoform from *Pteromalus puparum* suppresses the host prephenoloxidase cascade by forming complexes with host hemolyph proteinases. **Zhichao Yan** (yan\_zc@126.com)1, Qi Fang1, Lei Wang2, Yu Zhu1, and Gongyin Ye1, 1Zhejiang Univ., Hangzhou, China, 2Anhui Agricultural Univ., Hefei, China

**Symposium: Deciphering Complex Signaling Mechanisms in Insect-Plant Interactions**

***West Hall F1 (WF1) (Convention Center)***

**Moderator and Organizer:** Joe Louis, Univ. of Nebraska, Lincoln, NE

1:30 **0755** Herbivory-induced calcium signaling in the activation of plant defense. **Axel Mithöfer** (amithoefer@ ice.mpg.de), Max Planck Institute for Chemical Ecology, Jena, Germany

1:45 **0756** Influence of plant fatty acid desaturases on plant-aphid interactions. **Fiona L. Goggin** (fgoggin@ uark.edu), Univ. of Arkansas, Fayetteville, AR

2:00 **0757** Stone cells and the conifer defense syndrome. **Justin G. A. Whitehill** (whiteh5@msl.ubc.ca), The Univ. of British Columbia, Vancouver, BC, Canada

2:15 **0758** Signalling pathways and plant defence mechanisms to aphids. **Karam Singh** (karam.singh@ csiro.au), CSIRO, Floreat, Australia

2:30 **0759** An herbivore-induced plant volatile functions as a direct defense and within-plant priming signal. **Matthias Erb** (matthias.erb@ips.unibe.ch), Univ. of Bern, Bern, Switzerland

2:45 **0760** The mechanism in the adaption of *Spodoptera litura* to its new host plant. **Sichun Zheng** (sczheng62@126. com), South China Normal Univ., Guangzhou, China

**3:00 BREAK**

3:15 **0761** “Omic” approaches to decipher plant defense mechanisms against insect pests. **Joe Louis** (joelouis@ unl.edu), Univ. of Nebraska, Lincoln, NE

3:30 **0762** Genetic uncoupling of growth-defense tradeoffs in plant interactions with insect herbivores. **Gregg A. Howe** (howeg@msu.edu), Michigan State Univ., East Lansing, MI

3:45 **0763** Regulation of plant defense against the polyphagous green peach aphid. **Jyoti Shah** (shah@ unt.edu), Univ. of North Texas, Denton, TX

4:00 **0764** Identifying genes that underlie whitefly resistance in cassava. **Linda Walling** (linda.walling@ucr. edu), Univ. of California, Riverside, CA

4:15 **0765** Mediation of plant perception of herbivory by the third trophic level. **Gary Felton** (gwf10@psu.edu), Pennsylvania State Univ., University Park, PA

4:30 **0766** Manipulation of plant metabolism by proteins and small molecules in aphid saliva. **Georg Jander** (jander@cornell.edu), Boyce Thompson Institute for Plant Research, Ithaca, NY

4:45 **0767** Herbivory, local adaptation, and population genetics of invasive weed *Solanum elaeagnifolium* (Solanaceae). **Rupesh Kariyat** (rupesh.kariyat@usys. ethz.ch), ETH Zürich, Zürich, Switzerland

**Symposium: Integrated Pest Management Components and Packages for Tropical Crops**

***Room W331 D (Convention Center)***

**Moderators and Organizers:** Rangaswamy R. Muniappan1 and Short Heinrichs2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2IAPPS, Lincoln, NE

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**MONDAY**

**Monday, September 26 • AFTERNOON •**

1:30 **0768** The role of IPM in USAID’s feed the future initiative. **John Bowman** (jobowman@usaid.gov), USAID Bureau for Food Security, Washington, DC

1:45 **0769** Integrated pest management of chickpea leaf miner, *Liriomyza cicerina* (Rondani). **L. Ali** (l.ali@ cgiar.org)1, Mustapha El Bouhssini2, and A. Sabraoui1, 1International Center for Agriculture Research in the Dry Areas, Rabat, Morocco, 2International Center for Agriculture Research in the Dry Areas, Aleppo, Syria

2:00 **0770** Integrated pest management strategy of red palm weevil, *Rhynchophorus ferrugineus* Olivier, in the Near East and north African region. **Shoki AlDobai** (shoki.aldobai@fao.org)1 and J. R. Faleiro2, 1Food and Agriculture Organization of the United Nations,

Cairo, Egypt, 2Food and Agriculture Organization of the United Nations, Al-Hassa, Saudi Arabia

2:15 **0771** Towards development of a parasitoid cottage industry in the Sahel for biological control of the millet head miner. **N. Ba** (ba@gmail.com)1, Ibrahim Baoua2, A. Kabore3, Laouali Amadou4, L. Karimoune1, H. Salha1, L. Dabire5, Rangaswamy R. Muniappan6, and

George Norton6, 1International Crops Research Institute for the Semi-Arid Tropics, Niger, Niger, 2Univ. of Maradi, Niger, Niger, 3INERA, Burkina Faso, Burkina Faso, 4National Institute of Agronomy Research in Niger, Maradi, Niger, 5INERA, Niger, Niger, 6Virginia Polytechnic Institute and State Univ., Blacksburg, VA

2:30 **0772** Management of *Eriophyes dimocarpi* on Longan in Vietnam using safe and biological approaches.  
**Tran Thi My Hanh** (hoavn2003@gmail.com), Nguyen Thi Thoa, and Nguyen Hoa, Southern Horticultural Research Institute, Ho Chi Minh, Vietnam

2:45 **0773** An integrated pest management (IPM) strategy to manage bean pod borer (*Maruca vitrata*) on yard-long bean in southeast Asia. **Sopana Yule** (sopana.yule@ worldveg.org)1, Ramasamy Srinivasan2, Vu Hai3, and Khodsimouang Soukhavong4, 1AVRDC-The World Vegetable Center, Kamphaeng Saen, Thailand, 2AVRDC- The World Vegetable Center, Shanhua, Taiwan, 3Vietnam Academy of Agricltural Sciences, Thanh Tri, Vietnam, 4Dept. of Agriculture, Vientiane, Laos

**3:00 BREAK**

3:15 **0774** Biological control: A non-obvious option for managing insect pests in cowpea. **Elie Dannon** (e.dannon@cgiar.org)1, Benjamin Datinon1,  
Ramasamy Srinivasan2, Joelle Toffa1, David Arodokoun3, Barry R. Pittendrigh4, and Manuele Tamo1, 1International Institute of Tropical Agriculture, Cotonou, Benin, 2AVRDC-The World Vegetable Center, Shanhua, Taiwan, 3INRA, Cotonou, Benin, 4Univ. of Illinois, Champaign, IL

3:30 **0775** IPM as a strategic approach for management of virus diseases in vegetable crops in the tropics. **Naidu Rayapati** (naidu.rayapati@wsu.edu), Washington State Univ., Prosser, WA

3:45 **0776** Pest management in rain-fed crops in the semi-arid tropics: Prospects and problems.  
**Sumit Vashisth** (raentomology@cgiar.org)1,  
Jaba Jagdish2, and Hari Sharma2, 1International Crops

Research Institute for the Semi-Arid Tropics, Patancheru, India, 2 Dr. YS Parmar Univ. of Horticulture & Forestry, Nauni, Solan, India

4:00 **0777** Reducing insect pest vulnerabilities in rice value chain using ecologically-based IPM strategy. **Buyung Hadi** (b.hadi@irri.org), Josie Catindig,  
Silvia Villareal, and Charles Garcia, International Rice Research Institute, Metro Manila, Philippines

4:15 **0778** Presentation withdrawn

4:30 **0779** Development and dissemination of vegetable integrated pest management (IPM) practices and packages in Nepal. **Sulav Paudel** (spaudel111@gmail. com)1, Rangaswamy R. Muniappan2, and Edwin Rajotte3, 1iDE Nepal, Kathmandu, Nepal, 2Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 3Pennsylvania State Univ., University Park, PA

4:45 **Discussion**

**Symposium: True Bugs (Heteroptera) from the Neotropics: Advances on Basic and Applied Research**

***Room W230 C (Convention Center)***

**Moderators and Organizers:** Antônio Panizzi1,2 and Jocelia Grazia3, 1National Wheat Research Center, Passo Fundo, Brazil, 2Embrapa Trigo, Passo Fundo, Brazil, 3Federal Univ. of Rio Grande do Sul, Porto Alegre, Brazil

1:30 **0780** The family Aradidae — Taxonomy, diversity, and distribution in the neotropical region. **Ernst Heiss** (aradus@aon.at), Trioler Country Museum, Innsbruck, Austria

1:45 **0781** Diversity, classification, and evolution of neotropical stink bugs (Hemiptera: Pentatomoidea) associated with cultivated plants. **Cristiano Schwertner** (acrosternum@yahoo.com.br)1 and Jocelia Grazia2, 1Federal Univ. of São Paulo, Diadema, Brazil, 2Federal Univ. of Rio Grande do Sul, Porto Alegre, Brazil

2:00 **0782** Shield bugs in the new world: An update on  
the knowledge of the neotropical Scutelleridae.  
**Joe Eger** (jeeger@dow.com)1, Aline Barcellos2, and Luciana Weiler3, 1Dow AgroSciences, Tampa, FL, 2Zoobotanical Foundation, Porto Alegre, Brazil, 3Federal Univ. of Rio Grande do Sul, Porto Alegre, Brazil

2:15 **0783** The status of Heteroptera research in Latin America. **Dimitri Forero** (forero-i@javeriana.edu.co), Pontifical Xavierian Univ., Bogotá, Colombia

2:30 **0784** First insights into the phylogenetic relationships of the *Euschistus*-group. **Kim Barão** (kbarao@yahoo. com.br), Federal Univ. of Rio Grande do Sul, Porto Alegre, Brazil

2:45 **0785** Aquatic bugs (Heteroptera: Gerromorpha & Nepomorpha) from the neotropics. **Felipe Moreira** (felipe.moreira@ioc.fiocruz.br), Oswaldo Cruz Foundation, Rio de Janeiro, Brazil

**3:00 BREAK**



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**MONDAY**

**Monday, September 26 • AFTERNOON •**

3:15 **0786** Seasonal occurrence, host plants, and morphological and physiological changes of the redbanded stink bug, *Piezodorus guildinii* (Westwood) (Heteroptera: Pentatomidae) in Uruguay. **María Zerbino** (szerbino@inia.org.uy)1, Antônio Panizzi2, and

Nora Altier1, 1National Institute of Agricultural Investigations, Colonia, Uruguay, 2National Wheat Research Center, Passo Fundo, Brazil

3:30 **0787** Pheromone strategies to manage neotropical stink bugs and its natural enemies in arable crops:  
An *Euschistus heros* model. **Miguel Borges** (miguel. borges@embrapa.br), Embrapa Genetic Resources and Biotechnology, Brasília, Brazil

3:45 **0788** Stink bug sheath, saliva, and cell rupture feeding as cause of host injury. **Antônio Panizzi** (antonio.panizzi@embrapa.br)1 and Tiago Lucini2, 1Embrapa Wheat, Passo Fundo, Brazil, 2Federal Univ. of Paraná, Curitiba, Brazil

4:00 **0789** The potential risk losses caused by *Dichelops melacanthus* (Dallas) to maize in the neotropics.  
Ivan Cruz1 and **Antônio Panizzi** (antonio.panizzi@ embrapa.br)2, 1Embrapa Corn and Sorghum, Sete Lagoas, Brazil, 2Embrapa Trigo, Passo Fundo, Brazil

4:15 **0790** The bronze bug, *Thaumastocoris peregrinus* Carpintero & Dellapé (Hemiptera: Thaumastocoridae): Challenging *Eucalyptus* plantations in the Neotropics. **Carlos Wilcken** (cwilcken@fca.unesp.br), São Paulo State Univ., Botucatu, Brazil

4:30 **0791** Role of endosymbionts and potential applications on neotropical true bug’s management. **Simone Prado** (simone.prado@embrapa.br), Embrapa Environment, Jaguariúna, Brazil

4:45 **0792** Geographical and temporal variability of  
stink bug susceptibility to insecticides in Brazil.  
**Daniel Sosa-Gómez** (daniel.sosa-gomez@embrapa. br)1 and Patricia Husch2, 1Embrapa Soy, Londrina, Brazil, 2Federal Univ. of Paraná, Curitiba, Brazil

5:00 **0793** Neotropical stink bugs and biological control. **Walker A. Jones** (walker.jones@ars.usda.gov), USDA - ARS, Stoneville, MS

**Symposium: Wireworm and Click Beetle Management: IPM Toolbox for the 21st Century**

***Room W331 C (Convention Center)***

**Moderators and Organizers:** Bob Vernon1 and Anuar Morales- Rodriguez2, 1Agriculture and Agri-Food Canada, Agassiz, BC, Canada, 2Univ. of California, Riverside, CA

1:30 **0794** Wireworm management using trap crops. **Ashish Adhikari** (ashish.adhikari@msu.montana.edu)1, Gadi V. P. Reddy1, and Bob Vernon2, 1Montana State Univ., Conrad, MT, 2Agriculture and Agri-Food Canada, Agassiz, BC, Canada

1:45 **0795** Biology, ecology, and control of wireworms (Coleoptera: Elateridae) in cereal crops. **Ivan Milosavljevic** (ivan.milosavljevic@email.wsu.edu)1, Aaron Esser2, and David Crowder1, 1Washington State Univ., Pullman, WA, 2Washington State Univ., Ritzville, WA

2:00 **0796** Characterizing the molecular biology of *Limonius californicus* and its application to pest management. **Kevin Wanner** (kwanner@montana.edu), Montana State Univ., Bozeman, MT

2:15 **0797** Cultural control of wireworms an alternative management strategy. **Anuar Morales-Rodriguez** (am434@cornell.edu), Univ. of California, Riverside, CA

2:30 **0798** The effect of conservation agriculture on *Agriotes* spp. populations: First results of the life+ project helpsoil. **Lorenzo Furlan** (lorenzo.furlan@ venetoagricoltura.org), Veneto Agricoltura, Legnaro, Italy

2:45 **0799** Smells good but claims your life: An attract and kill strategy for wireworm control in potato.

**Stefan Vidal** (svidal@gwdg.de), Georg August Univ., Göttingen, Germany

**3:00 BREAK**

3:15 **0800** Timing of application of *Metarhizium brunneum* against wireworms in Swiss crop rotation schemes. **Giselher Grabenweger** (giselher.grabenweger@ agroscope.admin.ch), Agroscope, Zürich, Switzerland

3:30 **0801** Toward a comprehensive strategy for wireworm biocontrol. **Todd Kabaluk** (todd.kabaluk@agr.gc.ca), Agriculture and Agri-Food Canada, Agassiz, BC, Canada

3:45 **0802** Click beetle IPM. **Bob Vernon** (vernonbs@agr. gc.ca) and Wim van Herk, Agriculture and Agri-Food Canada, Agassiz, BC, Canada

4:00 **0803** Wireworms in potatoes: Management strategies and more. **Christine Noronha** (christine.noronha@agr. gc.ca), Agriculture and Agri-Food Canada, Charlottetown, PEI, Canada

4:15 **0804** Challenges of controlling wireworms with insecticides in potatoes in the mid-Atlantic U.S.  
**John D. Aigner** (daigner@vt.edu) and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

4:30 **0805** Integrated control of wireworms in Florida sugarcane. Ronald H. Cherry and **Michael Karounos** (wompum@ufl.edu), Univ. of Florida, Belle Glade, FL

**Symposium: Scarabs without Borders: Lessons from a Century of Invasions**

***Room W222 B (Convention Center)***

**Moderators and Organizers:** Trevor Jackson1 and Michael G. Klein2, 1AgResearch, Ltd., Christchurch, New Zealand, 2The Ohio State Univ., Heber, AZ

1:30 **0806** Scarabs without borders: Where are they now? **Trevor Jackson** (trevor.jackson@agresearch.co.nz), AgResearch, Ltd., Christchurch, New Zealand

1:45 **0807** Scarab Central resources at the University of Nebraska: We have what you need, and you collect what we want. **Brett C. Ratcliffe** (bratcliffe@unl.edu), Univ. of Nebraska, Lincoln, NE

2:00 **0808** The Japanese beetle: Still bugging us 100 years later. **Michael G. Klein** (klein.10@osu.edu), The Ohio State Univ., Heber, AZ

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**MONDAY**

**Monday, September 26 • AFTERNOON •**

2:15 **0809** Introduction of exotic Scarabaeine dung  
beetle species to southwestern Australia: Winners and losers after 35 years. **James Ridsdill-Smith** (james. ridsdell-smith@csiro.au)1, John Matthiessen2,  
David Cousins3, and Robert Emery3, 1Univ. of Western Australia, Perth, Australia, 2CSIRO, Perth, Australia, 3Dept. of Agriculture and Food, South Perth, Australia

2:30 **0810** Continental shifts — African black beetle (*Heteronychus arator*) invades Australasia.  
**Alison Popay** (alison.popay@agresearch.co.nz) and Warren King, AgResearch, Ltd., Hamilton, New Zealand

2:45 **0811** The rhinoceros beetle invasion of Guam: An unprecedented disaster. **Aubrey Moore** (amoore@ uguam.uog.edu)1, Roland Quitugua1, Trevor Jackson2, Sean Marshall2, and Matthew Siderhurst3, 1Univ. of Guam, Mangilao, Guam, 2AgResearch, Ltd., Christchurch, New Zealand, 3Eastern Mennonite Univ., Harrisonburg, VA

**3:00 BREAK**

3:15 **0812** Detection of an invasive biotype of *Oryctes rhinoceros* (L.) in the Pacific. **Sean Marshall** (sean. marshall@agresearch.co.nz)1, Maclean Vaqalo2,  
Aubrey Moore3, Roland Quitugua3, and Trevor Jackson1, 1AgResearch, Ltd., Christchurch, New Zealand, 2Secretariat of the Pacific Community, Suva, Fiji, 3Univ. of Guam, Mangilao, Guam

3:30 **0813** Control of rhinoceros beetle in endemic outbreak areas. **Ramle Moslim** (ramle@mpob.gov.my) and Norman Kamarudin, Malaysian Palm Oil Board, Kuala Lumpur, Malaysia

3:45 **0814** Tools to combat beetles threatening the Hawaiian Islands. **Mary Liz Jameson** (maryliz.jameson@gmail.com), Joshua Dunlap, and Emmy Engasser, Wichita State Univ., Wichita, KS

4:00 **0815** Semiochemistry of scarabs: A European perspective. **Jozsef Vuts** (jozsef.vuts@rothamstead. ac.uk)1, Christine Woodcock1, Zoltan Imrei2, John Pickett1, Mike Birkett1, and Miklos Toth2, 1Rothamsted Research, Harpenden, United Kingdom, 2Plant Protection Institute, Budapest, Hungary

4:15 **0816** Chemical controls used to manage invasive and native scarab pests of turf and ornamentals in the United States. **David Shetlar** (shetlar.1@osu.edu), The Ohio State Univ., Columbus, OH

4:30 **0817** Management of scarabs in the regulated urban environment. **Michael Brownbridge** (michael. brownbridge@vinelandresearch.com), Vineland Research and Innovation Centre, Vineland Station, ON, Canada

4:45 **0818** Management of pest scarabs in Mexico. **Miguel Najera Rincon** (minaj47@hotmail.com)1,2, Trevor Jackson3, Guadalupe Zitlalpopoca Hernandez2, and John Larsen2, 1INIFAP, Uruapan, Mexico, 2National Autonomous Univ. of México, Morelia, Mexico, 3AgResearch, Ltd., Christchurch, New Zealand

5:00 **0819** *Phyllophaga* pheromones and sex attractants: Juggling the many species. **Paul S. Robbins** (paul.robbins@ars.usda.gov), USDA - ARS, Ft. Pierce, FL

**SD0820** Management of pest scarabs in Japan. **Shin Asano** (sangaku@abs.agr.hokudai.ac.jp)1 and Kazuhiro Iiyama2, 1Hokkaido Univ., Sapporo, Japan, 2Kyushu Univ., Fukuoka, Japan

**SD0821** An eradication program for rhinoceros beetle in Hawaiʻi. **Darcy Oishi** (darcy.e.oishi@hawaiʻi.gov), Division of Plant Industry, Honolulu, HI

**SD0822** Comparing the challenges and successes of Japanese beetle (*Popillia japonica* Newman 1841) mitigation in two western North American states (Oregon and Utah). **Clint Burfitt** (clintburfitt@hotmail.com)1, Diana Kearns1, Alan Mudge1, and Kristopher Watson2, 1Oregon Dept. of Agriculture, Salem, OR, 2Utah Dept. of Agriculture and Food, Salt Lake City, UT

**SD0823** Detoxification enzymes in Japanese beetle adults and larvae: Prospects for management and eradication. **David Held** (dwh0004@auburn.edu), Adekunle Adesanya, and Nannan Liu, Auburn Univ., Auburn, AL

**SD0824** Presentation withdrawn

**SD0825** Lures and traps for NE Chinese scarab pests. **Ri-zhao Chen** (bobob1972@163.com)1 and  
Michael G. Klein2, 1Jilin Agricultural Univ., Changchun, China, 2The Ohio State Univ., Heber, AZ

**SD0826** Insecticides and bio-pesticides for scarab quarantine use in nurseries: Potential and reality. **Jason B. Oliver** (joliver@tnstate.edu)1, Karla Addesso1, Christopher Ranger2, Michael E. Reding2, and Michael G. Klein3, 1Tennessee State Univ., McMinnville, TN, 2USDA - ARS, Wooster, OH, 3The Ohio State Univ., Heber, AZ

**SD0827** Eradication of Japanese beetle from Palisade, Colorado. **Bob Hammon** (bob.hammon@mesacounty.us), Colorado State Univ., Grand Junction, CO

**SD0828** Japanese beetle: The California experience.  
**Jason Leathers** (jason.leathers@cdfa.ca.gov) and Kevin Hoffman, California Dept. of Food and Agriculture, Sacramento, CA

5:15 **Poster Session**  
**Symposium: Innovative Strategies of Mosquito**

**Control**

***Room W331 A (Convention Center)***

**Moderators and Organizers:** Stephen Dobson1 and  
Roberto Barrera2, 1Univ. of Kentucky, Lexington, KY, 2Centers for Disease Control and Prevention, San Juan, PR

1:30 **0829** Innovation: The hall of mirrors in mosquito control. **Daniel A. Strickman** (dan.strickman@ gatesfoundation.org), Bill and Melinda Gates Foundation, Seattle, WA

1:45 **0830** Evaluation of combined strategies for controlling mosquito-borne diseases. **Alun L. Lloyd** (alun\_lloyd@ncsu.edu)1, Kenichi Okamoto2, and Fred Gould1, 1North Carolina State Univ., Raleigh, NC, 2Yale Univ., New Haven, CT

2:00 **0831** Integrating vaccines and vector control for dengue prevention. **Thomas W. Scott** (twscott@ ucdavis.edu), Univ. of California, Davis, CA



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**MONDAY**

**Monday, September 26 • AFTERNOON •**

2:15 **0832** Novel malaria and NTD vector control insecticides and tools: Crossing the finish line.  
**Nick Hamon** (nick.hamon@ivcc.com)1, Sarah Rees1, David Malone1, and Daniel A. Strickman2, 1IVCC, Liverpool, United Kingdom, 2USDA - ARS, Beltsville, MD

2:30 **0833** Insecticide-treated house screens to reduce infestations of dengue vectors. **Pablo Manrique-Saide** (pablo\_manrique2000@hotmail.com), Autonomous Univ. of Yucatán, Merida, Mexico

2:45 **0834** Electrostatic netting as an insecticide-resistance breaking tool for malaria vector control. Bart Knols and **Marit Farenhorst** (marit@in2care.org), In2Care B.V., Wageningen, Netherlands

**3:00 BREAK**

3:15 **0835** Control of container *Aedes* mosquito vectors using trapping devices. **Roberto Barrera** (amz9@cdc. gov), Veronica Acevedo, Gilberto Felix, Ryan Hemme, Jesus Vazquez, Jorge Munoz, and Manuel Amador, Centers for Disease Control and Prevention, San Juan, PR

3:30 **0836** Advancing a paradigm: Spatial repellents for control of vector-borne disease. **Nicole L. Achee** (nachee@nd.edu), Univ. of Notre Dame, South Bend, IN

3:45 **0837** New methods for improving the impacts of larvicides and adulticides. **Greg Devine** (greg.devine@ qimrberghofer.edu.au), QIMR Berghofer Medical Research Institute, Herston, Australia

4:00 **0838** Male mosquitoes as vehicles for insecticide. **Corey L. Brelsfoard** (cbrelsfoard@mosquitomate.com), MosquitoMate, Inc., Lexington, KY

4:15 **0839** R&D activities of the Joint FAO/IAEA Insect Pest Control Laboratory toward sterile insect technique (SIT)-based population control of mosquito species. **Jeremie Gilles** (j.gilles@iaea.org)1, Rosemary Lees2, and Kostas Bourtzis2, 1Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, Seibersdorf, Austria, 2International Atomic Energy Agency, Vienna, Austria

4:30 **0840** Comparing transgenic mosquito technique and SIT mosquito programs. Danilo Carvalho and **André Costa-da-Silva** (alcosta@icb.usp.br), Univ. of São Paulo, São Paulo, Brazil

4:45 **0841** Developing a *Wolbachia*-based strategy to control dengue in China. **Zhiyong Xi** (xizy@msu.edu), Michigan State Univ., East Lansing, MI

5:00 **0842** A bacterium in the fight against dengue. **Luciano Moreira** (luciano@cpqrr.fiocruz.br), Oswaldo Cruz Foundation, Belo Horizonte, Brazil

5:15 **0843** *Wolbachia* biopesticide regulation and application in the USA. **Stephen Dobson** (sdobson@ uky.edu), Univ. of Kentucky, Lexington, KY

**Symposium: Vector-Borne Diseases of Livestock**

***Room W331 B (Convention Center)***

**Moderators and Organizers:** D. Scott McVey1 and Roman Kucheryavenko2, 1USDA - ARS, Manhattan, KS, 2National Scientific Center, Kharkiv, Ukraine

1:30 **0844** African swine fever in Ukraine: History of eradi- cation, present, and prospects. **Roman Kucheryavenko** (rkucheryavenko@ukr.net), National Scientific Center, Kharkiv, Ukraine

2:00 **0845** *Ornithodoros verrucosus* in Ukraine: Evaluating regional presence and its possible impact on the epidemiology of African swine fever. **Filatov Serhii** (filatovmidge@gmail.com), National Scientific Center, Kharkiv, Ukraine

2:15 **0846** Equine piroplasmosis and associated tick vectors. **Glen Scoles** (scoles@vetmed.wsu.edu), USDA - ARS, Pullman, WA

2:30 **0847** Dynamic of tick and bovine babesiosis in central Brazil in a world of potential climatic changes. **Renato Andreotti** (renato.andreotti@embrapa.br), Brazilian Agricultural Research Corporation, Campo Grande, Brazil

2:45 **0848** The population genetics of potential Rift Valley fever mosquito vectors in the United States. **Lee Cohnstaedt** (lee.cohnstaedt@ars.usda.gov) and Phillip Schumm, USDA - ARS, Manhattan, KS

**3:00 BREAK**

3:15 **0849** Strategies used in the control and management of Rift Valley fever in Africa. **Phelix Majiwa** (majiwap@ arc.agric.za)1,2 and Robert Maluleke1, 1Agricultural Research Council, Onderstepoort, South Africa,

2Univ. of Pretoria, Onderstepoort, South Africa

3:30 **0850** *Culicoides*: The controller of orbivirus transmission. **Barbara Drolet** (barbara.drolet@ars. usda.gov), Christopher Lehiy, Lindsey Reister, Mark Ruder, and D. Scott McVey, USDA - ARS, Manhattan, KS

3:45 **0851** Predictive biology and control strategies for vector-borne diseases of livestock. **D. Scott McVey** (scott.mcvey@ars.usda.gov), Barbara Drolet, and Lee Cohnstaedt, USDA - ARS, Manhattan, KS

**Symposium: Evolution and Biology of Chalcidoidea: Integrating Genomics, Fossils, Microbiomes, and Natural History**

***Room W340 A (Convention Center)***

**Moderators and Organizers:** James Woolley1, John M. Heraty2, and Astrid Cruaud3, 1Texas A&M Univ., College Station, TX, 2Univ. of California, Riverside, CA, 3INRA, Montferrier-sur-Lez, France

1:30 **0852** Fossil chalcidoid wasps and the history of megadiversity. **Lars Krogmann** (lars.krogmann@ smns-bw.de)1, Ralph Peters2, Roger A. Burks3, and John M. Heraty3, 1State Museum of Natural History, Stuttgart, Germany, 2Alexander Koenig Zoological Research Museum, Bonn, Germany, 3Univ. of California, Riverside, CA

1:45 **0853** The most ancestral genus of Mymaridae, with comments on generic relationships and evolution within the family. **John Huber** (john.huber@agr.gc.ca), Natural Resources Canada, Ottawa, ON, Canada

2:00 **0854** Phylogenomics, genomics, and our understanding of Chalcidoidea evolution. **Ralph Peters** (ralph\_peters@ hotmail.com), Alexander Koenig Zoological Research Museum, Bonn, Germany

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**MONDAY**

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2:15 **0855** There is more than one way to jump: Eupelmidae, Encyrtidae, and the interplay between phylogenomics and morphology. **James Woolley** (jimwoolley@tamu.edu), Texas A&M Univ., College Station, TX

2:30 **0856** Figs and wasps arm-in-arm: An 80 million year walk in the jungle. **Jean-Yves Rasplus** (rasplus@ supagro.inra.fr) and Astrid Cruaud, INRA, Montferrier- sur-Lez, France

2:45 **0857** Unjumbling the jumbled trichogrammatids: NGS to the rescue. **Astrid Cruaud** (cruaud@supagro. inra.fr)1, Geraldine Bout2, Guenaëlle Genson1, and Jean-Yves Rasplus1, 1INRA, Montferrier-sur-Lez, France, 2INRA, Sophia Antipolis, France

**3:00 BREAK**

3:15 **0858** What exactly is an aphelinid anyway? **Andrew Polaszek** (a.polaszek@nhm.ac.uk), The Natural History Museum, London, United Kingdom

3:30 **0859** The role of the symbiont *Cardinium* in shaping the ecology and evolution of *Encarsia*. **Marco Gebiola** (marco.gebiola@gmail.com)1, Suzanne E. Kelly1,  
Peter Hammerstein2, Massimo Giorgini3, and

Martha Hunter1, 1Univ. of Arizona, Tucson, AZ, 2Humboldt Univ., Berlin, Germany, 3National Research Council of Italy, Portici, Italy

3:45 **0860** Genomics and adaptation in *Wolbachia*, an obligate reproductive parasite in *Trichogramma* wasps. **Amelia Lindsey** (alind005@ucr.edu)1, John H. Werren2, Stephen Richards3, and Richard Stouthamer1, 1Univ. of California, Riverside, CA, 2Univ. of Rochester, Rochester, NY, 3Baylor College of Medicine, Houston, TX

4:00 **0861** Genetics and genomics of *Aphelinus* — keeping ahead in the parasitism race. **Keith R. Hopper** (khopper@udel.edu), USDA - ARS, Newark, DE

4:15 **0862** Morphometrics and the description of cryptic species in the Chalcidoidea. **Hannes Baur** (baur. hannes@gmail.com), Natural History Museum of the Civic Community, Bern, Switzerland

4:30 **0863** Immature development of Chalcidoidea: Trends, functional ecology, and comparison with other parasitoids. **Alex Gumovsky** (entedon@gmail.com)1,2, 1National Academy of Sciences of Ukraine, Kiev, Ukraine, 2Univ. of the Witwatersrand, Johannesburg, South Africa

4:45 **0864** Insights into Eurytomidae and Chalcididae: What does the future hold? **Michael Gates** (michael. gates@ars.usda.gov), USDA - ARS, Washington, DC

5:00 **0865** Unraveling the ant parasitic Eucharitidae — taxonomic and biological approaches. **John M. Heraty** (john.heraty@ucr.edu)1, Jason Mottern2, Roger A. Burks1, Ralph Peters3, Alan Lemmon4, Emily Lemmon4, and

D. Darling5, 1Univ. of California, Riverside, CA, 2USDA - ARS, Washington, DC, 3Alexander Koenig Zoological Research Museum, Bonn, Germany, 4Florida State U niv., Tallahassee, FL, 5Royal Ontario Museum, Toronto, ON, Canada

5:15 **0866** Biological control in the 21st century — do chalcids still count? **Erica Kistner** (erica.kistner@ucr.edu) and Mark S. Hoddle, Univ. of California, Riverside, CA

**Symposium: Recent Advances in Heteropteran (Hemiptera) Systematics and Evolution**

***Room W231 C (Convention Center)***

**Moderators and Organizers:** Thomas J. Henry1 and Wenjun Bu2, 1USDA - ARS, Washington, DC, 2Nankai Univ., Tianjin, China

1:30 **0867** Species biodiversity can be overestimated using a fixed threshold: Insights from DNA barcoding of the genus *Cletus* (Hemiptera: Coreidae) and COI data from phylogeographical studies. **Haiguang Zhang** (haiguangzhang123@163.com)1, Minhua Lv1, Wenbo Yi1, Weibing Zhu2, and Wenjun Bu1, 1Nankai Univ., Tianjin, China, 2Chinese Academy of Sciences, Shanghai, China

1:45 **0868** Millipede assassin bugs (Heteroptera: Reduviidae: Ectrichodiinae) show off: Evolution of aposematic coloration and extreme sexual dimorphism. **Michael Forthman** (mfort001@ucr.edu), Univ. of California, Riverside, CA

2:00 **0869** Sea-level fluctuation and host-plant habitat requirements influence the Pleistocene history of  
the invasive species *Amphiareus obscuriceps* (Hemiptera: Anthocoridae): Inferences from molecular phylogeography and ecological niche modeling.

**Danli Zhang** (danlizhang2012@163.com)1, Zhen Ye1, Kazutaka Yamada2, Yahui Zhen1, Chenguang Zheng1, and Wenjun Bu1, 1Nankai Univ., Tianjin, China, 2Tokushima Prefectural Museum, Tokushima, Japan

2:15 **0870** From leaf litter to canopy: Uncovering the biodiversity of Dipsocoromorpha. **Christiane Weirauch** (christiane.weirauch@ucr.edu), Rochelle Hoey- Chamberlain, Alexander Knyshov, Stephanie Leon, and Sarah Frankenberg, Univ. of California, Riverside, CA

2:30 **0871** The classification of the Pentatomidae (Hemiptera: Heteroptera): Past, present, and future. **David Rider** (david.rider@ndsu.edu)1 and Cristiano Schwertner2, 1North Dakota State Univ., Fargo, ND, 2Federal Univ. of São Paulo, Diadema, Brazil

2:45 **0872** The origin and evolution of the Tingidae (Hemiptera: Heteroptera). **Eric Guilbert** (guilbert@ mnhn.fr)1 and Marcus Guidoti2, 1National Museum of Natural History, Paris, France, 2Federal Univ. of Rio Grande de Sul, Porto Alegre, Brazil

**3:00 BREAK**

3:15 **0873** Phylogeny and tribal assessment of the Isometopinae (Hemiptera: Miridae) and discussion  
of their relationship with the Cylapinae, including “Psallopini”. **Thomas Henry** (thomas.henry@ars.usda. gov)1 and Andrzej Wolski2, 1USDA - ARS, Washington, DC, 2Opole Univ., Opole, Poland

3:30 **0874** Presentation withdawn

3:45 **0875** Phylogeny and character evolution in Eccritotarsini (Heteroptera: Bryocorinae).  
**Fedor Konstantinov** (fkonstantinov@gmail.com)1 and Anna Namyatova2, 1St. Petersburg State Univ., St. Petersburg, Russia, 2Univ. of New South Wales, Sydney, Australia

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4:00 **0876** From pretarsi to purines: How knowledge of relationships in the Phylinae, based on new and novel synapomorphies, have changed. **Katrina Menard** (kmenard@ou.edu)1 and Randall T. Schuh2, 1Sam Noble Oklahoma Museum of Natural History, Norman, OK, 2American Museum of Natural History, New York, NY

4:15 **0877** Geographical isolation and Pleistocene climate fluctuations as motors in speciation: Case study on mountain stream insects of the genus *Pseudovelia* (Hemiptera: Veliidae). **Zhen Ye** (yezhen1987331@163. com)1, Pingping Chen2, and Wenjun Bu1, 1Nankai Univ., Tianjin, China, 2Naturalis Biodiversity Center, Leiden, Netherlands

**Symposium: Systematics, Biogeography, and Ecology of Cerambycidae and Buprestidae**

***Room W231 A (Convention Center)***

**Moderators and Organizers:** Eugenio Nearns1 and Ann M. Ray2, 1Purdue Univ., West Lafayette, IN, 2Xavier Univ., Cincinnati, OH

1:30 **0878** Crepuscular cerambycids favor trees with moist wood. **Amy Berkov** (berkov@sci.ccny.cuny.edu)1, Christina Torres1, Héctor Barrios2, and Sara Pinzon- Navarro3, 1City College of New York, New York, NY, 2Univ. of Panamá, Panama City, Panama, 3Smithsonian Tropical Research Institute, Panama City, Panama

1:45 **0879** Cladistic analysis of the tribe Eburiini Blanchard 1945 (Cerambycidae, Cerambycinae). **Juan Pablo Botero** (jp\_bot@yahoo.com) and Marcela Monné, Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

2:00 **0880** Cladistic analysis of the genus *Cosmisoma* Audinet-Serville, 1834 (Cerambycidae, Cerambycinae). **Allan Carelli Aragão** (allancarelli@hotmail.com) and Marcela Monné, Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

2:15 **0881** Isolation by adaptation in *Monochamus clamator*: Host plants as a selective pressure. **Patrick Gorring** (psg7@cornell.edu) and Brian Ferrell, Harvard Univ., Cambridge, MA

2:30 **0882** Phylogenomic data resolve the enigmatic higher-level phylogeny of longhorned beetles (Coleoptera: Cerambycidae). **Stephanie Haddad** (stephanyhaddad@gmail.com)1, Seunggwan Shin2, Alan Lemmon3, Emily Lemmon3, and Duane D. McKenna1, 1Univ. of Memphis, Memphis, TN, 2North Carolina State Univ., Raleigh, NC, 3Florida State Univ., Tallahassee, FL

2:45 **0883** West meets East: How do tropical beetles disperse across Beringia? Evolutionary origin of *Callipogon relictus* and allied species (Cerambycidae: Prioninae) in the rainforests of the new and old worlds. **Sang Kim** (sikim@g.harvard.edu) and Brian Ferrell, Harvard Univ., Cambridge, MA

**3:00 BREAK**

3:15 **0884** Community structure of cerambycid beetles in a forest mosaic on the Osa Peninsula, Costa Rica. **Lin Li** (lincarrieli@gmail.com)1, Reinaldo Aguilar2, and Amy Berkov1, 1City College of New York, New York, NY, 2Los Charcos de Osa, Rincon de Osa, Costa Rica

3:30 **0885** BuprestidID: An interactive tool for the identification of the metallic wood-boring beetles (Coleoptera: Buprestidae). **Gavin Martin** (gmartin33@ live.com)1, Nathan Lord1, Seth M. Bybee1, and

Charles L Bellamy2, 1Brigham Young Univ., Provo, UT, 2California Dept. of Food and Agriculture, Sacramento, CA

3:45 **0886** Taxonomic catalog of the fauna of Brazil — families Buprestidae and Cerambycidae. **Marcela Monné** (mlmonne2@gmail.com) and Miguel Monné, Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

4:00 **0887** Longicorn ID: A tool for identification of larval Cerambycidae. **Eugenio Nearns** (gino@nearns.com)1, Nathan Lord2, Steve Lingafelter3, Antonio Santos-Silva4, Kelly Miller5, and Jennifer Zaspel1, 1Purdue Univ., West Lafayette, IN, 2Brigham Young Univ., Provo, UT, 3USDA - ARS, Washington, DC, 4Univ. of São Paulo, São Paulo, Brazil, 5Univ. of New Mexico, Albuquerque, NM

4:15 **0888** Cerambycidae in the tropical dry forest of western Mexico. Felipe Noguera, **Nayeli Gutiérrez** (pinedaaa@gmail.com), and Cisteil Pérez-Hernández, National Autonomous Univ. of México, Mexico City, Mexico

4:30 **0889** Isolation and identification of a male-produced attractant pheromone for the invasive velvet long- horned beetle, *Trichoferus campestris* (Cerambycinae: Hesperophanini). **Ann M. Ray** (raya6@xavier.edu)1, Joseph Francese2, Yunfan Zou3, Kristopher Watson4, Jocelyn G. Millar3, Damon Crook2, and Baode Wang2, 1Xavier Univ., Cincinnati, OH, 2USDA - APHIS, Buzzards Bay, MA, 3Univ. of California, Riverside, CA, 4Utah Dept. of Agriculture and Food, Salt Lake City, UT

4:45 **0890** Phylogeny of Polyrhaphidini and their placement among the Lamiinae (Coleoptera: Cerambycidae). **Diego de Santana Souza** (diegosantanasouza@hotmail. com)1, Luciane Marinoni1, Marcela Monné2, and

Jesús Gómez-Zurita3, 1Federal Univ. of Paraná, Curitiba, Brazil, 2Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil, 3Pompeu Fabra Univ., Barcelona, Spain

5:00 **0891** A simple method for observing female genitalia with inflation for Cerambycidae. **Junsuke Yamasako** (mesoxxmesosa@hotmail.com), The Univ. of Tokyo, Tokyo, Japan

**Symposium: Bt Mode of Action, Resistance Mechanisms, and Global Patterns**

***Room W230 D (Convention Center)***

**Moderators and Organizers:** Alejandra Bravo and Mario Soberón, National Autonomous Univ. of México, Cuernavaca, Mexico

1:30 **0892** Global patterns of field-evolved resistance to Bt crops: Successes and failures. **Bruce Tabashnik** (brucet@ag.arizona.edu) and Yves Carriere, Univ. of Arizona, Tucson, AZ

1:45 **0893** The status or resistance of maize stem borers to Bt maize in South Africa. **Johnnie Van der Berg** (johnnie.vandenberg@nwu.ac.za)1, Annemie Erasmus2, and Hannalene du Plessis1, 1North-West Univ., Potchefstroom, South Africa, 2Agricultural Research Council, Potchefstroom, South Africa

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2:00 **0894** Resistance monitoring to Bt maize: The case of Spain after 17 years of cultivation. **Gema Farinos** (gpfarinos@cib.csic.es), Center of Biological Research, Madrid, Spain

2:15 **0895** Insect resistance to Bt toxins in Brazil and Latin America. **Rose Monnerat** (rose.monnerat@embrapa.br), Embrapa Genetic Resources and Biotechnology, Brasília, Brazil

2:30 **0896** Mode of action of Bt 3d-Cry toxins and use of genetically modified toxins to counter pest resistance. **Mario Soberón** (mario@ibt.unam.mx) and Alejandra Bravo, National Autonomous Univ. of México, Cuernavaca, Mexico

2:45 **0897** Mode of action of Vip3 proteins. **Juan Ferre** (juan.ferre@uv.es), Univ. of Valencia, Valencia, Spain

**3:00 BREAK**

3:15 **0898** The expanding role of ABC proteins in Cry toxin mode of action. **David G. Heckel** (heckel@ice.mpg.de), Max Planck Institute for Chemical Ecology, Jena, Germany

3:30 **0899** Resistance to *Bacillus thuringiensis* Cry toxins in the cabbage looper, *Trichoplusia ni*. **Ping Wang** (pingwang@cornell.edu), Cornell Univ., Geneva, NY

3:45 **0900** Resistance to Cry1Ac and Cry2Ab in the pink bollworm, *Pectinophora gossypiella*. **Jeffrey A. Fabrick** (jeff.fabrick@ars.usda.gov), USDA - ARS, Maricopa, AZ

4:00 **0901** Molecular characterization of resistance to Bt corn in *Spodoptera frugiperda*. **Juan Luis Jurat-Fuentes** (jurat@utk.edu), Univ. of Tennessee, Knoxville, TN

4:15 **0902** Bt resistance in fall armyworm: Diversity in cross-resistance, inheritance, and fitness costs. **Fangneng Huang** (fhunag@agcenter.lsu.edu), Louisiana State Univ., Baton Rouge, LA

4:30 **0903** Considering amino acid sequence similarity of toxins for development of sustainable Bt crop pyramids. **Yves Carriere** (ycarrier@ag.arizona.edu)1, Neil Crickmore2, and Bruce Tabashnik1, 1Univ. of Arizona, Tucson, AZ, 2Univ. of Sussex, Brighton, United Kingdom

4:45 **0904** Interaction between chafer and Bt, a story of insects environmental adaptation. **Changlong Shu** (clshu@ippcaas.cn) and Jie Zhang, Chinese Academy of Agricultural Sciences, Beijing, China

5:00 **0905** Emerging resistance to Bt crops in Latin America prompts new implementation paradigm for IRM. **Timothy J. Dennehy** (timothy.dennehy@bayer.com), Univ. of Arizona, Tucson, AZ

5:15 **0906** Farm level aspects of IRM, IPM connections. **William Hutchison** (hutch002@umn.edu), Univ. of Minnesota, St. Paul, MN

**Symposium: The Physiological Ecology of Insect Flight: From Millisecond Escape to Long-Distance Migration**

***Room W414 B (Convention Center)***

**Moderators and Organizers:** Robert Dudley1 and Jason Chapman2, 1Univ. of California, Berkeley, CA, 2Rothamsted Research,

Harpenden, United Kingdom

1:30 **0907** Sensory motor integration in the flight system of *Drosophila*. **Michael Dickinson** (flyman@caltech. edu), California Institute of Technology, Pasadena, CA

1:45 **0908** Catching the breeze: How flying insects sense airflow. **Sanjay Sane** (sane@ncbs.res.in)1, Taruni Roy2, and Dinesh Natesan3, 1National Centre for Biological Sciences, Bangalore, India, 2National Center for Biological Sciences, Bangalore, India, 3Neurobiology, Bangalore, India

2:00 **0909** Evasive maneuvers in freely flying fruit flies consist of rapid visually-directed banked turns. **Florian Muijires** (florian.muijres@wur.nl), Wageningen Univ. and Research Centre, Wageningen, Netherlands

2:15 **0910** Predator versus prey: Biomechanics, behavior, and strategy during aerial predation in dragonflies. **Stacey Combes** (sacombes@ucdavis.edu), Univ. of California, Davis, CA

2:30 **0911** Hawkmoth flight in unsteady flows. **Ty Hedrick** (thedrick@bio.unc.edu), Univ. of North Carolina, Chapel Hill, NC

2:45 **0912** Bumblebee flight across a 9000m simulated elevational gradient. **Michael E. Dillon** (michael.dillon@ uwyo.edu)1 and Robert Dudley2, 1Univ. of Wyoming, Laramie, WY, 2Univ. of California, Berkeley, CA

**3:00 BREAK**

3:15 **0913** Ants in the atmosphere: Colony founding, mating, and dispersal in ant queens. **Jackson Helms** (jackson.a.helms-1@ou.edu), Univ. of Oklahoma, Norman, OK

3:30 **0914** Using stable isotopic tools to track insect origins and movements at continental scales. **Keith Hobson** (khobson6@uwo.ca), Univ. of Western Ontario, London, ON, Canada

3:45 **0915** Wind drift compensation in a suite of migratory neotropical Lepidoptera. **Robert Dudley** (wings@ socrates.berkeley.edu)1 and Robert B. Srygley2, 1Univ. of California, Berkeley, CA, 2USDA - ARS, Sidney, MT

4:00 **0916** Monarch butterflies are not true navigators. **Henrik Mouritsen** (henrik.mouritsen@uni-oldenburg.de)1, Rachael Derbyshire2, Julia Stalleicken1, Ole Mouritsen3, Barrie Frost4, and Ryan Norris2, 1Univ. of Oldenburg, Oldenburg, Germany, 2Univ. of Guelph, Guelph, ON, Canada, 3Aalborg Univ., Aalborg, Denmark, 4Queen’s Univ., Kingston, ON, Canada

4:15 **0917** Monarchs as a model system for studying animal migration and infectious diseases. **Sonia Altizer** (saltizer@uga.edu), Univ. of Georgia, Athens, GA

4:30 **0918** Radar observations of locust flight capability, and implications for locust management.  
**V. Alistair Drake** (a.drake@adfa.edu.au), Univ. of New South Wales, Canberra, Australia

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4:45 **0919** Doppler weather radar detects emigratory flights of beet armyworms, *Spodoptera exigua*, during a major pest outbreak. **John Westbrook** (john.westbrook@ ars.usda.gov) and Ritchie Eyster, USDA - ARS, College Station, TX

5:00 **0920** From worms in the fields to moth DNA — a history of *Spodoptera frugiperda* migration in North America. **Robert L. Meagher** (rob.meagher@ars.usda. gov)1, Rodney N. Nagoshi1, Shelby J. Fleischer2, and John Westbrook3, 1USDA - ARS, Gainesville, FL, 2Pennsylvania State Univ., University Park, PA,

3USDA - ARS, College Station, TX

5:15 **0921** Go with the flow? Wind selectivity and orientation in high-flying insect migrants. **Jason Chapman** (jason.chapman@rothamsted.ac.uk), Rothamsted Research, Harpenden, United Kingdom

**Symposium: Emerging Technologies for Successful Applications of dsRNA to Reduce Pests and Pathogens in Agriculture**

***West Hall F2 (WF2) (Convention Center)***

**Moderators and Organizers:** William Moar1 and Wayne B. Hunter2, 1Monsanto Company, St. Louis, MO, 2USDA - ARS, Ft. Pierce, FL

1:30 **0922** RNAi-mediated insect pest management: Challenges and opportunities. **James A. Baum** (james.a.baum@monsanto.com), Monsanto Company, Chesterfield, MO

2:00 **0923** Parental RNA interference of genes involved in embryonic development of the western corn rootworm, *Diabrotica virgifera virgifera*. **Ana Vélez** (anamaria. velez@gmail.com)1, Elane Fishilevich2, Kenneth Narva2, and Blair Siegfried3, 1Univ. of Nebraska, Lincoln, NE, 2Dow AgroSciences, Indianapolis, IN, 3Univ. of Florida, Gainesville, FL

2:15 **0924** Advances to development of non-transgenic RNAi control strategies for insects. **Eduardo de Andrade** (eduardo.andrade@embrapa.br)1, Wayne B. Hunter2, and Vitor de Andrade3, 1Embrapa Labex, Fort Pierce, FL, 2USDA - ARS, Ft. Pierce, FL, 3Westwood High School, Ft. Pierce, FL

2:30 **0925** Emerging biopesticides to control insect pests in urban environments. **Saikat Kumar Ghosh** (saikat. ghosh@ars.usda.gov) and Dawn Gundersen-Rindal, USDA - ARS, Beltsville, MD

2:45 **0926** Control of pests of canola using RNA interference technologies. **Suresh Desai** (beesuresh@gmail.com)1, Aditi Singh1, Chris Anderson2, James A. Baum3,  
Michael Crawford4, Mark Belmonte1, and Steve Whyard1, 1Univ. of Manitoba, Winnipeg, MB, Canada, 2Monsanto Canada, Winnipeg, MB, Canada, 3Monsanto Company, Chesterfield, MO, 4Monsanto Company, St. Louis, MO

**3:00 BREAK**

3:15 **0927** Topical RNAi in citrus tree crops to control hemipteran pests. **Wayne B. Hunter** (wayne.hunter@ ars.usda.gov) and Eduardo de Andrade, USDA - ARS, Ft. Pierce, FL

3:30 **0928** Large scale RNA production for RNAi applications in broad acre agriculture. **Patrick McLaughlin** (patrick. mclaughlin@apsellc.com), Yulia Korshunova, John Kilmer, and Juan Arhancet, APSE, Inc., St. Louis, MO

3:45 **0929** Gene silencing of herbivorous insects by host plant chloroplast genome modification. **Sher Khan** (skhan@ice.mpg.de)1, Jiang Zhang2, Ralph Bock2, and David Heckel1, 1Max Planck Institute for Chemical Ecology, Jena, Germany, 2Max Planck Institute, Potsdam-Golm, Germany

4:00 **0930** Environmental risk management of RNAi pesticides: Sustainable process design through bioinformatics and community curation.  
**Alexie Papanicolaou** (a.papanicolaou@uws.edu.au)1, Brad Coates2, Kent S. Shelby3, Wayne B. Hunter4,  
Jay Evans5, and James Cook6, 1Western Sydney Univ., Sydney, Australia, 2USDA - ARS, Ames, IA, 3USDA

- ARS, Columbia, MO, 4USDA - ARS, Ft. Pierce, FL, 5USDA - ARS, Beltsville, MD, 6Hawkesbury Institute for the Environment, Richmond, Australia

4:15 **0931** Ecological risk assessment for an RNAi plant incorporated protectant: Framework, analysis, and approach. Pamela Bachman1, Joshua Fischer2, Jennifer Fridley1, **Peter Jensen** (peter.d.jensen@monsanto. com)1, Geoffrey Mueller1, Jianguo Tan1, Joshua Uffman1 and Fatima Zapata1, 1Monsanto Company, St. Louis, MO, 2Monsanto Company, Creve Coeur, MO

4:30 **0932** Environmental safety assessment considerations for plants expressing novel insecticidal RNAi traits in Canada. **Andrea Hitchon** (andrea.hitchon@inspection. gc.ca), Cecile Girard and Sarah G. Davis, Canadian Food Inspection Agency, Ottawa, ON, Canada

4:45 **0933** SmartStax PRO: The first commercial transgenic crop expressing insecticidal dsRNA for the control of corn rootworm. **Sean Evans** (spevan@monsanto.com)1, Joshua Bynum1, Matthew Carroll1, Thomas Clark2, Ronald Flannagan2, Graham P. Head1, William Moar1, Paula A. Price1, Gerrit Segers2, Alan Willse1, and

Heidi Windler2, 1Monsanto Company, St. Louis, MO, 2Monsanto Company, Chesterfield, MO

5:00 **0934** The potential of RNAi-based pest control in the African sweet potato weevil, *Cylas puncticollis* (Coleoptera, Brentidae). **Katterinne Prentice** (katterinne. prenticemuro@ugent.be)1, Olivier Christiaens1, Ine Pertry2, Ana Bailey3, Chuck Niblett3, Godelieve Gheysen1,

Marc Ghislain4, and Guy Smagghe1, 1Ghent Univ., Ghent, Belgium, 2Vlaams Institute for Biotechnology, Ghent, Belgium, 3Venganza, Inc., Florida, FL, 4International Potato Center, Nairobi, Kenya

**Symposium: The Khapra Beetle: A Potential Invasive Species**

***Room W315 B (Convention Center)***

**Moderators and Organizers:** Frank Arthur1 and Joel Perez-Mendoza2, 1USDA - ARS, Manhattan, KS, 2USDA - APHIS, Laredo, TX

1:30 **0935** Fluctuation of interceptions of *Trogoderma granarium* in foods coming to the USA from abroad:  
A 30-year data analysis. **Joel Perez-Mendoza** (joel.perez-mendoza@aphis.usda.gov), USDA - APHIS, Laredo, TX

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1:45 **0936** Recognition and identification training: The 2:00 foundation of an effective *Trogoderma granarium*  
exclusion program. **Charles Brodel** (charles.brodel@ aphis.usda.gov), USDA - APHIS, Miami, FL

2:00 **0937** Measures to prevent the introduction of khapra  
beetle to México. **Francisco Corral** (fjwong@guayacan. 2:15 uson.mx), Univ. of Sonora, Sonora, Mexico

2:15 **0938** Survey of *Trogoderma granarium* in Spain  
and Greece. **Jordi Riudavets** (jordi.riudavets@irta.cat)1  
and Christos Athanassiou2, 1IRTA, Barcelona, Spain, 2:30 2Univ. of Thessaly, Nea Ionia, Greece

2:30 **0939** Current status and proposed research for khapra  
beetle in Argentina. **Micaela Buteler** (butelermica@  
gmail.com), CONICET, Mendoza, Argentina 2:45

2:45 **0940** Molecular identification of *Trogoderma*  
*granarium* and phylogenetic analysis of US *Trogoderma*.  
**Rachel Olsen** (olsonrl@r.umn.edu)1, Norman Barr2,  
Roxanne Farris2, and Anthony I. Cognato3, 1Univ. of **3:00** Minnesota, Rochester, MN, 2USDA - APHIS, Edinburg,

TX, 3Michigan State Univ., East Lansing, MI

**3:00 BREAK**

**0947** Coleopteran exotic insects into the Republic of Korea: Comparing border interception and incursion from 1996 to 2014. **Lee Wonhoon** (wonhoon80@korea. kr), Animal and Plant Quarantine Agency, Gyeonggi-do, South Korea

**0948** Digestion mechanisms of wood degrading arthropods operating in the marine intertidal and subtidal zones. **Simon Cragg** (simon.cragg@port.ac.uk), Univ. of Portsmouth, Portsmouth, United Kingdom

**0949** Beetles and drywood termites: A hazard to buildings in southern Europe. **Lina Nunes** (linanunes@ Inec.pt), National Laboratory for Civil Engineering, Lisbon, Portugal

**0950** Deathwatch beetle, *Euvriletta peltata* (*Xyletinus peltatus*), structural infestation in Griffin, Georgia, USA. **Daniel R. Suiter** (dsuiter@uga.edu), Univ. of Georgia, Griffin, GA

**BREAK**

3:15 **0941** How fumigation efficacy relates to diapause,  
dose, and temperature. **Scott W. Myers** (scott.w.myers@ 3:30 aphis.usda.gov), USDA - APHIS, Buzzards Bay, MA

3:30 **0942** Evaluation of novel insecticides for control of  
khapra beetle, *Trogoderma granarium* Everts (Coleoptera: Dermestidae). **Mukti Ghimire** (mukti.n.ghimire@aphis. usda.gov)1, Frank Arthur2, Scott W. Myers1, and 3:45 Thomas Phillips3, 1USDA - APHIS, Buzzards Bay, MA,

2USDA - ARS, Manhattan, KS, 3Kansas State Univ., Manhattan, KS

3:45 **0943** Using *Trogoderma variabile* as a surrogate 4:00 species for *T. granarium* to establish susceptibility to insecticides. **Frank Arthur** (frank.arthur@ars.usda.gov),  
USDA - ARS, Manhattan, KS

4:00 **0944** Controlling *Trogoderma granarium* with  
extreme temperatures. **Diana Wilches** (diana\_wico2@ hotmail.com)1, Robert Laird2, Kevin Floate1, and 4:15 Paul Fields3, 1Agriculture and Agri-Food Canada,  
Lethbridge, AB, Canada, 2Univ. of Lethbridge, Lethbridge,  
AB, Canada, 3Agriculture and Agri-Food Canada,  
Winnipeg, MB, Canada

**0952** Molecular identification of invasive drywood wood boring species using frass and fecal pellets by loop-mediated isothermal amplification and nested PCR assays. **Tatsuya Ide** (idet@affrc.go.jp), Forestry and Forest Products Research Institute, Tsukuba, Japan

**0953** Evaluation of non-contact AE sensor for termite detection. **Wakako Ohmura** (murasan@ffpri. affrc.go.jp), Forestry and Forest Products Research Institute, Tsukuba, Japan

**0954** Nondestructive evaluation of larval development and feeding and pupal ecdysis of the bamboo powderpost beetle, *Dinoderus minutus*, using X-ray CT and acoustic emission monitoring. **Hiroki Watanabe** (watanabe@h3news1.kais.kyoto-u.ac.jp), Kyoto Univ., Kyoto, Japan

**0955** The fusion of incipient colonies in the drywood termite *Incisitermes minor*. **S. Khoirul Himmi** (himmi@ rish.kyoto-u.ac.jp), Kyoto Univ., Uji, Japan

**Symposium: A Global Perspective on Insect Pests of Wood Products**

***Room W230 A (Convention Center)***

**Moderators and Organizers:** Vernard Lewis1 and Brian Forschler2, 1Univ. of California, Richmond, CA, 2Univ. of Georgia, Athens, GA

1:30 **0945** Wood borers in structural timber — European regulations for their control and can TTIP (European Commission) comply? **Rudy Plarre** (ruediger.plarre@ bam.de), Federal Institute for Materials Research and Testing, Berlin, Germany

1:45 **0946** Innovative wood treatments with hybrid inorganic-organic polymers and a proposal for drywood termites standard testing protocol. **Lara Maistrello** (lara.maistrello@unimore.it), University of Modena and Reggio Emilia, Modena, Italy

4:30 **0956** Drywood insect pests: An Asian perspective. **Tsuyoshi Yoshimura** (tsuyoshi@rish.kyoto-u.ac.jp), Kyoto Univ., Uji, Japan

**Symposium: How Human Activities Shape the Global Distribution of Insects**

***Room W414 D (Convention Center)***

**Moderators and Organizers:** Chin-Cheng Yang1, Chow-Yang Lee2, and Andrew Suarez3, 1Kyoto Univ., Uji, Japan, 2Univ. of Science, Penang, Malaysia, 3Univ. of Illinois, Champaign, IL

1:30 **0957** The reemergence of bed bugs as a global menace from a population genetic perspective. **Warren Booth** (warren-booth@utulsa.edu)1,  
Coby Schal2, and Edward Vargo3, 1The Univ. of Tulsa, Tulsa, OK, 2North Carolina State Univ., Raleigh, NC, 3Texas A&M Univ., College Station, TX

3:15 **0951** Termite-associated nematode fauna in relation to their host/carrier termite habitat. **Natsumi Kanzaki** (nkanzaki@ffpri.affrc.go.jp), Forestry and Forest Products Research Institute, Tsukuba, Japan

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1:45 **0958** Global invasion of *Aedes aegypti* mosquitoes*,* 1:45 an important vector of human diseases. **Andrea Gloria-**  
**Soria** (andrea.gloria-soria@yale.edu) and  
Jeffrey R. Powell, Yale Univ., New Haven, CT

2:00 **0959** Invasion of the BLTs: Patterns and mechanisms  
of the geographic expansion of Lyme disease in the  
midwestern U.S. **Brian F. Allan** (ballan@illinois.edu)1,  
Natalie Pawlikowski1, Allison Gardner1, Sarah Hamer2,  
Graham J. Hickling3, James Miller1, Anna Schotthoefer4,  
and Jean Tsao5, 1Univ. of Illinois, Champaign, IL, 2Texas  
A&M Univ., College Station, TX, 3Univ. of Tennessee,  
Knoxville, TN, 4Marshfield Clinic Research Foundation, 2:00 Marshfield, WI, 5Michigan State Univ., East Lansing, MI

2:15 **0960** Phylogeography of the fungus-growing termite *Macrotermes gilvus* and insight into open- vegetation dispersal corridors in Pleistocene southeast Asia. **Veera Singham** (veerasingham@usm.my), Ahmad Sofiman Othman, and Chow-Yang Lee, Univ.

of Science, Penang, Malaysia 2:15

2:30 **0961** Reconstructing the global invasion routes of the cabbage white butterfly using citizen science assisted genomics. **DeWayne Shoemaker** (dewayne.shoemaker@ ars.usda.gov) and Sean Ryan, USDA - ARS, Gainesville, FL

2:45 **0962** Phylogeography of the invasive longhorn  
crazy ant, *Paratrechina longicornis*. **Shu-Ping Tseng** (d03632001@ntu.edu.tw)1, James Wetterer2,  
Sylvain Hugel3, Chow-Yang Lee4, Andrew Suarez5, 2:30 DeWayne Shoemaker6, En-Cheng Yang1, and

Chin-Cheng Yang7, 1National Taiwan Univ., Taipei, Taiwan, 2Florida Atlantic Univ., Jupiter, FL, 3Univ. of Strasbourg, Renés Descartes, France, 4Univ. of Science, Penang, Malaysia, 5Univ. of Illinois, Champaign, IL, 6USDA - ARS, Gainesville, FL, 7Kyoto Univ., Uji, Japan

**3:00 BREAK**

**0967** Impact assessment of *Laricobius nigrinus* (Coleoptera: Derodontidae), a predator of hemlock woolly adelgid. **Ariel Heminger** (arielrh@vt.edu)1, Albert E. Mayfield III2, Joseph Elkinton3,

Gregory J. Wiggins4, Jerome F. Grant4, Jeff Lombardo5, Thomas McAvoy1, Andrew Tait6, Bryan Mudder2,  
and Scott Salom1, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2USDA - Forest Service, Asheville, NC, 3Univ. of Massachusetts, Amherst, MA, 4Univ. of Tennessee, Knoxville, TN, 5Dartmouth College, Hanover, NH, 6North Carolina State Univ., Asheville, NC

**0968** Establishment, dispersal, and impact of *Laricobius osakensis* Montgomery and Shiyake (Coleoptera: Derodontidae), as biological control agent of the hemlock woolly adelgid, *Adelges tsugae* Annand. **Ashley Toland** (ashleyat@vt.edu) and Scott Salom, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

**0969** Phenology and synchrony of *Scymnus coniferarum* (Coleoptera: Coccinellidae) and its host hemlock woolly adelgid (Hemiptera: Adelgidae) in Tacoma, Washington. **Molly Darr** (mdarr@vt.edu)1, Scott Salom1, Thomas McAvoy1, Richard C. McDonald2, and Rachel Brooks3, 1Virginia Polytechnic Institute  
and State Univ., Blacksburg, VA, 2Symbiont Biological Pest Management, Sugar Grove, NC, 3Thurston County Washington, Olympia, WA

**0970** Evaluating a potential area-wide IPM strategy for managing hemlock woolly adelgid in the eastern United States. **Kenton Sumpter** (skenton7@vt.edu)1, Scott Salom1, Carlyle C. Brewster1, Troy D. Anderson1, Albert E. Mayfield III2, and Thomas McAvoy1, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2USDA - Forest Service, Asheville, NC

3:15 **0963** Factors associated with colonization success of  
tropical invasive ants at mid-high altitude. **Chin-Cheng**  
**Yang** (ccyangistheman@ntu.edu.tw)1, Shu-Ping Tseng2,  
Yi-Ming Weng2, and Han-Chih Ho2, 1Kyoto Univ., Uji,  
Japan, 2National Taiwan Univ., Taipei, Taiwan **3:00**

3:30 **0964** Distribution of exotic ants is associated with land-use along a meridional provincial highway in western Taiwan. **Chung-Chi Lin** (cclin@cc.ncue.edu. tw), National Changhua Univ. of Education, Changhua, Taiwan

3:45 **0965** Insight into human-mediated jump dispersal of insects: A synthesis. **Andrew Suarez** (avsuarez@life. illinois.edu), Univ. of Illinois, Champaign, IL

**Graduate Student Oral Competition: Agricultural and Forest Entomology: Forest Pests**

***Room W232 C (Convention Center)***

**Moderators:** Paul Borth1 and Michael Fisher2, 1Paul W. Borth Consulting, Zionsville, IN, 2North Carolina State Univ., Cary, NC

1:30 **0966** Patterns of host preference of the invasive *Glycaspis brimblecombei* Moore (Hemiptera: Psyllidae). **Samantha Bush** (samantha.bush@fabi.up.ac.za), Bernard Slippers, and Brett Hurley, Univ. of Pretoria, Pretoria, South Africa

2:45 **0971** Impact of host defenses induced by hemlock woolly adelgid (*Adelges tsugae*) feeding on a native lepidopteran. **Mary Mallinger** (mallinger.mary@gmail. com)1, Robert Schaeffer2, and Evan L. Preisser1, 1Univ. of Rhode Island, Kingston, RI, 2Tufts Univ., Medford, MA

**BREAK**

3:15 **0972** Seasonal phenology of the pine bark adelgid, *Pineus strobi* (Hemiptera: Adelgidae), in southwestern Virginia. **Holly Wantuch** (wholly3@vt.edu), Scott Salom, and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

3:30 **0973** Scale insect and pathogen colonization patterns on ailing white pine. **Thomas D. Whitney** (thomas. whitney@uga.edu)1, Kamal Gandhi1, Brittany Barnes1, Michelle Cram2, Arya Aghdasi1, and Jiangming Yao1,3, 1Univ. of Georgia, Athens, GA, 2USDA - Forest Service, Athens, GA, 3Guangxi Univ., Nanning, China

3:45 **0974** Herbivore-induced delays in conifer phenology are exacerbated by climate change. **Claire Wilson** (wilsonc@uri.edu)1, Robert Schaeffer2, Colin M. Orians2, and Evan L. Preisser1, 1Univ. of Rhode Island, Kingston, RI, 2Tufts Univ., Medford, MA

4:00 **0975** Development of mycangia in ambrosia beetles in relation to symbionts and ontogeny. **You Li** (yourreason@hotmail.com)1, Jiri Hulcr1, Siqin Ge2, and Yongying Ruan2, 1Univ. of Florida, Gainesville, FL, 2Chinese Academy of Sciences, Beijing, China

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4:15 **0976** Enhanced detection of *Pityophthorus juglandis*, the primary vector of thousand cankers disease. **Bridget Blood** (bblood@purdue.edu)1, Denita Hadziabdic2, William Klingeman2, and Matthew Ginzel1, 1Purdue Univ., West Lafayette, IN, 2Univ. of Tennessee, Knoxville, TN

4:30 **0977** Thousand cankers disease: Scolytine beetles and phoretic fungal pathogens associated with symptomatic eastern black walnut (*Juglans nigra*). **Tyler Stewart** (stewar23@purdue.edu)1,

Margaret McDermott-Kubeczko2, Jennifer Juzwik3, and Matthew Ginzel1, 1Purdue Univ., West Lafayette, IN, 2Univ. of Minnesota, St. Paul, MN, 3USDA - Forest Service, St. Paul, MN

4:45 **0978** A survey of the parasitic Hymenoptera of larch casebearer in Minnesota. **Allastacia Gebauer** (gebau005@umn.edu) and Brian Aukema, Univ. of Minnesota, St. Paul, MN

5:00 **0979** The unique role of Cerambycids associated with spreading sap-stain fungi in a native Australian sclerophyll forest. **Stephen Seaton** (s.seaton@murdoch. edu.au), Giles Hardy, and Bernard Dell, Murdoch Univ., Melville, Australia

**Graduate Student Oral Competition: Agricultural and Forest Entomology: Hemipteran Pests**

***Room W232 B (Convention Center)***

**Moderators:** Jon M. Babcock1 and Louis Nottingham2, 1Dow AgroSciences, Indianapolis, IN, 2Virginia Polytechnic Institute and State Univ., Blacksburg, VA

1:30 **0980** Reduced caterpillar damage benefits the plant bug *Lygus hesperus* on *Bt* cotton. **Michael Eisenring** (michael.eisenring@agroscope.admin.ch)1, Steven Naranjo2, Joe Hull2, Steffen Hagenbucher1, Angelique Abbott2, Michael Meissle1, and Jörg Romeis1, 1Agroscope, Zürich, Switzerland, 2USDA - ARS, Maricopa, AZ

1:45 **0981** Comparing boll injury and EILs for species of a boll-feeding sucking bug complex (Hemiptera: Miridae and Pentatomidae) on South Texas cotton. **James Glover** (james.glover@tamu.edu)1,2, Michael Brewer1, and Gregory Sword2, 1Texas A&M AgriLife Research, Corpus Christi, TX, 2Texas A&M Univ., College Station, TX

2:00 **0982** Spatial relationships of plant bugs in large scale cotton operations: Do edge and ecotone matter? **Isaac Esquivel** (iesqu002@tamu.edu)1, Michael Brewer2, and Robert Coulson1, 1Texas A&M Univ., College Station, TX, 2Texas A&M AgriLife Research, Corpus Christi, TX

2:15 **0983** The ecology and economics of an emergent pest, the brown stink bug (*Euschistus* servus), in an established cotton IPM program. **Lydia Brown** (lbrown@cals.arizona.edu)1, Peter Ellsworth1,  
Steven Naranjo2, Michael Toews3, and George Frisvold4, 1Univ. of Arizona, Maricopa, AZ, 2USDA - ARS, Maricopa, AZ, 3Univ. of Georgia, Tifton, GA, 4Univ. of Arizona, Tucson, AZ

2:30 **0984** Evaluation of *Oebalus pugnax* impact on varying stages of rice development. **Aaron Cato** (ajcato@uark.edu)1, Gus Lorenz2, and Jarrod T. Hardke3, 1Univ. of Arkansas, Fayetteville, AR, 2Univ. of Arkansas, Lonoke, AR, 3Univ. of Arkansas, Stuttgart, AR

2:45 **0985** Efficacy of chemigation for managing stink bugs. **Xing Wei** (xingwei@uga.edu), Michael Toews, Phillip M. Roberts, and Wes Porter, Univ. of Georgia, Tifton, GA

**3:00 BREAK**

3:15 **0986** Feeding behavior of the stink bug *Bagrada hilaris* is changed by the electrical signals applied during EPG recordings. **Edmar Tuelher** (edmar. tuelher@ufv.br)1, Tiago Lucini2, Felix Cervantes3, and Elaine Backus3, 1Federal Univ. of Viçosa, Viçosa, Brazil, 2Federal Univ. of Paraná, Curitiba, Brazil, 3USDA - ARS, Parlier, CA

3:30 **0987** Cold tolerance and overwintering behavior of kudzu bugs (*Megacopta cribraria*) at its northern limit. **Jessica Grant** (grantji@umd.edu) and William O. Lamp, Univ. of Maryland, College Park, MD

3:45 **0988** Enhanced monitoring and management strategies for *Megacopta cribraria* in soybeans. **Anthony Greene** (adg2@clemson.edu)1, Jeremy Greene1, Francis Reay-Jones2, and Francesca Stubbins1, 1Clemson Univ., Blackville, SC, 2Clemson Univ., Florence, SC

4:00 **0989** Edge effects of *Halyomorpha halys* (Stål), brown marmorated stink bug, in southeastern row crops. **Whitney Hadden** (wthadden@uga.edu)1, James F. Walgenbach2, and Michael Toews1, 1Univ. of Georgia, Tifton, GA, 2North Carolina State Univ., Mills River, NC

4:15 **0990** Influence of elevation on dispersal behavior of brown marmorated stink bug (*Halyomorpha halys*) seeking overwintering sites. **John Cullum** (john29@ vt.edu)1, Christopher Bergh1, Michael J. Raupp2,

Paula M. Shrewsbury2, P. Dilip Venugopal3, Holly Mar- tinson2, and Tracy C. Leskey4, 1Virginia Polytechnic Institute and State Univ., Winchester, VA, 2Univ. of Maryland, College Park, MD, 3U.S. Environmental Protection Agency, Washington, DC, 4USDA - ARS, Kearneysville, WV

4:30 **0991** Optimizing attract-and-kill technology for harlequin bug, *Murgantia histrionica* (Hahn). **Anthony S. DiMeglio** (tonydimeglio@gmail.com)1, Thomas P. Kuhar1, and Donald Weber2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2USDA - ARS, Beltsville, MD

4:45 **0992** Anatomical damage in cotton squares by nymphal *Lygus lineolaris* in relation to EPG-recorded feeding behavior. **Eeva Sharma** (eevasharma@mail. fresnostate.edu)1, Felix Cervantes2, Elaine Backus2, and John Bushoven1, 1California State Univ., Fresno, CA, 2USDA - ARS, Parlier, CA



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**Graduate Student Oral Competition: Biodiversity, Biogeography, and Conservation of Arthropods: Diversity**

***Room W223 B (Convention Center)***

**Moderators:** Ainsley Seago1 and Raul F. Medina2, 1Univ. of California, Berkeley, CA, 2Texas A&M Univ., College Station, TX

1:30 **0993** Assessment of bee diversity using citizen science protocols. **Lisa Mason** (lisa.mason@colostate. edu) and Arathi Seshadri, Colorado State Univ., Fort Collins, CO

1:45 **0994** Revitalizing urban vacant land for pollinator communities. **MaLisa Spring** (malisa.spring@gmail. com) and Mary Gardiner, The Ohio State Univ., Wooster, OH

2:00 **0995** Urban landscape heterogeneity influences green space value for cavity nesting bees and wasps. **Katherine Todd** (todd.489@osu.edu) and Mary Gardiner, The Ohio State Univ., Wooster, OH

2:15 **0996** Fire diversity promotes plant-pollinator community diversity. **Lauren Ponisio** (lponisio@ berkeley.edu), Univ. of California, Berkeley, CA

2:30 **0997** Ground-dwelling insect responses to prescribed rangeland fire. **Britt Smith** (britt.smith@ ttu.edu), Brad Dabbert, and Robin M. Verble-Pearson, Texas Tech Univ., Lubbock, TX

2:45 **0998** Assessment of forest arthropod diversity through metabarcoding. **Sarah Meierotto** (s.meierotto@ uky.edu) and Michael J. Sharkey, Univ. of Kentucky, Lexington, KY

**3:00 BREAK**

3:15 **0999** Reorganization of taxonomic, functional,  
and phylogenetic ant biodiversity after conversion  
to rubber plantation. **Cong Liu** (cong.liu0514@gmail. com)1, Benoit Guénard2, Benjamin Blanchard3, Yan-Qiong Peng4, and Evan Economo1, 1Okinawa Institute of Science and Technology, Onna, Japan, 2Univ. of Hong Kong, Hong Kong, China, 3The Field Museum of Natural History, Chicago, IL, 4Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Kunming, China

3:30 **1000** New species of armored scale insects (Hemiptera: Diaspididae) described from New Caledonia. **Fredericka Hamilton** (fbh0006@auburn.edu), Mayrolin García Morales, Nicholas Christodoulides, and Nate Hardy, Auburn Univ., Auburn, AL

3:45 **1001** Speciation patterns of beetles in the highlands of Ecuador. **Sofia Muñoz-Tobar** (smunoz@clemson. edu), Clemson Univ., Clemson, SC

4:00 **1002** Phylogeography of *Synuchus dubius* (Coleoptera: Carabidae) in Arizona’s Madrean Sky Island Archipelago. **Alan Yanahan** (yanahan@email.arizona. edu) and Wendy Moore, Univ. of Arizona, Tucson, AZ

4:15 **1003** Defense mechanisms of *Pachyrhynchus* weevils. **Lu-Yi Wang** (lu1200120012011@gmail.com)1, Chung-Ping Lin1, and Wen-San Huang2, 1National Taiwan Normal Univ., Taipei, Taiwan, 2National Museum of Natural Science, Taichung, Taiwan

4:30 **1004** Investigating the effects of plant diversity on insect diversity and soil health in a corn production system. **Claire LaCanne** (celacanne@gmail.com)1 and Jonathan Lundgren2, 1South Dakota State Univ., Brookings, SD, 2Ecdysis Foundation, Estelline, SD

4:45 **1005** Arthropod biodiversity estimates for three native subalpine plant species on Hawaii’s Maunakea Volcano. **Heather Stever** (hstever@hawaii.edu),  
Jesse A. Eiben, and Marleena Sheffield, Univ. of Hawai’i, Hilo, HI

5:00 **1006** Relative density variability over the past 15 years of *Nysius wekiuicola,* an endemic seed bug of conservation concern on the summit of the Maunakea volcano, Hawaii. **Jessica Kirkpatrick** (jakirkpa@hawaii. edu) and Jesse A. Eiben, Univ. of Hawai’i, Hilo, HI

5:15 **1007** Species diversity and phenology of predators of sucking pest complex in mulberry ecosystems of Eastern India. **Lalitha Natarajan** (lalitha.nm@gmail.com)1,2, Manne Santhakumar3, Nirmal Kumar Sundaramurthy1, and Kanika Trivedy1, 1Central Sericultural Research & Training Institute, Berhampore, India, 2Visva-Bharati Univ., Santiniketan, India, 3Shivaji Univ., Kohlapur, India

**Graduate Student Oral Competition: Insect-Plant Interactions in a Changing Climate**

***Room W240 B (Convention Center)***

**Moderators:** Jessica Kansman1 and Joshua Benoit2, 1Univ. of Missouri, Columbia, MO, 2Univ. of Cincinnati, Cincinnati, OH

1:30 **1008** Effects of two climate change factors, elevated temperature and water stress, on the rice brown planthopper, *Nilaparvata lugens* (Stål). **Ye Tan** (tanye0722@126.com) and Zeng-Rong Zhu, Zhejiang Univ., Hangzhou, China

1:45 **1009** The performance of a plant-herbivore- parasitoid food-web under climate change scenarios. **Sandra Flores-Mejia** (sandra.flores-mejia.1@ulaval. ca), Valérie Fournier, and Conrad Cloutier, Univ. Laval, Québec City, QC, Canada

2:00 **1010** Influence of bioclimatic variables on the distribution of coffee berry borer, *Hypothenemus hampei* (Ferrari) (Coleoptera: Curculionidae) in coffee in Puerto Rico. Jose Garcia, **Jose Carlos V. Rodrigues** (jose\_carlos@mac.com), Yobana Mariño, and

Paul Bayman, Univ. of Puerto Rico, San Juan, PR

2:15 **1011** Do biotic components of healthy soils increase plant resistance to herbivores? **Elizabeth Rowen** (epr5119@psu.edu) and John Tooker, Pennsylvania State Univ., University Park, PA

2:30 **1012** Enhancement of web-builder spider populations in eggplant fields by surrounding flowering plants. **Elsaid Elnabawy** (said19832007@ yahoo.com)1,2, Katsuo Tsuda1, and Yositaka Sakamaki1, 1Kagoshima Univ., Korimoto, Japan, 2Kafrelsheikh Univ., Kafr el-Sheikh, Egypt

2:45 **1013** Disruption of ecosystem function through spread of an invasive ant (*Wasmannia auropunctata*) in a tropical biodiversity hotspot. **Maureen Cateine** (maureen.cateine@ird.fr) and Hervé Jourdan, Institute of Research for Development, Nouméa , New Caledonia

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**3:00 BREAK**

3:15 **1014** Urban forest fragments: Potential refugia to mitigate the effects of urban warming. **Lawrence Long** (lclong2@ncsu.edu) and Steven Frank, North Carolina State Univ., Raleigh, NC

3:30 **1015** How do impervious surface and surrounding vegetation affect pest colonization rates of urban trees? **Kristi Backe** (kbacke@ncsu.edu) and Steven Frank, North Carolina State Univ., Raleigh, NC

3:45 **1016** Aquatic insect larvae are major players in mediating lakes’ carbon-sequestering capacities in the warming world. **Viktor Baranov** (baranov@igb-berlin. de)1, Stefan Krause2, and Joerg Lewandowski1, 1Leibniz Institute of Freshwater Ecology and Inland Fisheries, Berlin, Germany, 2Univ. of Birmingham, Birmingham, United Kingdom

4:00 **1017** Gene expression analysis and validation for potential marker genes of mycorrhizal rice plants in response to feeding with fall armyworm, S*podoptera frugiperda*. **Lina Bernaola** (lbernaola@agcenter.lsu. edu)1 and Michael Stout2, 1Louisiana State Univ., Baton Rouge, LA, 2Louisiana State Univ. AgCenter, Baton Rouge, LA

4:15 **1018** Influence of fatty acid desaturation on photosynthesis and aphid resistance in tomato. **Janithri Wickramanayake** (janithriwick@gmail.com), Junhuan Xu, and Fiona L. Goggin, Univ. of Arkansas, Fayetteville, AR

4:30 **1019** The influence of drought stress on bird cherry-oat aphid (*Rhopalosiphum padi* (L.)) host-plant utilization, emigration, and feeding behavior: Implications for pathogen transmission in wheat. **Jessica Kansman** (jtkp8b@missouri.edu) and Debbie Finke, Univ. of Missouri, Columbia, MO

4:45 **1020** Maize defense responses to phloem sap-sucking corn leaf aphid. **Suresh Varsani** (ssvarsani@gmail. com), Saumik Basu, and Joe Louis, Univ. of Nebraska, Lincoln, NE

5:00 **1021** Methylation as a driving factor of biotypification and increased virulence in aphids. **Kelly Breeds** (breedskelly@gmail.com) and A. M. Botha, Stellenbosch Univ., Stellenbosch, South Africa

**Graduate Student Oral Competition: Integrated Pest Management and Sustainable Agriculture: Landscape Systems**

***Room W240 C (Convention Center)***

**Moderators:** Von Kaster1 and Rayda Krell2, 1Syngenta Seeds, Slater, IA, 2Rayda K. Krell, LLC, Entomological and Agricultural Communications, Ridgefield, CT

1:30 **1022** Impact of farmscaping on stink bug density over corn. **Arun Babu** (ababu2@ncsu.edu)1,  
Dominic Reisig2, Wesley Everman1, Ronnie Heiniger2, and James F. Walgenbach3, 1North Carolina State Univ., Raleigh, NC, 2North Carolina State Univ., Plymouth, NC, 3North Carolina State Univ., Mills River, NC

1:45 **1023** Farming practices can affect the kudzu bug, an invasive soybean pest in the US. **Alejandro Del Pozo** (aidelpoz@ncsu.edu)1, Dominic Reisig2, Jack Bacheler1, and Chris Reberg-Horton1, 1North Carolina State Univ., Raleigh, NC, 2North Carolina State Univ., Plymouth, NC

2:00 **1024** Field evaluation of potential trap crops for managing kudzu bug, *Megacopta cribraria* in soybean production. **Blessing Ademokoya** (bfa0003@auburn. edu), Rammohan Rao Balusu, and Henry Fadamiro, Auburn Univ., Auburn, AL

2:15 **1025** Spatial distribution of *Megacopta cribraria* egg masses and parasitism by *Paratelenomus saccharalis* in soybean. **Ian Knight** (ianak@uga.edu) and  
Michael Toews, Univ. of Georgia, Tifton, GA

2:30 **1026** Cover crop residues and their effects on  
pest beetle populations in vegetables. **Peter Coffey** (peterlcoffey@gmail.com) and Cerruti Hooks, Univ. of Maryland, College Park, MD

2:45 **1027** Identification of unique volatile compounds associated with repelling whiteflies (Hemiptera: Aleyrodidae) in desert watermelon (*Citrullus colocynthis*). **Bobbie Blake** (bblake238@gmail.com)1, Alvin M. Simmons1, Gloria McCutcheon2, Michael Walla3, Mihail Kantor2, and Amnon Levi1, 1USDA - ARS, Charleston, SC,

2Claflin Univ., Orangeburg, SC, 3Univ. of South Carolina, Columbia, SC

**3:00 BREAK**

3:15 **1028** Native perennial plants to attract natural enemies. **Dan Gibson** (gibso124@msu.edu) and Douglas A. Landis, Michigan State Univ., East Lansing, MI

3:30 **1029** Local and landscape-scale diversity interact to shape herbivore communities in *Brassica oleracea* crops. **Lauren Snyder** (lds97@cornell.edu) and Alison Power, Cornell Univ., Ithaca, NY

3:45 **1030** Effects of red clover living mulch on arthropod communities and cucurbit yield. **Hanna Kahl** (hkahl@ umd.edu) and Cerruti Hooks, Univ. of Maryland, College Park, MD

4:00 **1031** The effect of introducing wildflower strips  
in apple orchards on pollination and pest regulation services. **Megan McKerchar** (m.mckerchar@worc.ac.uk)1, Michelle Fountain2, Simon Potts3, and Duncan Westbury1, 1Univ. of Worcester, Worcester, United Kingdom, 2East Malling Research, Kent, United Kingdom, 3Reading Univ., Reading, United Kingdom

4:15 **1032** Do prairie plantings alter the community structure and function of insect communities in agroecosystems? **Eric Middleton** (middl145@umn.edu)1 and Christopher R. Philips2, 1Univ. of Minnesota, Minneapolis, MN, 2Univ. of Minnesota, St. Paul, MN

4:30 **1033** The influence of planting date on the occurrence of insect pest in Mississippi soybean. **Nicholas R. Bateman** (nbateman@entomology.msstate. edu)1, Angus Catchot1, Jeff Gore2, Don Cook2,  
Fred Musser1, and Trent Irby1, 1Mississippi State Univ., Mississippi State, MS, 2Mississippi State Univ., Stoneville, MS



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**MONDAY**

**Monday, September 26 • AFTERNOON •**

4:45 **1034** Management of corn earworm and fall armyworm in grain sorghum. **Chris Dobbins** (cdobbins@drec.msstate.edu)1, Jeff Gore1, Angus Catchot2, Don Cook1, Fred Musser2, and Joel Moor1, 1Mississippi State Univ., Stoneville, MS, 2Mississippi State Univ., Mississippi State, MS

5:00 **1035** Improving crop pest management using qualitative data networks. **Nancy Bostick** (nbostick@ uga.edu)1, Jason M. Schmidt1, C. T. Bargeron1,  
Tim Brenneman1, Albert Culbreath1, G. David Buntin2, Joseph LaForest1, and Michael Toews1, 1Univ. of Georgia, Tifton, GA, 2Univ. of Georgia, Griffin, GA

**Graduate Student Oral Competition: Morphology, Systematics, and Phylogeny: Flies, Lepidopterans, and Others**

***Room W240 D (Convention Center)***

**Moderators:** John Leavengood1 and Paul Goldstein2, 1USDA - APHIS, Pharr, TX, 2USDA - ARS, Washington, DC

1:30 **1036** Bryophyte-feeders in the midst of carnivores: Long-term association between rhagionid flies (Diptera: Rhagionidae) and liverworts. **Yume Imada** (imayume.ac@gmail.com) and Makoto Kato, Kyoto Univ., Kyoto, Japan

1:45 **1037** Ecological and phylogenetic diversification of multidimensional niches in predatory *Lasiopogon* robber flies (Diptera: Asilidae). **Tristan McKnight** (trismckn@umich.edu) and Lacey Knowles, Univ. of Michigan, Ann Arbor, MI

2:00 **1038** The *Rudolfina* problem – a Neotropical explosion of a monobasic Palaearctic genus (Diptera: Sphaeroceridae: Limosininae). **Steven Paiero** (steve.paiero@gmail.com) and Stephen Marshall, Univ. of Guelph, Guelph, ON, Canada

2:15 **1039** A world review of the generic and species concepts of the subtribe Criorhinina (Diptera: Syrphidae). **Kevin Moran** (kevinmoran88@comcast.net)1 and Jeffrey Skevington2, 1Carleton Univ., Ottawa, ON, Canada, 2Agriculture and Agri-Food Canada, Ottawa, ON, Canada

2:30 **1040** Exploring the relationship between diet breadth and the extraordinary morphological diversity of *Acronicta* larvae through the lens of a molecular phylogeny (Lepidoptera: Noctuidae: Acronictinae). **Brigette Zacharczenko** (brigette.zacharczenko@uconn. edu) and David L. Wagner, Univ. of Connecticut,

Storrs, CT

2:45 **1041** To speak or be silent: Body size affects defensive sound production in caterpillars.  
**Melanie Scallion** (melanie.scallion@cmail.carleton. ca), Amanda Dookie, Veronica Bura, and Jayne Yack, Carleton Univ., Ottawa, ON, Canada

**3:00 BREAK**

3:15 **1042** Preliminary next-gen phylogeny of *Philodoria* (Lepidoptera: Gracillariidae), the endangered leaf miners of Hawaii. **Christopher Johns** (johns.chris.a@ ufl.edu), Univ. of Florida, Gainesville, FL

3:30 **1043** Proposed phylogeny of Noctuini (Noctuoidea: Noctuidae: Noctuinae) using four molecular markers. **Melissa S. Sisson** (melissa.sisson@und.edu),  
Matthew J. Flom, Janna L. Mabey, and Rebecca B. Simmons, Univ. of North Dakota, Grand Forks, ND

3:45 **1044** Phylogeny, evolution of lichenivory, and chemical sequestration in the lichen moth genus *Hypoprepia* (Hübner) (Lepidoptera: Erebidae: Arctiinae: Lithosiini). **Timothy Anderson** (ander472@purdue.edu) and Jennifer Zaspel, Purdue Univ., West Lafayette, IN

4:00 **1045** Thinking out of (species) bounds: Phylogenetic incongruities in the butterfly genus *Speyeria* show widespread interspecific introgression. **Erin Campbell** (eocampbe@ualberta.ca) and Felix Sperling, Univ. of Alberta, Edmonton, AB, Canada

4:15 **1046** Anchored phylogenomics recovers a robust phylogeny of Erebinae (Lepidoptera: Noctuoidea: Erebidae). Jesse Breinholt, Akito Y. Kawahara, and **Nicholas Homziak** (nhomziak@ufl.edu), Univ. of Florida, Gainesville, FL

4:30 **1047** Phylogenomic analysis, using anchored enrichment, reveals the evolutionary history of sensory structures in emerald moths (Lepidoptera: Geometridae: Geometrinae). **David Plotkin** (dplotkin@ufl.edu) and Akito Kawahara, Univ. of Florida, Gainesville, FL

**Contributed Papers: Agricultural and Forest Entomology: Forest Insects, Pollinators, Systematics, and Remote Sensing**

***Chapin Theater (Convention Center)***

**Moderators:** John Adamczyk1 and Alana Pindar2, 1USDA - ARS, Poplarville, MS, 2Univ. of Guelph, Guelph, ON, Canada

1:30 **1048** Interactions between two invasive insect species co-occurring on non-native pine trees.  
**Mesfin Wondafrash Gossa** (mesfin.gossa@fabi.up.ac.za)1,2, Bernard Slippers1, Jeff Garnas1, and Brett Hurley1, 1Univ. of Pretoria, Pretoria, South Africa, 2Haramaya Univ., Dire Dawa, Ethiopia

1:45 **1049** Evaluation of trunk injections for the control of invasive ambrosia beetles in California avocados. **Frank J. Byrne** (frank.byrne@ucr.edu), Akif Eskalen, and Joseph G. Morse, Univ. of California, Riverside, CA

2:00 **1050** Detecting and quantifying the patterns and occurrence of the sixspined engraver beetle (*Ips calligraphus*) that colonize Mediterranean pines in low elevations of the Sonoran Desert in Tucson. **Peter Warren** (plwarren@cals.arizona.edu), Univ. of Arizona, Tucson, AZ

2:15 **1051** Oviposition height preferences and diurnal flight patterns of *Monochamus titillator* and *M. carolinensis* in the Ozark National Forest. **Jake Bodart** (jwbodart@email.uark.edu), Larry D. Galligan, and Fred M. Stephen, Univ. of Arkansas, Fayetteville, AR

2:30 **1052** SPLAT Verb: A semiochemical-based strategy for managing *Dendroctonus ponderosae*, the mountain pine beetle, at the individual pine and small stand level. Christopher J. Fettig1, Robert A. Progar2, Lia Spiegel2, Steve Munson3, Anna Hermosillo4, Kavita Sharma4, William Urrutia4, Rodrigo Oliveira da Silva4,

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**MONDAY**

**Monday, September 26 • AFTERNOON •**

Carmem Bernardi4, **Jonathan Rico** (jonathan.r@iscatech. com)4, Jesse Saroli4, Kim Spencer4, and Agenor Mafra- Neto4, 1USDA - Forest Service, Davis, CA, 2USDA - Forest Service, La Grande, OR, 3USDA - Forest Service, Ogden, UT, 4ISCA Technologies, Inc., Riverside, CA

2:45 **1053** Termites (Isoptera): Friend or foe? **Cecilia Dahlsjö** (c.dahlsjo@gmail.com)1,

Thomas Bourguignon2, Jan Sobotnik1, Jana Jaklova1, Petr Stiblik1, Matej Zidek1, and Juan Wicman3, 1Czech Univ. of Life Sciences, Prague, Czech Republic, 2The Univ. of Sydney, Camperdown, Australia, 3National Univ. of Ucayali, Pucallpa, Peru

**3:00 BREAK**

3:15 **1054** The influence and implications of row crop agriculture on the exposure of honey bees (*Apis mellifera*) to pesticides. **Scott Stewart** (sdstewart@utk. edu)1, Mohamed Alburaki1, Gus Lorenz2, Don Johnson3, Jon Zawislak4, and John Adamczyk5, 1Univ. of Tennessee, Jackson, TN, 2Univ. of Arkansas, Lonoke, AR, 3Univ. of Arkansas, Fayetteville, AR, 4Univ. of Arkansas, Little Rock, AR, 5USDA - ARS, Poplarville, MS

3:30 **1055** Prioritizing spatial investment in pollinator conservation practices in farmland to support crop pollination and honey bee health. **Yajun Zhang** (angieyzhang@gmail.com), Jason Gibbs, Meghan Milbrath, Douglas A. Landis, and Rufus Isaacs, Michigan State Univ., East Lansing, MI

3:45 **1056** Foraging activity and colony development of *Bombus impatiens* on three potential surrogate plants for use in semi-field pesticide toxicity studies with bumble bees. **Angela Gradish** (agradish@uoguelph. ca)1, Cynthia Scott-Dupree1, and Chris Cutler2, 1Univ. of Guelph, Guelph, ON, Canada, 2Dalhousie Univ., Truro, NS, Canada

4:00 **1057** Native pollinators in Ontario agriculture.  
**Alana Pindar** (apindar@uoguelph.ca)1 and Nigel E. Raine2, 1Univ. of Guelph, Guelph, ON, Canada, 2Royal Holloway, Univ. of London, Egham, United Kingdom

4:15 **1058** Molecular methods for the identification of *Autographa gamma* (Linnaeus). **Luke Tembrock** (tembrock@colostate.edu)1, Todd Gilligan2, Norman Barr3, and Roxanne Farris3, 1Colorado State Univ., Fort Collins, CO, 2USDA - APHIS, Fort Collins, CO, 3USDA - APHIS, Edinburg, TX

4:30 **1059** Resolving host-parasitoid food webs in an oubreak species using high-throughput metabarcoding approach. **Stefaniya Kamenova** (stefaniya.kamenova@ gmail.com)1, Veronique Martel2, Robert Johns3,

Eldon Eveleigh3, and M. Alex Smith1, 1Univ. of Guelph, Guelph, ON, Canada, 2Natural Resources Canada, Québec City, QC, Canada, 3Natural Resources Canada, Fredericton, NB, Canada

4:45 **1060** Molecular-based initiatives to support the identification of *Helicoverpa armigera* (Hübner) in the New World. **Todd Gilligan** (todd.m.gilligan@aphis.usda. gov)1, Luke Tembrock2, Norman Barr3, and Roxanne Farris3, 1USDA - APHIS, Fort Collins, CO, 2Colorado State Univ., Fort Collins, CO, 3USDA - APHIS, Edinburg, TX

5:00 **1061** A taxonomic study of subfamilies Scardiinae and Nemapogoninae (Lepidoptera: Tineidae) from Japan. **Yohei Osada** (borbocinnara53@hotmail.com)1, Makoto Sakai2, Shin-ichi Yoshimatsu3, Guo-Hua Huang4, and Toshiya Hirowatari1, 1Kyushu Univ., Fukuoka, Japan, 2Kyosei-Kagaku, Ibaraki, Japan, 3National Institute for Agro-Environmental Sciences, Tsukuba, Japan, 4Hunan Agricultural Univ., Changsha, China

5:15 **1062** Enhanced early detection tools using remote sensing and GIS data fusion techniques. **Ryan Hanavan** (rhanavan@fs.fed.us)1, Bruce Cook2, Lawrence Corp3, Rich Hallett1, and Jen Pontius4, 1USDA - Forest Service, Durham, NH, 2National Aeronautics and Space Administration, Greenbelt, MD, 3Sigma Space Corporation, Greenbelt, MD, 4Univ. of Vermont, Burlington, VT

**Contributed Papers: Agricultural and Forest Entomology: Integrated Pest Management, Host-Plant Interactions, and Transgenic Crops**

***Room W225 B (Convention Center)***

**Moderators:** Jeremy Greene1 and Jürgen Gross2, 1Clemson Univ., Blackville, SC, 2Julius Kühn Institute, Dossenheim, Germany

1:30 **1063** Location of *Helicoverpa zea* larval instars on determinate and indeterminate soybean. **Dominic Reisig** (dominic\_reisig@ncsu.edu)1, Don Cook2, Jeremy Greene3, Michael Caprio4, Fred Musser4, and Francis Reay-Jones5, 1North Carolina State Univ., Plymouth, NC, 2Mississippi State Univ., Stoneville, MS, 3Clemson Univ., Blackville, SC, 4Mississippi State Univ., Mississippi State, MS, 5Clemson Univ., Florence, SC

1:45 **1064** Effect of planting date on populations of thrips in cotton in South Carolina. **Jeremy Greene** (greene4@ clemson.edu)1 and Francis Reay-Jones2, 1Clemson Univ., Blackville, SC, 2Clemson Univ., Florence, SC

2:00 **1065** Several varieties of the coconut leaf beetles *Brontispa longissima* Gestro (Coleoptera: Chrysomelidae) at North Celebes and East Java, Indonesia. **Sri Karindah** (skarindah@yahoo.com)1, Novalisa Lumentut2, Ika Indriawati1, Retno Puspitarini1, and Lilik Sulistyowati1, 1Univ. of Brawijaya, Malang, Indonesia, 2Indonesia Palmae Research Institute, Manado, Indonesia

2:15 **1066** Adaptation of the brown planthopper, *Nilaparvata lugens* (Stål), to resistant rice varieties. **Jedeliza B. Ferrater** (jferrater@irrialumni.org)1,  
Peter W. de Jong2, Marcel Dicke2, and Finbarr G. Horgan3, 1East-West Seed Company, San Rafael, Philippines, 2Wageningen Univ. and Research Centre, Wageningen, Netherlands, 3International Rice Research Institute, Metro Manila, Philippines

2:30 **1067** Species diversity and abundance of cereal stem borer natural enemies and associated host plants in Botswana. **Reyard Mutamiswa** (reyard.mutamiswa@ studentmail.biust.ac.bw) and Casper Nyamukondiwa, Botswana International Univ. of Science and Technology, Palapye, Botswana

2:45 **1068** Innovative control strategies for phytoplasma disease vectors by attractive and repellent allelochemicals. **Jürgen Gross** (juergen.gross@jki.bund.de)1,  
Jannicke Gallinger1, Margit Rid1, and Cornelia Dippel2, 1Julius Kühn Institute, Dossenheim, Germany, 2IS Insect Services GmbH, Berlin, Germany



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**MONDAY**

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**3:00 BREAK**

3:15 **1069** Apple orchard protection from codling moth (*Cydia pomonella*) using an attract-and-kill trap. **Benjamin Jaffe** (jaffebd@gmail.com) and  
Peter J. Landolt, USDA - ARS, Wapato, WA

**Contributed Papers: Genetics and Evolutionary Entomology: Populations and Spatial Diversity**

***Room W330 B (Convention Center)***

**Moderators:** Ariel Toloza1 and Olav Rueppell2, 1CONICET, Villa Martelli, Argentina, 2Univ. of North Carolina, Greensboro, NC

**1078** Diversity of sociality in the desert ant (genus *Cataglyphis*). **Tali Reiner Brodetzki** (talireiner@gmail. com)1, Serge Aron2, and Abraham Hefetz1, 1Tel Aviv Univ., Tel Aviv, Israel, 2Free Univ. of Brussels, Brussels, Belgium

3:30 **1070** Plants outside the field matter: Interactions  
between *Bagrada hilaris* and non-crop hosts. 1:30 **Ian M. Grettenberger** (iangrett@gmail.com)1,  
Jhalendra Rijal2, Larry Godfrey1, and Shimat V. Joseph3,  
1Univ. of California, Davis, CA, 2Univ. of California  
Cooperative Extension, Modesto, CA, 3Univ. of  
California Cooperative Extension, Salinas, CA

3:45 **1071** Host plant resistance to sunflower insect pests in North America. **Jarrad Prasifka** (jarrad.prasifka@ars. usda.gov), USDA - ARS, Fargo, ND

4:00 **1072** Improve control of navel orangeworm  
(*Amyelois transitella*) in pistachios and almonds by  
increasing application efficency, insecticide choice, and  
spray timing. **Joel Siegel** (joel.siegel@ars.usda.gov)1, 2:00 Mark Demkovich2, and Matt Strmiska3, 1USDA - ARS,

Parlier, CA, 2Univ. of Illinois, Champaign, IL, 3Qualified Applicator Specialists, Fresno, CA

4:15 **1073** Dieback of cocoa (*Theobroma cacao* L.) plant  
tissues caused by the brown cocoa mirid, *Sahlbergella* 2:15 *singularis* Haglund (Hemiptera: Miridae), and associated pathogenic fungi. **Joseph Anikwe** (jachuks@yahoo.com)1  
and Henry Otuonye2, 1Univ. of Lagos, Lagos, Nigeria,  
2Cocoa Research Institute of Nigeria, Ibadan, Nigeria

4:30 **1074** Efficacy of transgenic corn hybrids producing  
*Bacillus thuringiensis* proteins against natural 2:30 infestations of *Eoreuma loftini* (Lepidoptera: Crambidae)  
in Louisiana. **Julien M. Beuzelin** (jbeuzelin@agcenter.  
lsu.edu)1, Blake E. Wilson2, Matt T. VanWeelden3, and  
Allan T. Showler4, 1Louisiana State Univ. AgCenter,  
Alexandria, LA, 2Louisiana State Univ. AgCenter, Baton  
Rouge, LA, 3Univ. of Florida, Belle Glade, FL, 4USDA -  
ARS, Kerrville, TX

4:45 **1075** Tolerance response of cotton bollworm  
(*Helicoverpa armigera)* to Cry expressing Bt cotton. **Muhammad Asam Riaz** (asam.riaz@uos.edu.pk)1,  
Saba Tehseen1, Mohsin Raza1, Muhammad Usman1,  
Muhammad Zeeshan Majeed1, Muhammad Afzal1, and  
Sohail Ahmed2, 1Univ. of Sargodha, Sargodha, Pakistan, 3:15 2Univ. of Agriculture, Faisalabad, Pakistan

5:00 **1076** Effect of some local plant extracts against  
whitefly on Bt cotton. **Muhammad Asrar** (asraragri@ gmail.com)1, Khuram Zia2 and Kashif Ali1, 1Government 3:30 College Univ., Faisalabad, Pakistan, 2Univ. of Agriculture, 3:45 Faisalabad, Pakistan

Richard Harrison2, 1USDA - APHIS, Buzzards Bay, MA, 2Cornell Univ., Ithaca, NY

**1080** Population genetic structure and environmental heterogeneities of honey bee (*Apis mellifera* L.) populations in South Africa. **Amin Eimanifar** (amineimanifar@ufl.edu), Tao Zhang, and James D. Ellis, Univ. of Florida, Gainesville, FL

**1081** New insights into the extraordinary diversity of *Serratia symbiotica*: A tritrophic point of view.  
**Inès Pons Guillouard** (ines.pons@uclouvain.be), François Renoz, Valentin Pierson, Abdelmounaim Errachid, Christine Noël, and Thierry Hance, Catholic Univ. of Louvain, Louvain-la-Neuve, Belgium

**1082** Population genetic analysis in human head lice: Comparison between microsatellite and insecticide resistance markers. **Ariel Toloza** (atoloza@conicet.gov.ar)1, David Reed2, María Picollo3, and Marina Ascunce2, 1CONICET, Villa Martelli, Argentina, 2Univ. of Florida, Gainesville, FL, 3Center of Insecticides and Pest Research, Villa Martelli, Argentina

5:15 **1077** Integrative taxonomy of SE-Asian and Oceanic tephritid fruit flies. **Mark Schutze** (m.schutze@qut. edu.au)1,2, Matthew Krosch1,2, Jane Royer2,3, Nicholas Woods2,4, Rod Turner2,4, Melanie Bottrill2,4, Bill Woods2,5, Ian Lacey2,5, Jacinta McMahon1,2, Francesca Strutt1,2, and Stephen Cameron2, 1Queensland Univ. of Technology, Brisbane, Australia, 2Plant Biosecurity Cooperative Research Centre, Bruce, Australia, 3Queensland Dept.  
of Agriculture and Fisheries, Brisbane, Australia, 4Plant Health Australia, Deakin, Australia, 5Dept. of Agriculture and Food, South Perth, Australia

1:45 **1079** Identification of the geographic origin of invasive Asian gypsy moth (*Lymantria dispar asiatica* and *L. d. japonica*) using ddRAD sequencing. **Yunke Wu** (yw578@cornell.edu)1,2, John Molongoski1, David Lance1, Steven Bogdanowicz2, and

2:45 **1083** Phenotypic variation and aposematic signaling in an arctiid moth (*Utetheisa ornatrix*). **Richard Gawne** (richard.gawne@duke.edu) and Fred Nijhout, Duke Univ., Durham, NC

**3:00 BREAK**

**1084** Mitochondrial phylogenomics and high-altitude adaptation in the New World buckeye butterflies (Genus *Junonia*). **Jeffrey Marcus** (marcus@cc.umanitoba. ca), Univ. of Manitoba, Winnipeg, MB, Canada

* **1085**Presentation withdrawn
* **1086**Presentation withdrawn

4:00 **1087**  
heritable symbionts is shaped by context-dependent transmission rates. **Jacob Russell** (jar337@drexel.edu)1, Andrew H. Smith1, Kerry M. Oliver2, and Danielle Rock1, 1Drexel Univ., Philadelphia, PA, 2Univ. of Georgia, Athens, GA

4:15 **1088** Characterization of *Protophormia*, *Lucilia*, and *Chrysomya* species based on taxonomic and multigene approaches. **Muhammad Qureshi** (qureshienv@yahoo. com), Government College Univ., Lahore, Pakistan

Strong community structuring of defensive



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**MONDAY**

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4:30 **1089** Genetic and morphological changes underlying speciation in leaf-cutter ants. **Mauricio Bacci** (mbacci@ rc.unesp.br)1, Cynara Rodovalho2, Milene Ferro3,  
Sérgio Kakazu3, Cintia Bezerra3, and Christian Rabeling4, 1São Paulo State Univ., São Paulo, Brazil, 2Oswaldo Cruz Foundation, Rio de Janeiro, Brazil, 3São Paulo State Univ., Rio Claro, Brazil, 4Univ. of Rochester, Rochester, NY

4:45 **1090** Anthropocene reversals of anophelism and malaria. **Graham White** (grahambwhite@hotmail.com), USDA - ARS, Gainesville, FL

5:00 **1091** Ant-fungal inter-genomic epistasis and the fitness of ants and their domesticated fungus. **Katrin Kellner** (antkatrina@gmail.com)1,2,  
Ulrich G. Mueller1, and Timothy A. Linksvayer3, 1The Univ. of Texas, Austin, TX, 2The Univ. of Texas, Tyler, TX, 3Univ. of Pennsylvania, Philadelphia, PA

**Contributed Papers: Integrated Pest Management and Sustainable Agriculture: Fruits and Vegetables**

***Room W231 B (Convention Center)***

**Moderators:** Linnet Gohole1 and Elena Rhodes2, 1Univ. of Eldoret, Eldoret, Kenya, 2Univ. of Florida, Gainesville, FL

1:30 **1092** Ecological trends of fruit flies (Family: Tephritidae) on table grapes along multiple gradients of the Lower Orange River, Northern Cape. **Tanya Smit** (tanyasmit175@gmail.com), Schalk van der Merwe Louw, and Vaughn Swart, Univ. of the Free State, Bloemfontein, South Africa

1:45 **1093** Broad mite (*Polyphagotarsonemus latus*) spread, biology, and management tactics for blackberry. **Jessica LeFors** (lefors@uark.edu) and Don Johnson, Univ. of Arkansas, Fayetteville, AR

2:00 **1094** The agapanthus gall midge — determining biology and control of a newly described pest.  
**Hayley Jones** (hayleyjones@rhs.org.uk)1, Jude Bennison2, Andrew Salisbury1, Anna M. Platoni1, and

Gerard R. G. Clover1, 1Royal Horticultural Society, Surrey, United Kingdom, 2ADAS UK, Ltd., Cambridge, United Kingdom

2:15 **1095** Economic injury level and economic threshold in IPM for strawberries. **Sergei Popov** (sergei\_ya\_popov@ mail.ru), Russian Timiryazev State Agrarian Univ., Moscow, Russia

2:30 **1096** The interactive influence of *Drosophila suzukii* and *D. melanogaster* on sour rot outbreaks in grapevine. Antoine Rombaut1, Robin Guilhot1, Anne Xuéreb1, Patricia Gibert2, and **Simon Fellous** (simon.fellous@ supagro.inra.fr)1, 1INRA, Montferrier-sur-Lez, France, 2Claude Bernard University Lyon 1, Villeurbanne, France

2:45 **1097** Surveys for spotted wing drosophila, *Drosophila suzukii*, in strawberries and other small fruits in Alachua Co., Florida. **Elena Rhodes** (erhodes@ufl.edu) and Oscar Liburd, Univ. of Florida, Gainesville, FL

**3:00 BREAK**

3:15 **1098** Foraging ecology of the invasive spotted wing drosophila in raspberry plantings. **Kevin Rice** (ricekevinb@gmail.com) and Tracy C. Leskey, USDA - ARS, Kearneysville, WV

3:30 **1099** Studying specificity of aphid species in commercial strawberry fields in Atlantic Canada and identifying potential aphid vectors of viruses associated with strawberry decline. **Debra Moreau** (debra. moreau@agr.gc.ca)1, Peggy Dixon2, and Robert Foottit3, 1Agriculture and Agri-Food Canada, Kentville, NS, Canada, 2Agriculture and Agri-Food Canada, St. John’s, NF, Canada, 3Agriculture and Agri-Food Canada, Ottawa, ON, Canada

3:45 **1100** A molecular mechanism for jasmonic acid synthesis involved in whitefly-begomovirus-plant interactions. **Ping Li** (liping6434@126.com), Yue Hong, Juan-Juan Zhao, and Shu-Sheng Liu, Zhejiang Univ., Hangzhou, China

4:00 **1101** Pest monitoring and population models in greenhouses: A next step in biological control.  
Rob Moerkens1, **Vincent Sluydts** (sluydts@gmail.com)2, Els Berckmoes3, Sanne Van Gool1, Amber Tilley3,  
and Herwig Leirs2, 1Research Center Hoogstraten, Hoogstraten, Belgium, 2Univ. of Antwerp, Antwerp, Belgium, 3Research Station for Vegetable Production, Sint-Katelijne-Waver, Belgium

4:15 **1102** Plant pearl bodies mediate trophic interactions in an okra crop system. **Akanksha Singh** (ga46jim@ mytum.de)1, Veronika Mayer2, Sharon Zytynska1, and Wolfgang Weisser1, 1Technical Univ., Freising, Germany, 2Univ. of Vienna, Vienna, Austria

4:30 **1103** Recommendations for management of the swede midge, *Contarinia nasturtii*, in organic crucifer production. **Braden Evans** (bevans02@uoguelph.ca) and Rebecca Hallett, Univ. of Guelph, Guelph, ON, Canada

4:45 **1104** Composition and abundance of insect pests of African indigenous vegetables in western Kenya. **Linnet Gohole** (lgohole@gmail.com)1, Silvia Omasaja1, and John Stephen Yaninek2, 1Univ. of Eldoret, Eldoret, Kenya, 2Purdue Univ., West Lafayette, IN

5:00 **1105** Monitoring aphids and potato virus Y in seed and commercial potato fields in Oregon. **Sudep Bag** (sudeep.bag@oregonstate.edu)1, Silvia Rondon1, Kenneth E. Frost1, Darrin Walenta2, and Brian Charlton3, 1Oregon State Univ., Hermiston, OR, 2Oregon State Univ., La Grande, OR, 3Oregon State Univ. Extension Service, Klamath Falls, OR

**Contributed Papers: Integrated Pest Management and Sustainable Agriculture: IPM Programs**

***Room W225 A (Convention Center)***

**Moderators:** Cerruti Hooks1 and Dakshina Seal2, 1Univ. of Maryland, College Park, MD, 2Univ. of Florida, Homestead, FL

1:30 **1106** Integrated pest management of the western tarnished plant bug (*Lygus hesperus*) in California strawberries. **Surendra Dara** (skdara@ucanr.edu), Univ. of California Cooperative Extension, San Luis Obispo, CA

1:45 **1107** Using strip tillage and living mulches to build an ecologically based pest management program. **Cerruti Hooks** (crrhooks@umd.edu), Alan Leslie, and Guihua Chen, Univ. of Maryland, College Park, MD

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**MONDAY**

**Monday, September 26 • AFTERNOON •**

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2:00 **1108** Overcoming barriers to IPM adoption in flue-cured tobacco. **Jeremy Slone** (jdslone@ncsu. edu) and Hannah Burrack, North Carolina State Univ., Raleigh, NC

2:15 **1109** Partnerships in extension: An argument for public and private cooperation. **Marc Fisher** (mlfisher@ dow.com)1, Rayda Krell2, and Kevin Steffey1, 1Dow AgroSciences, Indianapolis, IN, 2Rayda K. Krell, LLC, Entomological and Agricultural Communications, Ridgefield, CT

2:30 **1110** The global marketplace is driving and documenting sustainable improvements in health and environmental outcomes through IPM and other  
best practices: Entomologists have opportunities to participate! **Thomas Green** (ipmworks@ipminstitute.org), Matthew Doyle Olson, Ariel Larson, Emily Ciesielski, Chloe Nelson, Erika Nickels, Peter Werts, Thomas Bernard, Patrick Shannon-Hughes, Daniel Skolnik,

Justin Leatherwood, Natalie Kaner, Kelly Adams, and Matt Neff, IPM Institute of North America, Madison, WI

2:45 **1111** Alternative pest management strategies for specialty crops. **Amanda Buchanan** (alynn@msu.edu)1, Jason M. Schmidt2, Matthew Grieshop1, and Zsofia Szendrei1, 1Michigan State Univ., East Lansing, MI, 2Univ. of Georgia, Tifton, GA

**3:00 BREAK**

3:15 **1112** An integrated approach for management of pepper weevil, *Anthonomus eugenii* Cano (Coleoptera: Curculionidae). **Dakshina Seal** (dseal3@ufl.edu), Mohammad Razzak, and Catherine Sabines, Univ. of Florida, Homestead, FL

3:30 **1113** Integrated pest management and sustainable agriculture — a moving feast of challenges for northern Australian grain/pulse industries. **Elizabeth Williams** (liz.williams@daf.qld.gov.au)1, Hugh Brier1, and

Melina Miles2, 1Queensland Dept. of Agriculture and Fisheries, Kingaroy, Australia, 2Queensland Dept. of Agriculture and Fisheries, Toowoomba, Australia

3:45 **1114** *Tuta absoluta* in Belgian greenhouses: Evolution towards a season-long IPM control strategy. Els Berckmoes1, Hans Casteels2, Raf De Vis1,  
**Rob Moerkens** (rob.moerkens@proefcentrum.be)3, Amber Tilley1, Luc Tirry4, Veerle Van Damme4,5, and Lieve Wittemans1, 1Proefstation voor de Groenteteelt, Sint-Katelijne-Waver, Belgium, 2Institue for Agricultural and Fisheries Research, Merelbeke, Belgium, 3Research Center Hoogstraten, Hoogstraten, Belgium, 4Ghent Univ., Ghent, Belgium, 5Institute for Agricultural and Fisheries Research, Merelbeke, Belgium

4:00 **1115** The long and challenging road for adopting some pest management concepts in sub-Saharan countries. **Pierre Silvie** (pierre.silvie@cirad.fr), IRD/ CIRAD, Montpellier, France

4:15 **1116** Alfalfa pest management in the irrigated desert of the southwest: Challenges and opportunities. **Ayman Mostafa** (ayman@cals.arizona.edu), Univ. of Arizona, Phoenix, AZ

4:30 **1117** The pest status of carob moth, *Ectomelois ceratoniae* Zeller, on citrus in South Africa: Developing an integrated pest management program. **Sean Thackeray** (sean.thacks@gmail.com)1, Wayne Kirkman1,2,  
Sean Moore1,2, and Martin Hill1, 1Rhodes Univ., Grahamstown, South Africa, 2Citrus Research International, Port Elizabeth, South Africa

4:45 **1118** Integrated pest management of *Oryctes monoceros*, *Rhynchophorus phoenicis,* and *Latoia viridissima* in Okomu oil palm plantation, Nigeria. **Charles Aisagbonhi** (iziegb@gmail.com)1, Billy Ghansah2, Victor Adaigbe1, Thomas Aneni1, Minister Irorere2, and Glory Ohwevwo2, 1Nigerian Institute for Oil Palm Research, Benin City, Nigeria, 2Okomu Oil Palm Company, Benin City, Nigeria



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**MONDAY**

**Tuesday, September 27 • MORNING •**

**Tuesday, September 27, 2016 • Morning**

**Plenary Presentation Featuring Dr. Baldwyn Torto**

***Chapin Theater (Convention Center)***

**Moderators and Organizers:** Walter S. Leal1, Alvin M. Simmons2, and Catherine Loudon3, 1Univ. of California, Davis, CA, 2USDA - ARS, Charleston, SC, 3Univ. of California, Irvine, CA

8:00 **1119** Introduction of the Plenary Speaker.  
**Catherine Loudon** (cloudon@uci.edu), Univ. of California, Irvine, CA

8:05 **1120** Rift Valley Fever in East Africa: Three frontiers, one purpose. **Baldwyn Torto** (btorto@icipe.org), International Centre of Insect Physiology and Ecology, Nairobi, Kenya

**Plenary Presentation Featuring Dr. Carolina Barillas-Mury**

***Valencia Room (Convention Center)***

**Moderators and Organizers:** Walter S. Leal1, Alvin M. Simmons2, and Anthony James3, 1Univ. of California, Davis, CA, 2USDA - ARS, Charleston, SC, 3Univ. of California, Irvine, CA

8:00 **1121** Introduction of the Plenary Speaker. **Anthony James** (aajames@uci.edu), Univ. of California, Irvine, CA

8:05 **1122** Mosquito immunity and the invisible parasite: Implications for global malaria transmission. **Carolina Barillas-Mury** (cbarillas@niaid.nih.gov), National Institutes of Health, Bethesda, MD

**Undergraduate Student Poster Competition: Medical and Veterinary Entomology**

***West Hall C (Convention Center)***

* **D3266**Dissemination of *Ehrlichia chaffeensis* using an artificial membrane feeding system. **Paige Allen** (paige. allen@eagles.usm.edu)1, Tais Saito2, Rebekah Bullard1, Jaclyn Williams1, and Shahid Karim1, 1Univ. of Southern Mississippi, Hattiesburg, MS, 2The Univ. of Texas, Galveston, TX
* **D3267**Zoonotic diseases in dengue negative samples from Nuevo Leon State, Mexico. **Martha Lopez** (martha\_a\_a@ hotmail.com), Iram Rodriguez, Adriana Flores,  
  Zinnia Molina-Garza, and Gutsavo Ponce-Garcia, Autonomus Univ. of Nuevo León, San Nicolas de los Garza, Mexico
* **D3268**Presentation withdrawn
* **D3269**Epigenetic effects in the African malaria mosquito *Anopheles coluzzii*. **Kerry Maguschak** (mkerry14@vt.edu), Atashi Sharma and Igor Sharakhov, Virginia Polytechnic Institute and State Univ., Blacksburg, VA
* **D3270**Zika virus infection and dissemination within South Texas mosquito vectors. **Brenda Hernandez Barron** (brenda.hernandezbarron01@utrgv.edu), John Thomas, and Christopher Vitek, The Univ. of Texas, Edinburg, TX

**D3271** Report of chikungunya virus in wild populations of *Aedes aegypti* L. from San Marcos, Guerrero, Mexico. **Iram Rodriguez** (iramrodriguez@gmail.com)1, Martha Lopez1, Adriana Flores1, Felipe Dzul2, and Gutsavo Ponce-Garcia1, 1Autonomus Univ. of Nuevo León, San Nicolas de los Garza, Mexico, 2Secretary of Health of Guerrero, Acapulco, Mexico

**D3272** Effect of wound depth on decomposition rate and species composition of carrion-feeding Diptera.  
**Holly Munro** (hlmunr8021@ung.edu), Melissa Parks, and Evan Lampert, Univ. of North Georgia, Oakwood, GA

**D3273** Flesh-eating beetle (*Dermestes maculatus*) life history traits depend on meat type and rotting duration. **Stephanie Olson** (solson\_01@arcadia.edu), Karen Scott, and Tobias Landberg, Arcadia Univ., Glenside, PA

**D3274** Effects of decomposition of carrion on surrounding arthropod populations and soil nutrient content. **Samantha Sawyer** (s1sawyer@student.bridgew. edu) and Christopher Bloch, Bridgewater State Univ., Bridgewater, MA

**D3275** Expression and dsRNA knockdown of aquaporins AaAQP3a and AaAQP3b in the Malpighian tubules of the larval disease vector, *Aedes aegypti*.  
**Lidiya Misyura** (lidiyam@my.yorku.ca) and Andrew Donini, York Univ., Toronto, ON, Canada

**D3276** Diapause regulation in the flesh fly (*Sarcophaga bullata*) by histone acetylase transferases and histone deacetylases. **Robin Bautista Jimenez** (bautista-jimenez.1@ osu.edu), Julie Reynolds, and David L. Denlinger, The Ohio State Univ., Columbus, OH

**D3277** SkitoSnack: The development of an artificial blood meal replacement for mosquito culture. **Hae-Na Chung** (ichung@nmsu.edu), Stacy D. Rodriguez,  
Kristina Gonzales, and Immo Hansen, New Mexico State Univ., Las Cruces, NM

**Undergraduate Student Poster Competition: Morphology, Systematics, and Phylogeny**

***West Hall C (Convention Center)***

**D3278** Preliminary analysis on the dispersal route of *Tabanus bromius* L., 1758 (Diptera: Tabanidae) in Turkey. **Sumeyra Sanal Demirci** (sumeyrasanal@gmail.com)1, Ali Kilic1, and Serap Mutun2, 1Anadolu Univ., Eskisehir, Turkey, 2Abant Izzet Baysal Univ., Bolu, Turkey

**D3279** Investigating cryptic species of *Chlorochroa uhleri*  
Stål (Hemiptera: Pentatomidae), a green stink bug. **Ryan Torres** (rtorres28@ucmerced.edu)1, Bradley Higbee2, and Andrea Joyce1, 1Univ. of California, Merced, CA, 2Wonderful Orchards, Shafter, CA

**D3280** Biogeographical and phylogenetic relationships among the South American Acanthosomatidae: A first approach. **Mariom Carvajal** (mariom.carvajal@gmail.com), Eduardo Faundez, and David Rider, North Dakota State Univ., Fargo, ND

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**TUESDAY**

**ANNOUNCING**

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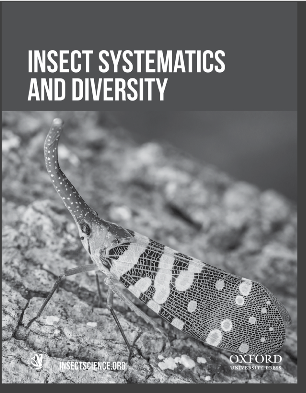
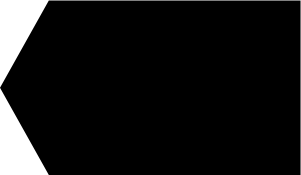
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**Dr. Sydney A. Cameron and Dr. James B. Whitfield from the University of Illinois will serve as co-editors-in-chief.**

ISD will publish original research on systematics, evolution, and biodiversity of insects and related arthropods. The journal will welcome integrative studies incorporating comparative and functional morphology, conservation, behavior, taxonomy, molecular phylogenetics, paleobiology, natural history, and articles that utilize novel technologies or data types or describe emerging methods of research. It will be online-only, enabling publication of papers in a variety of lengths, from short communications, to reviews of current topics, to revisions of up to 200 pages.

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**Tuesday, September 27 • MORNING •**

* **D3281**Recent origin and expansion of the Neotropical ant *Neoponera villosa* (Formicidae: Ponerinae). **Marilyn Mendoza** (tzutujam@gmail.com)1,  
  Chantal Poteaux2, Andrea Jiménez1, and   
  Alejandro Zaldívar-Riverón1, 1National Autonomous Univ. of México, México, Mexico, 2Univ. of Paris 13, Villetaneuse, France
* **D3282**Comparison of a molecular and morphological phylogeny in the quill mite family Syringophilidae. **Suzanne Pinar** (spinar@mail.sfsu.edu) and Greg Spicer, San Francisco State Univ., San Francisco, CA
* **D3283**Phylogeography of *Ligia* isopods in South Africa. **Taylor Greenan** (taylorgreenan@gmail.com) and Carlos Santamaria, Univ. of South Florida, Sarasota, FL
* **D3284***Tylos* isopods in the Indo-Pacific: Are there any cryptic species? **Bryn Austin** (brynaustin@mail.usf.edu) and Carlos Santamaria, Univ. of South Florida, Sarasota, FL
* **D3285**Cryptic biodiversity of *Ligia* isopods in Vanuatu, a remote archipelago in the Pacific. **Sharla Rafferty** (srafferty@mail.usf.edu) and Carlos Santamaria, Univ. of South Florida, Sarasota, FL
* **D3286**Syrphidae composition and seasonal abundance at mid-elevation site in Utah. **Tyson Terry** (tysonjterry@ gmail.com) and C. Riley Nelson, Brigham Young Univ., Provo, UT

**Graduate Student Poster Competition: Acarology and Stored Products**

***West Hall C (Convention Center)***

* **D3287**Mechanisms of resistance to mite growth regulators  
  in the twospotted spider mite, *Tetranychus urticae*. **Adekunle Adesanya** (adekunle.adesanya@wsu.edu)1, Fang (Rose) Zhu1, Douglas Walsh2, and Laura C. Lavine1, 1Washington State Univ., Pullman, WA, 2Washington State Univ., Prosser, WA
* **D3288**Temperature-dependent development of *Amblyseius eharai* (Acari: Phytoseiidae). **Young-gyun Park** (insect1141@snu.ac.kr) and Joon-Ho Lee, Seoul National Univ., Seoul, South Korea
* **D3289**In silico genome directed investigation of the *Dermatophagoides pteronyssinus* proteomic response to desiccation. **Rose Waldron** (waldronroses@gmail. com)1,2,3, Natasha Gordon2, Sean Doyle1, and  
  David Fitzpatrick1, 1Maynooth Univ., Kildare, Ireland, 2Airmid Healthgroup, Ltd., Dublin, Ireland, 3The Irish Research Council, Dublin, Ireland
* **D3290**Assessment of wheat curl mite virulence to wheat genotypes and distribution of mite-vectored viruses in the north central United States. **Luaay Khalaf** (luaay\_kalani@yahoo.com)1, Wen-Po Chuang2,   
  Lina Aguirre-Rojas1, Alicia Timm3, and C. Michael Smith1, 1Kansas State Univ., Manhattan, KS, 2National Taiwan Univ., Taipei, Taiwan, 3Univ. of Cincinnati, Cincinnati, OH
* **D3291**Development and validation of sequential sampling plans for the ham mite, *Tyrophagus putrescentiae* (Shrank) (Acari: Acaridae), on dry-cured ham. **Barbara Amoah** (bamoah@ksu.edu)1, Subramanyam Bhadriraju1, David Hagstrum1, M. Wes Schilling2, and Thomas Phillips1, 1Kansas State Univ., Manhattan, KS, 2Mississippi State Univ., Mississippi State, MS

**D3292** Survival of stored-product psocids (Psocoptera: Liposcelididae) at 43% relative humidity. **Abena Ocran** (abena.ocran@okstate.edu), George Opit, Kandara Shakya, and Sandipa G. Gautam, Oklahoma State Univ., Stillwater, OK

**D3293** Presentation withdrawn

**D3294** Efficacy of the deltamethrin-incorporated ZeroFly® storage bag against stored-product insects.  
**Sulochana Paudyal** (sulochana.paudyal@okstate.edu)1, George Opit1, Enoch A. Osekre2, Naomi Manu3,

James Danso3, and Kandara Shakya1, 1Oklahoma State Univ., Stillwater, OK, 2Kwame Nkrumah Univ. of Science and Technology, Kumasi, Ghana, 3Northern Arizona Univ., Kumasi, Ghana

**Graduate Student Poster Competition: Arthropod Vectors of Animal and Plant Disease**

***West Hall C (Convention Center)***

**D3295** Environmental and socioeconomic factors associated with human cases of West Nile virus. **Eunis Hernandez** (ehernandez83@ucmerced.edu), Karen Cedano, and Andrea Joyce, Univ. of California, Merced, CA

**D3296** How does hybridisation influence life-history parameters and dispersal in *Culex pipiens* mosquitoes? Simon Carpenter1, Christopher Sanders1, Mary Cameron2, Anthony Wilson1, and **Christopher Gamble** (chris. gamble@pirbright.ac.uk)1,2, 1The Pirbright Institute, Woking, United Kingdom, 2London School of Hygiene and Tropical Medicine, London, United Kingdom

**D3297** Species composition and insecticide susceptibility of malaria vectors in two regions in Mauritania. **Mohamed Aly Ould Lemrabott** (mohamedalylemrabott@ yahoo.fr)1, Aichetou Mint Mohamed Lemine1,2, Mohamed Salem Ould Ahmedou Salem3,

Khadijetou Mint Lekweiry3, Khyarhoum Ould Brahim1, Mohamed Ouldabdallahi1, Leonardo Basco4,  
Hervé Boegreau5, Ousmane Faye2, Frédéric Simard6, Ali Ould Mohamed Salem Boukhary3, and Driss Belghyti7, 1Genomes Unit of Research and Media ,

Nouakchott, Mauritania, 2Univ. Cheikh Anta Diop, Dakar, Senegal, 3Univ. of Science and Medical Technology, Nouakchott, Mauritania, 4Reserch Institute for Develoment, Marseille, France, 5Institute of Army Biomedical Research, Paris, France, 6Research Institute for Development, Montpellier, France, 7Univ. Ibn Tofail, Kénitra, Morocco

**D3298** Potential vectors of heartworm (*Dirofilaria immitis*) in Arkansas and development of models to predict seasonal transmission for high risk states in the U.S. **Sofija Todorovic** (sofija.todorovi@smail.astate.edu) and Tanja McKay, Arkansas State Univ., Jonesboro, AR

**D3299** Presentation withdrawn

**D3300** What is ‘fitness’? Defining fitness and appropriate proxies for mosquitoes that transmit human malaria. **Johanna Ohm** (Jro182@psu.edu)1, Lauren Cator2, William Nelson3, Andrew Read1, and Matthew B. Thomas1, 1Pennsylvania State Univ., University Park, PA, 2Imperial College London, London, United Kingdom, 3Queen’s Univ., Kingston, ON, Canada

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**TUESDAY**

**Tuesday, September 27 • MORNING •**

* **D3301**The Hydra Effect: Controlling mosquito populations as a labor of Hercules, overcompensatory response to additional mortality as an effect of behavioral change. **Kristina McIntire** (kmmcint@ilstu.edu) and Steven Juliano, Illinois State Univ., Normal, IL
* **D3302**Ecology and coexistence of *Anopheles* larvae in aquatic habitats in Mazandaran Province, northern Iran.  
  **Seyed Hassan Nikookar** (nikookar\_84@yahoo.com), Ahmadali Enayati, Mahmoud Fazeli-Dinan, and Seyyed Payman Ziapour, Mazandaran Univ. of Medical Sciences, Sari, Iran
* **D3303**Visualisation and quantification of bluetongue virus in *Culicoides* biting midges. **Alice Muntzer** (alice.muntzer@ pirbright.ac.uk)1, Andrew Shaw2, Gillian Pullinger1, Peter Mertens1, Pippa Hawes1, Massimo Palmarini2,   
  and Anthony Wilson1, 1The Pirbright Institute, Woking, United Kingdom, 2Univ. of Glasgow, Glasgow,  
  United Kingdom
* **D3304**Approaches to controlling *Culicoides* biting midges in the United Kingdom using vector-proof housing and immunological approaches targeting salivary proteins. **Laura Tugwell** (laura.tugwell@pirbright.ac.uk)1,2, Alison Blackwell3, Maria Montoya1, Karin Darpel1,2, and Simon Carpenter1, 1The Pirbright Institute, Woking, United Kingdom, 2Univ. of Surrey, Guildford, United Kingdom, 3APS Biocontrol, Ltd., Dundee, United Kingdom
* **D3305**Black fly species (Diptera: Simuliidae) occurring in Mississippi. **Tina Nations** (tina.nations@msdh.ms.gov) and Jerome Goddard, Mississippi State Univ., Mississippi State, MS

**Graduate Student Poster Competition: Insect Immunology**

***West Hall C (Convention Center)***

* **D3306**Characterization of virulence factors in the fatal honey bee disease American foulbrood. **Julia Ebeling** (julia.ebeling@hu-berlin.de)1, Daniel Krska2,  
  Ravikiran Ravulapalli2, Lena Poppinga1, Anne Fünfhaus1, A. Rod Merrill2, and Elke Genersch1, 1Institute for   
  Bee Research, Hohen Neuendorf, Germany, 2Univ. of Guelph, Guelph, ON, Canada
* **D3307**Functional characterization of *Manduca sexta* peptidoglycan recognition protein-5. **Mansi Gulati** (mansi.gulati@okstate.edu), Yang Wang, and Haobo Jiang, Oklahoma State Univ., Stillwater, OK
* **D3308**The *Xenorhabdus nematophila* serine protease inhibitor ecotin is necessary for virulence in lepidopteran larvae. **Ángel Casanova-Torres** (amcasanova@wisc.edu) and Heidi Goodrich-Blair, Univ. of Wisconsin, Madison, WI
* **D3309**The immune gene expression and pyrethroid resistance in house flies, *Musca domestica*. **Zhou Chen** (zzc0012@ auburn.edu) and Nannan Liu, Auburn Univ., Auburn, AL
* **D3310**Evolution of immune priming favored by the low  
  cost of the secondary immune response in the mealworm beetle, *Tenebrio molitor*. **Julien Dhinaut** (julien.dhinaut@u-bourgogne.fr), Manon Chogne, and Yannick Moret, Univ. of Bourgogne, Dijon, France

**D3311** Characterization of hemolymph protease-1 and its function in the phenoloxidase cascade in tobacco hornworm, *Manduca sexta*. **Yan He** (yanhe@okstate. edu), Haobo Jiang, Fan Yang, and Yang Wang, Oklahoma State Univ., Stillwater, OK

**D3312** Functions of stress responsive peptides and their activation in *Anopheles gambiae*. **Krishna Bhattarai** (krishna.bhattarai@okstate.edu), Xiaolong Cao, and Haobo Jiang, Oklahoma State Univ., Stillwater, OK

**D3313** Host plant effects on buckeye (*Junonia coenia*) survival and immunity during infection with the *Junonia coenia* densovirus. **Carmen Mo** (carmen@nevada.unr.edu)1,  
M. Deane Bowers2, Peri Mason2, Mike Teglas1,

Jennifer Hsueh1, Craig Dodson1, and Angela Smilanich1, 1Univ. of Nevada, Reno, NV, 2Univ. of Colorado, Boulder, CO

**D3314** Pathogen and parasitoid loads in wild populations of Baltimore checkerspots (*Euphydryas phaeton*) vary depending on host plant availability. **Nadya Muchoney** (nmuchoney@nevada.unr.edu)1, Angela Smilanich1, Peri Mason2, Mike Teglas1, Jennifer Hsueh1, Samantha Feeney1, and M. Deane Bowers2, 1Univ. of Nevada, Reno, NV, 2Univ. of Colorado, Boulder, CO

**D3315** Input neuronal pathways for photoperiodism in the bean bug, *Riptortus pedestris*. **Jili Xi** (xijier1001@gmail. com) and Sakiko Shiga, Osaka City Univ., Osaka, Japan

**D3316** The molecular cross-talk in a unique parasitic manipulation strategy. **Maayan Kaiser** (kaiserm@ post.bgu.ac.il)1, Ryan Arvidson2, Michael E. Adams2, and Frederic Libersat1, 1Ben-Gurion Univ. of the Negev, Beersheva, Israel, 2Univ. of California, Riverside, CA

**Graduate Student Poster Competition: Integrated Pest Management and Sustainable Agriculture: Management Tactics**

***West Hall C (Convention Center)***

**D3317** Landscape effects on flea beetles and their natural enemies in the Canadian Prairies. **Thais Silva Guimaraes** (silvagtf@myumanitoba.ca)1, Tharshinidevy Nagalingam1, Jennifer Otani2, Héctor A. Cárcamo3, Tyler Wist4,

John Gavloski5, and Alejandro Costamagna1, 1Univ. of Manitoba, Winnipeg, MB, Canada, 2Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, 3Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, 4Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, 5Manitoba Agriculture, Food and Rural Initiatives, Carman, MB, Canada

**D3318** Plant species diversity facilitates behavioral interactions that lead to enhanced herbivore suppression.  
**Kathryn Ingerslew** (ksiggc@mail.missouri.edu) and Debbie Finke, Univ. of Missouri, Columbia, MO

**D3319** *Melittia cucurbitae* (squash vine borer) attraction to zucchini as a trap crop. **Mike McFarland** (mcfarland.447@ osu.edu) and Celeste Welty, The Ohio State Univ., Columbus, OH

**D3320** Attractiveness of seven insectary plants to natural enemies of insect pests in a vegetable cropping system. **Binita Shrestha** (bswc2@mail.missouri.edu)1,  
Debbie Finke1, and Jaime Pinero2, 1Univ. of Missouri, Columbia, MO, 2Lincoln Univ., Jefferson City, MO

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**TUESDAY**

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* **D3321**Incidence of red maple tree insect pests in cover crop and non-cover crop production plots. **Sujan Dawadi** (dawadisujan01@gmail.com)1, Karla Addesso2,  
  Jason B. Oliver2, and Manoj Pandey1, 1Tennessee State Univ., Nashville, TN, 2Tennessee State Univ., McMinnville, TN
* **D3322**Plant growth promoting rhizobacteria treatment reduce oviposition by European corn borer on maize. **Joseph Disi** (jod0003@auburn.edu)1, Simon Zebelo2, Joseph Kloepper1, and Henry Fadamiro1, 1Auburn Univ., Auburn, AL, 2Univ. of Maryland, Princess Anne, MD
* **D3323**The effect of plant hormone treatment of seeds on whole-plant tolerance to insects. **Mengqi Zhang** (zhangmengqi614@gmail.com)1, Phyllis Weintraub2, Joshua Klein3, and Shimon Rachmilevitch1, 1Ben-Gurion Univ. of the Negev, Sede Boker, Israel, 2Agricultural Research Organisation, Gilat, Israel, 3Agricultural Research Organisation, Bet-Dagan, Israel
* **D3324**Presentation withdrawn
* **D3325**Volatiles of *Murraya koenigii* involved on the process of the host selection behavior of the psyllid *Diaphorina citri* Kuwayama (Hemiptera: Liviidae). **Vitor Beloti** (vitorbeloti@usp.br), Franciele dos Santos, Gustavo Alves, José Mauricio Bento, and Pedro Yamamoto, Univ. of   
  São Paulo, Piracicaba, Brazil
* **D3326**Oil and soap for armored and soft scales: Pathway to success or slippery slope toward failure? **Carlos Quesada** (cquesand@purdue.edu) and Clifford Sadof, Purdue Univ., West Lafayette, IN

**Graduate Student Poster Competition: Integrated Pest Management and Sustainable Agriculture: Pest Physiology**

***West Hall C (Convention Center)***

* **D3327**Expression of *Rorippa indica* defensin in *Brassica juncea* enhances tolerance against *Lipaphis erysimi*. **Poulami Sarkar** (poulamisarkarbt@gmail.com) and Samir Sikdar, Bose Institute, Kolkata, India
* **D3328**Effect of temperature on growth and development of sugarcane aphid on sorghum. **Philip Hinson** (philison2@gmail.com) and Bonnie Pendleton, West Texas A&M Univ., Canyon, TX
* **D3329**How orchard soil, nutrition, natural enemies, management, and grower perceptions relate to  
  woolly apple aphid (*Eriosoma lanigerum*) problems. **Robert Orpet** (robert.orpet@wsu.edu)1, Elizabeth H. Beers1, John Reganold2, Jessica Goldberger2, Vincent Jones1, and David Crowder2, 1Washington State Univ., Wenatchee, WA, 2Washington State Univ., Pullman, WA
* **D3330**Detecting corn rootworm (*Diabrotica* spp.) resistance development to *Bt*-RW traits: Root injury vs. beetle emergence. **Edwin Benkert** (benke017@umn.edu), Trisha Leaf, and Ken Ostlie, Univ. of Minnesota,   
  St. Paul, MN
* **D3331**Dominance of Cry1-resistant fall armyworm in different planting patterns of non-Bt and Bt corn. **Ying Niu** (yniu@agcenter.lsu.edu), Binod Acharya, and Fangneng Huang, Louisiana State Univ., Baton Rouge, LA

**D3332** Lack of fitness costs associated with *Bacillus thuringiensis* Cry2Ab2 resistance in the fall armyworm, *Spodoptera frugiperda* (J.E. Smith). **Binod Acharya** (bacharya@agcenter.lsu.edu)1, Graham P. Head2,

Paula A. Price2, and Fangneng Huang1, 1Louisiana State Univ., Baton Rouge, LA, 2Monsanto Company, St. Louis, MO

**D3333** Transcriptome assembly and differential analysis of resistant and susceptible western corn rootworm, *Diabrotica virgifera virgifera* LeConte, responses to eCry3.1Ab transgenic corn. **Zixiao Zhao** (zxzhao5@ gmail.com)1, Lisa Meihls2, Kent S. Shelby2,

Christine Elsik1, Thomas A. Coudron2, and  
Bruce Hibbard2, 1Univ. of Missouri, Columbia, MO, 2USDA - ARS, Columbia, MO

**D3334** Efficacy of insecticides for control of brown marmorated stink bug (*Halyomorpha halys* Stål) nymphs in Ontario. **Kaelyn Hunter** (khunter@mail.uoguelph.ca)1,  
Angela Gradish1, Hannah Fraser2, Tara Gariepy3, and Cynthia Scott-Dupree1, 1Univ. of Guelph, Guelph, ON, Canada, 2Ontario Ministry of Agriculture, Food and Rural Affairs, Vineland, ON, Canada, 3Agriculture and Agri-Food Canada, London, ON, Canada

**D3335** Differential susceptibility of *Riptortus pedestris* (Hemiptera: Alydidae) and its two egg parasitoids to flonicamid. **Naresh Dangi** (frennaresh1@gmail.com) and Un Taek Lim, Andong National Univ., Andong, South Korea

**D3336** Determinants of host use in tachinid parasitoids of stink bugs. **Matthew Duncan** (duncan.89@wright.edu) and John O. Stireman III, Wright State Univ., Dayton, OH

**D3337** Diamide resistance conferrred by target-site mutations in the ryanodine receptor of *Plutella xylostella*.  
**Ewan Richardson** (ewan.richardson@rothamsted. ac.uk)1, Bartek Troczka1, T.G. Emyr Davies1,

Martin Williamson1, Christopher George2, Alan Williams2, Melanie Scharwey3, and Ralf Nauen3, 1Rothamsted Research, Harpenden, United Kingdom, 2Cardiff Univ., Cardiff, United Kingdom, 3Bayer CropScience, Monheim, Germany

**Graduate Student Poster Competition: Medical and Veterinary Entomology**

***West Hall C (Convention Center)***

* **D3338**A survey of the relative abundance of mosquitoes  
  in their preferred breeding microhabitats of refuse dumps in Owerri, Imo state, Nigeria. **Chidinma Ikpeama** (chidinmaikpeama2015@gmail.com), Imo State Univ., Owerri, Nigeria
* **D3339**How different detritus types and access to detritus affect performance and nutrient stoichiometry of *Aedes albopictus* and *Culex quinquefasciatus*. **James Deerman** (james.deerman@eagles.usm.edu) and Donald Yee, Univ. of Southern Mississippi, Hattiesburg, MS
* **D3340**Molecular detection for zoonotic bacteria from ticks (Acari: Ixodidae) in Georgia, USA. **Sarah Duong** (sd03094@georgiasouthern.edu) and Quentin Q. Fang, Georgia Southern Univ., Statesboro, GA
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**TUESDAY**

**Tuesday, September 27 • MORNING •**

* **D3341**Relationship between ixodid tick fauna and its host animals in Kanagawa Prefecture, Japan, evaluated by reverse line blot assay. **Tomomi Sato** (entomol@ meiji.ac.jp)1, Haruhiko Isawa2, Ryosuke Fujita2,3, Kentaro Itokawa2,3, Toshihiko Hayashi2, Takeo Yamauchi4, Mamoru Watanabe2, Kyo Itoyama1, and Kyoko Sawabe2, 1Meiji Univ., Kanagawa, Japan, 2National Institute of Infectious Diseases, Tokyo, Japan, 3Japan Agency for Medical Research and Development, Tokyo, Japan, 4Univ. of Hyogo, Hyogo, Japan
* **D3342***Rickettsia parkeri* modulates tick superoxide dismutases to survive within the tick vector. **Gary Crispell** (gary. crispell@eagles.usm.edu), Khemraj Budachetri, and Shahid Karim, Univ. of Southern Mississippi, Hattiesburg, MS
* **D3343**Investigation of pathogen prevalence and ecological determinants of questing density among lone star ticks in east-central Alabama. **Xiaodi Wang** (xzw0039@ tigermail.auburn.edu) and Derrick Mathias, Auburn Univ., Auburn, AL
* **D3344**Procurement and persistence of GFP-expressing *Escherichia coli* and *Salmonella typhimurium* in male and female house flies exposed to cattle manure. **Jessica Thomson** (jessiel@ksu.edu)1, Ludek Zurek1, and Dana Nayduch2, 1Kansas State Univ., Manhattan, KS, 2USDA - ARS, Manhattan, KS
* **D3345**Investigation of correlation between German cockroach (*Blattella germanica*) and medically important pathogens in urban area. **Xueyang Fan** (xf24@njit.edu), New Jersey Institute of Technology, Newark, NJ

**Graduate Student Poster Competition: Morphology, Systematics, and Phylogeny: Flies, Hemiptera, and Lepidoptera**

***West Hall C (Convention Center)***

* **D3346**Molecular systematics and new species of nearctic *Androprosopa* Mik (Diptera: Thaumaleidae).  
  **Robert J. Pivar** (rpivar@vols.utk.edu)1, John Moulton1, and Bradley Sinclair2, 1Univ. of Tennessee, Knoxville, TN, 2Canadian Food Inspection Agency, Ottawa, ON, Canada
* **D3347**Systematic and taxonomic revision of Scandinavian Empidoidea (Insecta: Diptera), with emphasis on the Swedish diversity of Empididae and Hybotidae.  
  **Emma Wahlberg** (emma.wahlberg@nrm.se)1,2, 1Swedish Museum of Natural History, Stockholm, Sweden, 2Univ. of Stockholm, Stockholm, Sweden
* **D3348**Flies that don’t fly: The impact of the *wingless* mutation *wg1* on the thorax morphology of *Drosophila melanogaster*. **Benjamin Fabian** (benjamin.fabian@ uni-jena.de) and Katharina Schneeberg, Friedrich Schiller Univ., Jena, Germany
* **D3349**Molecular phylogenetics of North American *Rhagoletis* (Diptera: Tephritidae): Monophyly and species group relationships of nearctic taxa.  
  **Daniel Hulbert** (hulbertd@msu.edu) and James Smith, Michigan State Univ., East Lansing, MI

**D3350** Comparative genome analysis of sap-feeding insects of the order Hemiptera. **Rebecca Corkill** (rebecca.corkill@ jic.ac.uk)1, Sam Mugford2, Neil Morrison3, and  
Saskia A. Hogenhout2, 1The John Innes Centre, Norfolk, United Kingdom, 2The John Innes Centre, Norwich, United Kingdom, 3Oxitec, Ltd., Abingdon, United Kingdom

**D3351** The genus *Poecilotoma* Dallas, 1851 (Hemiptera: Heteroptera) in Western Australia. **Eduardo Faundez** (ed.faundez@gmail.com) and David Rider, North Dakota State Univ., Fargo, ND

**D3352** Population structure of glasshouse whitefly, *Trialeurodes vaporariorum* (West.), and molecular identification of their symbionts in the UK.  
**Ali Kareem** (a.a.kareem@newcastle.ac.uk), Gordon Port, and Kirsten Wolff, Newcastle Univ., Newcastle upon Tyne, United Kingdom

**D3353** Exploring COI variation in Ecuadorian *Hermeuptychia* butterflies: The first step in an integrative approach to resolving species limits in this widely distributed and cryptic genus. **Denise Tan** (denisetsh@ufl.edu) and Keith R. Willmott, Univ. of Florida, Gainesville, FL

**D3354** A preliminary phylogeny of *Eudocima* based on morphological data (Lepidoptera: Erebidae: Calpinae). **Crystal Klem** (cklem@purdue.edu)1, Alberto Zilli2, and Jennifer Zaspel1, 1Purdue Univ., West Lafayette, IN, 2The Natural History Museum, London, United Kingdom

**Graduate Student Poster Competition: Morphology, Systematics, and Phylogeny: Springtails, Beetles, and Hymenoptera**

***West Hall C (Convention Center)***

**D3355** Taxonomic review of the family Onychiuriae (Poduromorpha: Collembola) from the Korean Peninsula. **Inae Lee** (annarium@gmail.com) and Kyung-Hwa Park, Chonbuk National Univ., Jeonju, South Korea

**D3356** Taxonomic revision of the genus *Macrohyliota* (Coleoptera: Silvanidae). **Takahiro Yoshida** (yoshida\_ toritoma@yahoo.co.jp) and Toshiya Hirowatari, Kyushu Univ., Fukuoka, Japan

**D3357** A preliminary phylogeny of *Edrotes* LeConte (Coleoptera: Tenebrionidae). **Christopher Wirth** (christophercwirth@gmail.com), Northern Arizona Univ., Flagstaff, AZ

**D3358** Reconstructing the patterns of diversification in the Neotropical montane bess beetles (Passalidae: Proculini). **Cristian Beza-Beza** (cfbeza@memphis.edu) and Duane D. McKenna, Univ. of Memphis, Memphis, TN

**D3359** Presentation withdrawn

**D3360** Sibling species of *Chrysis ignita* complex: Molecular, morphological, and trophic differentiation of North European species and description of new species (Hymenoptera: Chrysididae). **Svetlana Orlovskyte** (s.orlovskyte@gmail.com)1, Eduardas Budrys1,2, and Anna Budriene1, 1Nature Research Centre, Vilnius, Lithuania, 2Vilnius Univ., Vilnius, Lithuania

**D3361** A revision of the genus *Pristiceros* Gravenhorst from Japan (Hymenoptera: Ichneumonidae). **Namiki Kikuchi** (namikikikuchi@gmail.com)1 and Kazuhiko Konishi2, 1Hokkaido Univ., Sapporo, Japan, 2Ehime Univ., Matsuyama, Japan

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**TUESDAY**

**Tuesday, September 27 • MORNING •**

**D3362** Taxonomic study of Japanese Teleasini (Hymenoptera: Platygastridae). **Yoto Komeda** (kome123k123@gmail. com)1, Toshiharu Mita1, and Kenzo Yamagishi2, 1Kyushu Univ., Fukuoka, Japan, 2Meijo Univ., Nagoya, Japan

**Graduate Student Poster Competition: Physiology and Biochemistry: Moths and Mosquitoes**

***West Hall C (Convention Center)***

* **D3363***Bombyx mori* superoxide dismutase 1 and 2 play a role as metamorphosis initiator. **Yosui Nojima** (yosui. nojima@gmail.com)1, Katsuhiko Ito1, Hidemasa Bono2, Takeshi Yokoyama1, and Hiroko Tabunoki1, 1Tokyo Univ. of Agriculture and Technology, Fuchu, Japan, 2Database Center for Life Science, Mishima, Japan
* **D3364***BmorPlip*, a novel candidate gene involved in juvenile hormone biosynthesis in *Bombyx mori*. **Yuri Homma** (yuri.1116.gf@icloud.com)1, Tetsuro Shinoda2, Hiroaki Noda2, Kazuei Mita2, Yuki Nakamura2, Toshiki Namiki2, and Toru Togawa1, 1Nihon Univ., Tokyo, Japan, 2National Institute of Agrobiological Sciences, Tsukuba, Japan
* **D3365**Synthesis of complex-type N-glycans on recombinant proteins produced by silkworm-baculovirus expression system. **Daisuke Morokuma** (d.morokuma@agr.kyushu-u. ac.jp), Hiroaki Mon, JaeMan Lee, and   
  Takahiro Kusakabe, Kyushu Univ., Fukuoka, Japan
* **D3366**Ingestion of protein, but not gut distention, triggers vitellogenesis in *Aedes aegypti*. **Ruby Harrison** (reh21923@uga.edu), Michael Strand, and  
  Mark R. Brown, Univ. of Georgia, Athens, GA
* **D3367**Cholesterol localization and ecdysteroidogenesis in the mosquito *Aedes aegypti.* **David A. McKinney** (dmckinn7@uga.edu), Michael Strand, and  
  Mark R. Brown, Univ. of Georgia, Athens, GA
* **D3368**Yeast digestion in *Aedes aegypti* larvae. **Raquel Souza** (raqsouzarj@gmail.com)1, Hector Diaz-Albiter1,  
  Vivian Dillon2, Rod Dillon3, and Fernando Genta1, 1Oswaldo Cruz Foundation, Rio de Janeiro, Brazil, 2Univ. of Liverpool, Liverpool, United Kingdom, 3Lancaster Univ., Lancaster, United Kingdom
* **D3369**Identification of proteins interacting physically with the *Aedes aegypti* slimfast (CAT3) amino acid transporter. **Lavesh Bhatia** (lvb1790@nmsu.edu), Hitoshi Tsujimoto, and Immo Hansen, New Mexico State Univ., Las Cruces, NM
* **D3370**The role of specific ammonia transporters in ammonia excretion in the blood feeding female mosquito, *Aedes aegypti*. **Andrea Durant** (adurant@yorku.ca) and Andrew Donini, York Univ., Toronto, ON, Canada

**Graduate Student Poster Competition: Physiology and Biochemistry: Physiology**

***West Hall C (Convention Center)***

**D3371** Insect saliva as the first line of defense against plant defenses. **Loren Rivera Vega** (ljr181@psu.edu) and Gary Felton, Pennsylvania State Univ., University Park, PA

**D3372**

**D3373**

**D3374**

**D3375**

**D3376**

**D3377**

Blue light injures insect cells and kills insect organisms. **Shun Onodera** (sprv8tc9@yahoo.co.jp)1, Kazuki Shibuya1,2, Kei Suzuki1, Hisashi Aso1, and Masatoshi Hori1, 1Tohoku Univ., Sendai, Japan, 2Japan Society for the Promotion of Science, Tokyo, Japan

Mechanisms of drought-induced rapid cold-hardening in larvae of the goldenrod gall fly, *Eurosta solidaginis*. **J. D. Gantz** (gantzjd@miamioh.edu), Shu-Xia Yi, and Richard E. Lee, Miami Univ., Oxford, OH

Characterization of physiological role of potassium ion channels in the arthropod salivary gland. **Zhilin Li** (zhilin.li@agcenter.lsu.edu) and Daniel R. Swale, Louisiana State Univ., Baton Rouge, LA

Transposon mutagenesis of gut symbiont *Burkholderia* identified lipoprotein mutant resistant to host salivary gland of bean bug, *Riptortus pedestris*. **Ho Am Jang** (jha0209@naver.com), Eun Sil Seo, Jun Beom Lee,

and Bok-Luel Lee, Pusan National Univ., Busan, South Korea

The role of PEPCK in insect diapause, development, and stress response. **Drew Spacht** (spacht.2@osu. edu)1, Nicholas M. Teets2, and David L. Denlinger1, 1The Ohio State Univ., Columbus, OH, 2Univ. of Kentucky, Lexington, KY

The *Toxoneuron nigriceps* polydnavirus ANK1 protein induces apoptosis in insect S2 cells and *Heliothis virescens* hemocytes by interacting with Alix protein. **Rosanna Salvia** (r.salvia@unibas.it)1, Gerarda Grossi1, Simona Laurino1, Pietro Pucci2, Angela Amoresano2, Heiko Vogel3, S. Bradleigh Vinson4, Carmen Scieuzo1, Marisa Nardiello1, Andrea Scala1, Marta Petrone1, Sabino A. Bufo1, and Patrizia Falabella1, 1Univ. of

Basilicata, Potenza, Italy, 2CEINGE-Biotecnologie Avanzate, Napoli, Italy, 3Max Planck Institute for Chemical Ecology, Jena, Germany, 4Texas A&M Univ., College Station, TX

Regulation of ecdysteroidogenesis and development in *Heliothis virescens* (Lepidoptera: Noctuidae) by the target of rapamycin TOR. **Carmen Scieuzo** (carmen. scieuzo@gmail.com)1, Marisa Nardiello1, Rosanna Salvia1, Simona Laurino1, Gerarda Grossi1, Marta Petrone1, Andrea Scala1, Marco Pezzi2, S. Bradleigh Vinson3, Heiko Vogel4, Sabino A. Bufo1, and Patrizia Falabella1, 1Univ. of Basilicata, Potenza, Italy, 2Univ. of Ferrara, Ferrara, Italy, 3Texas A&M Univ., College Station, TX, 4Max Planck Institute for Chemical Ecology, Jena, Germany

**D3378**

**Poster Session 2: Acarology**

***West Hall C (Convention Center)***

**D3379** *Ferritin* gene exon/intron structure of the American dog tick, *Dermacentor variabilis*. **Quentin Q. Fang** (qfang@GeorgiaSouthern.edu) and Dana Sylvestre, Georgia Southern Univ., Statesboro, GA

**D3380** Physiological and molecular mechanisms underpinning winter-related stress in the American dog tick, *Dermacentor variabilis*. **Andrew Rosendale** (rosendaw@ucmail.uc.edu) and Joshua Benoit, Univ.

of Cincinnati, Cincinnati, OH

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**TUESDAY**

**Tuesday, September 27 • MORNING •**

* **D3381**Glutathione *S*-transferase is associated with acequinocyl and bifenazate resistance of twospotted mite, *Tetranychus usticae* (Acari: Tetranychidae). Gil-Hah Kim, Hyun-Na Koo, Hyun Kyung Kim, Wooseong Cho, and **Wonjin Kang** (kwonjin1134@naver.com), Chungbuk National Univ., Cheongju, South Korea
* **D3382**Precise molecular diagnostics for miticide resistance in *Tetranychus urticae* on hops. **Mariany Morales** (mariany.morales@wsu.edu)1, Adekunle Adesanya1, Bianca Mendoza1, Christina Nguyen1, Laura C. Lavine1, Douglas Walsh2, and Fang (Rose) Zhu1, 1Washington State Univ., Pullman, WA, 2Washington State Univ., Prosser, WA
* **D3383**Effects of two commercial neem-based insecticides on *Amblyomma americanum*: Repellency, mortality, and reproduction. **Allan Showler** (allan.showler@ars. usda.gov), USDA - ARS, Kerrville, TX
* **D3384**Adaptations of the mouthparts in Dermanyssina (Acari: Mesostigmata) from predatorism to parasitism. **Antonella Di Palma** (antonella.dipalma@unifg.it), Univ. of Foggia, Foggia, Italy

**Poster Session 2: Bioinformatics and Comparative Genomics of Arthropods**

***West Hall C (Convention Center)***

* **D3385**The i5k Workspace@NAL: New content, new tools, and new insights. **Monica F. Poelchau** (monica.poelchau@ ars.usda.gov)1, Mei-Ju Chen2, Yu-Yu Lin2, Gary Moore3, Vijaya Tsavatapalli3, and Christopher Childers3, 1USDA - ARS, Fort Collins, CO, 2National Taiwan Univ., Taipei, Taiwan, 3USDA - ARS, Beltsville, MD
* **D3386***Euroglyphus maynei* genome with comparison to  
  the scabies mite. Dean Rider, Marjorie Morgan, and **Larry G. Arlian** (larry.arlian@wright.edu), Wright State Univ., Dayton, OH
* **D3387**Ion Torrent PGM and Illumina HiSeq analysis of the metagenome of *Dermacentor variabilis* (Ixodidae). **Gregory A. Dasch** (GDasch@cdc.gov), T. Brian Shirey, Maria L. Zambrano, Mili Sheth, Zachary C. Holmes, and Amanda J. Williams-Newkirk, Centers for Disease Control and Prevention, Atlanta, GA
* **D3388**Integrated modeling of protein-coding genes in the *Manduca sexta* genome using RNA-seq data from the biochemical model insect. **Xiaolong Cao** (xiaolong. cao@okstate.edu) and Haobo Jiang, Oklahoma State Univ., Stillwater, OK
* **D3389**miRNAs in multiple developmental stages in western corn rootworm (*Diabrotica virgifera virgifera*) revealed by deep sequencing. **Haichuan Wang** (hwang4@unl. edu)1, Kan Liu1, Chi Zhang1, Arnubio Valencia J2, Newton Carneiro3, and Blair Siegfried4, 1Univ. of Nebraska, Lincoln, NE, 2Univ. of Caldas, Manizales, Colombia, 3Embrapa Maze and Sorgham, Sete Lagoas, Brazil, 4Univ. of Florida, Gainesville, FL
* **D3390**Comparative whole transcriptome analysis of *Locusta migratoria* revealed differences in long-non-coding RNAs between segragation and gregarious phase locusts. **Young Ho Koh** (kohyh@hallym.ac.kr)1,2, Phuong Nguyen1,2, Kwan-Seok Lee3, Jin Kyo Jung4, and

A-Young Kim1, 1Hallym Univ., Anyang, South Korea, 2Hallym Univ., Chuncheon, South Korea, 3National Academy of Agricultural Science, Suwon, South Korea, 4National Institute of Crop Science, Suwon, South Korea

**D3391** *De novo* transcriptome assembly of the screwworm fly, *Cochliomyia hominivorax* (Diptera: Calliphoridae): Perspectives for the identification of chemosensory genes and potential microRNAs targets. **Daniel Paulo** (daniel.f.paulo@gmail.com)1, Ana Junqueira2, and Ana Azeredo-Espin1, 1Univ. of Campinas, Campinas, Brazil, 2Nanyang Technological Univ., Singapore, Singapore

**D3392** Gene regulatory networks applied to transcriptome data to detect differences in adaptation to herbivory of two *Spodoptera frugiperda* strains focusing on peptidases. **Natalia Murad** (nataliafmurad@gmail. com)1, Karina Silva-Brandão2, and Marcelo Brandão3, 1Univ. of Campinas, Campinas, Brazil, 2Univ. of

São Paulo, Piracicaba, Brazil, 3Univ. of Alberta, Edmonton, AB, Canada

**D3393** Transcriptomic analysis of odor processing genes  
in *Leptinotarsa decemlineata*. **Bianca Mendoza** (chimi.mendoza@wsu.edu)1, Adekunle Adesanya1, Haichuan Wang2, Mariany Morales1, Laura C. Lavine1, Douglas Walsh3, and Fang (Rose) Zhu1, 1Washington State Univ., Pullman, WA, 2Univ. of Nebraska, Lincoln, NE, 3Washington State Univ., Prosser, WA

**D3394** O-GlcNAcPRED: A sensitive predictor to capture protein O-GlcNAcylation sites. **Cangzhi Jia** (cangzhijia@ dlmu.edu.cn)1 and Tian Liu2, 1Dalian Maritime Univ., Dalian, China, 2Dalian Univ. of Technology, Dalian, China

**Poster Session 2: Biological Control and Insect Pathology**

***West Hall C (Convention Center)***

**D3395** Presentation withdrawn

**D3396** Challenges to mass-rearing predators of hemlock woolly adelgid. **James Parkman** (jparkman@utk.edu), Univ. of Tennessee, Knoxville, TN

**D3397** Developing locally adapted factories for the mass production of entomopathogenic nematodes as biocontrol agents against soil insect pests. Hongmei Li1, Jinghua Chen2, Franz Bollhalder3, Ri Un Sil4,

Kyong Man Son4, Song Il Kang5, Joelle Kajuga6,  
Bancy Waweru6, Richou Han7, Yan Xun8, Xuehong Qui8, Keith A. Holmes9, **Michael Zellner** (michael.zellner@lfl. bayern.de)10, and Stefan Toepfer11, 1CABI, Beijing, China, 2Lvbenyuan Biotech Company Ltd, Guangzhou, China, 3Andermatt Biocontrol AG, Grossdietwil, Switzerland, 4Ministry of Agriculture, Pyongyang, North Korea, 5Academy of Agricultural Sciences, Pyongyang,  
North Korea, 6Rwanda Agriculture Board, Huye, Rwanda, 7Guangdong Academy of Agricultural Sciences, Guangzhou, China, 8Guangdong Institute of Applied Biological Resources, Guangzhou, China, 9CABI, Delémont, Switzerland, 10Bavarian State Research Centre for Agriculture, Freising, Germany, 11Chinese Ministry of Agriculture, Beijing, China

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**TUESDAY**

**Tuesday, September 27 • MORNING •**

* **D3398**Longevity of adults of the parasitoid *Cotesia flavipes* (Hymenoptera: Braconidae) from Brazilian biofactories. **Alessandra Marieli Vacari** (amvacari@gmail.com)1, Vanessa Fabiola Pereira Carvalho1, Lauany Santos2, Thamiris Sipriano1, Rafael Ferreira Santos1, and   
  Sergio Antonio De Bortoli1, 1São Paulo State Univ., Jaboticabal, Brazil, 2Univ. of São Paulo, Ituverava, Brazil
* **D3399**Quality control of *Cotesia flavipes* (Hymenoptera: Braconidae) from different Brazilian biofactories. **Rafael Ferreira Santos** (rsdosantos.rs@gmail.com)1, Caroline De Bortoli1, Josy Santos2, Alessandra Marieli Vacari1, Thamiris Sipriano1, and Sergio Antonio De Bortoli1, 1São Paulo State Univ., Jaboticabal, Brazil, 2Usina   
  São Martinho, Pradópolis, Brazil
* **D3400**Presentation withdrawn
* **D3401***Termitoloemus marshalli* (Diptera: Calliphoridae), a potential biocontrol agent of mound building termites, *Odontotermes* spp. (Isoptera: Termitidae) in India. **Sudhir Singh** (sudhirs@icfre.org), Forest Research Institute, Dehradun, India
* **D3402**Notes on Northwestern Europe greenhouse pests and biological control. **Janpiet Kaas** (biopre@xs4all.nl),  
  Bio Pre Biological Crop Protection, Aalsmeer, Netherlands
* **D3403**Toxicity of commercial pesticides on the green lacewing, *Chrysoperla carnea* (Neuroptera: Chrysopidae). **YoungSu Lee** (allexton74@gmail.com)1, HyunJu Lee1, JaeWoon Chung1, HeeA Lee1, and Byeong-Ryeol Choi2, 1Gyeonggi Agricultural Research and Extension Services, Hwasung, South Korea, 2National Institute   
  of Agricultural Science and Technology, Suwon, South Korea
* **D3404**Molecular identification and functional response  
  of *Mononeda marginata* (Coleoptera: Coccinellidae) to *Hansenia pulverulenta* nymphs (Hemiptera: Flatidae) found in coffee, C*offea* spp., growing areas of Hidalgo, Mexico. **Joana Meyer** (joanameyerflores@gmail.com) and Samuel Ramirez, Autonomus Univ. of Chapingo, Chapingo, Mexico
* **D3405**Flat bark beetle predators of the scolytine pest coffee berry borer in Hawaii coffee. **Peter Follett** (peter.follett@ ars.usda.gov)1, Andrea Kawabata2, and Eva Brill1, 1USDA - ARS, Hilo, HI, 2Univ. of Hawai’i, Kealakekua, HI
* **D3406**Habitat modification for *Ostrinia nubilalis* IPM in  
  New Jersey peppers. **George C. Condon** (george. condon@rutgers.edu) and George C. Hamilton, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ
* **D3407**Searching behavior of *Coccinella undecimpunctata* (Coleoptera: Coccinellidae) and its parasitoid, *Tetrastichus coccinellae* (Hymenoptera: Eulophidae).  
  **Mona El-Mandarawy** (melmandarawy@gmail.com), Plant Protection Research Institute, Giza, Egypt
* **D3408**Conservation biological control of the pear pest *Cacopsylla pyricola* (Homoptera: Psyllidae). **Kaushalya G. Amarasekare** (kaushalya2641@yahoo. com)1 and Peter Shearer2, 1Tennessee State Univ., Nashville, TN, 2Oregon State Univ., Hood River, OR

**D3409** Functional characterization of a chemosensory protein in a natural predator, *Chrysopa pallens,* indicates involvement of the protein in prey location. **Chenxi Liu** (liuchenxi@caas.cn), Juan Wang, and Hongyin Chen, Chinese Academy of Agricultural Sciences, Beijing, China

**D3410** Biological control based strategies to manage privet whitefly, *Aleurotrachelus trachoides*, in Florida. **Antonio Francis** (antonio.francis@freshfromflorida. com)1, Muhammad Ahmed2, Vivek Kumar3,

Lance Osborne3, and Cindy L. McKenzie4, 1Florida Dept. of Agriculture and Consumer Services, Apopka, FL, 2Univ. of Florida, Homestead, FL, 3Univ. of Florida, Apopka, FL, 4USDA - ARS, Ft. Pierce, FL

**D3411** Identification of potential predators of the western corn rootworm in maize fields of west central Nebraska. **Vinícius Suárez Victor** (vins\_victor@hotmail.com)1, Camila Oliveira-Hofman2, Kayla A. Mollet1, and

Julie Peterson1, 1Univ. of Nebraska, North Platte, NE, 2Univ. of Nebraska, Lincoln, NE

**D3412** Demographic parameters of parasitoid wasp, *Eretmocerus delhiensis*, on greenhouse whitefly, *Trialeurodes vaporariorum*. **Jafar Ebrahimifar** (jafar.ebrahimi@ut.ac.ir), Arsalan Jamshidnia, and Hossien Allahyari, Univ. of Tehran, Tehran, Iran

**D3413** Thermal requirements of different biotypes of *Telenomus podisi* (Hymenoptera: Platygastridae) in *Oebalus insularis* (Heteroptera: Pentatomidae) eggs. **Bruno Zachrisson** (bazsalam@gmail.com), Pedro Osorio, Onesio Martinez, and Guadalupe Gutierrez, Agricultural Research Institution of Panama, Panama, Panama

**D3414** Biocontrol of the exotic invasive heteropteran, *Halyomorpha* halys in mid-Atlantic USA ornamental landscapes assessed by sentinel egg mass: Negligible impact by native parasitoids and predators.

Mary Cornelius1, Christine Dieckhoff2, Kim A. Hoelmer2, Mark Payton3, Richard Olsen4, and **Matthew Greenstone** (matt.greenstone@ars.usda.gov)1, 1USDA - ARS, Beltsville, MD, 2USDA - ARS, Newark, DE, 3Oklahoma State Univ., Stillwater, OK, 4USDA - ARS, Washington, DC

**D3415** Saving wiliwili trees in Hawaii from the Erythrina  
gall wasp, *Quadrastichus erythrinae*, with a eurytomid parasitoid, *Eurytoma erythrinae*. **Juliana A. Yalemar** (juliana.a.yalemar@hawaii.gov), Renato C. Bautista, and Mohsen Ramadan, Hawaii Dept. of Agriculture, Honolulu, HI

**D3416** Efficacy of biological control of Asian citrus psyllid in South Texas during 2016. Daniel Flores1, Rupert Santos1, Mayra Rangel2, Gilbert Salazar2, Nicholas Soto2,  
Abel Villarreal3, Ariel Miranda4, Jose Urbalejo5,

Sergio Sanchez5, **Christopher Vitek** (christopher.vitek@ utrgv.edu)2, and Matt A. Ciomperlik1, 1USDA - APHIS, Edinburg, TX, 2The Univ. of Texas, Edinburg, TX, 3Texas Citrus Pest and Disease Management Corporation, Edinburg, TX, 4USDA - APHIS, Reynosa, Mexico, 5USDA - APHIS, Tijuana, Mexico

**D3417** Natural incidence of biological control agents on tarnished plant bugs adults and nymphs from wild host in the Delta. **Maribel Portilla** (maribel.portilla@ars. usda.gov), Randall Luttrell, and Katherine Parys, USDA - ARS, Stoneville, MS

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* **D3418**Variations in reproductive biology and diapause of two species of egg parasitoids (Hymenoptera: Encyritidae): Implications for biocontrol of the emerald ash borer. **Kristi Larson** (klarson@udel.edu)1,2 and Jian Duan1, 1USDA - ARS, Newark, DE, 2Univ. of Massachusetts, Amherst, MA
* **D3419**Parasitism efficacy of three strains of *Cotesia flavipes* from Brazilian biofactories. Thamiris Sipriano1, **Caroline De Bortoli** (carubortoli@yahoo.com.br)1, Lauany Santos2, Rafael Ferreira Santos1, Alessandra Marieli Vacari1, and Sergio Antonio De Bortoli1,   
  1São Paulo State Univ., Jaboticabal, Brazil, 2Univ. of São Paulo, Ituverava, Brazil
* **D3420**Flight activity of the parasitoid *Cotesia flavipes* (Hymenoptera: Braconidae) in different temperatures. Thamiris Sipriano1, Lauany Santos2, Rafael Ferreira Santos1, Taís Lavagnini3, Alessandra Marieli Vacari1, and **Sergio Antonio De Bortoli** (bortoli@fcav.unesp.br)1, 1São Paulo State Univ., Jaboticabal, Brazil, 2Univ. of   
  São Paulo, Ituverava, Brazil, 3Usina São Francisco, Sertãozinho, Brazil
* **D3421**Potential for integration of classical and conservation biological control of the olive fruit fly. **Livy Williams** (livy.williams@ars.usda.gov)1, Pauline Deschodt2, Olivia Pointurier2, Michelangelo La Spina3, and Arnaud Blanchet3, 1USDA - ARS, Charleston, SC, 2Montpellier SupAgro, Montpellier, France, 3USDA - ARS, Montpellier, France
* **D3422**Crop seeding manipulation affects densities of the alfalfa weevil, *Hypera postica,* and its introduced parasitoid, *Bathyplectes anurus*. **Kengo Nakahira** (nakahira@agr.kyushu-u.ac.jp), Shun-ichiro Iwase, and Masami Takagi, Kyushu Univ., Fukuoka, Japan
* **D3423**Perspectives of *Liriomyza* biological control in Brazil. **Tiago Costa-Lima** (tiago.lima@embrapa.br)1,  
  Valmir Costa2, Marcone César Chagas3, and  
  José R. P. Parra4, 1Brazilian Agricultural Research Corporation, Petrolina, Brazil, 2Biological Institute, Campinas, Brazil, 3Agricultural Research Company of Rio Grande do Norte, Parnamirim, Brazil, 4Univ. of São Paulo, Piracicaba, Brazil
* **D3424**Introduction, pre- and post-release monitoring of  
  the parasitoid *Tamarixia radiata* Pakistan strain (Hymenoptera: Eulophidae) against *Diaphorina citri* (Hemiptera: Psyllidae) in Puerto Rico. **Lesly Colon** (lesly.colon6@gmail.com)1, Ronald D. Weeks2, Aixa Ramírez1, and Daniel Sosa1, 1Dept. of Agriculture of Puerto Rico, San Juan, PR, 2USDA - APHIS, Raleigh, NC
* **D3425***Diaeretiella rapae* parasitism on cabbage aphid in field cages at Saltillo, Mexico. **Francisco Lopez-Monzon** (flopezmonzon@yahoo.com.mx), Reyna Torres-Acosta, Diego Camacho-Ponce, and Sergio Sanchez-Peña, Antonio Narro Agrarian Autonomous Univ., Saltillo, Mexico
* **D3426**Influence of host quality and temperature on the biology of *Diaeretiella rapae* (Hymenoptera: Braconidae). Monique Souza1 and **Marcus Sampaio** (mvsampaio@ iciag.ufu.br)2, 1Louisiana State Univ., Baton Rouge, LA, 2Federal Univ. of Uberlândia, Uberlândia, Brazil

**D3427** Identification of *Helicoverpa armigera* nucleopolyhedrovirus in Brazil. **Victor Hugo Da Costa** (victorhugodc@yahoocom.br)1, Marcus Soares2, Francisco Andrés Rodríguez-Dimate3, José Zanuncio4, and Fernando Valicente5, 1Federal Univ. of Lavras, Lavras, Brazil, 2Federal Univ. of Vales do Jequitinhonha e Mucuri, Diamantina, Brazil, 3Federal Univ. of

Viçosa, Sete Lagoas, Brazil, 4Federal Univ. of Viçosa, Viçosa, Brazil, 5Embrapa, Sete Lagoas, Brazil

**D3428** Comparative whole genome analysis of nucleopolyhedroviruses infecting saturniid silkworms by next-generation sequencing. **Jun Kobayashi** (koba-jun@yamaguchi-u.ac.jp)1, Kuni Sasaki2,  
Zenta Kajiura3, and Keiko Kadono-Okuda4, 1Yamaguchi Univ., Yamaguchi, Japan, 2Tottori Univ., Yamaguchi, Japan, 3Shinshu Univ., Ueda, Japan, 4National Institute of Agrobiological Sciences, Tsukuba, Japan

**D3429** *In vivo* production, speed of kill and insecticidal activity of selected isolates of the alphabaculovirus isolated from *Agrotis ipsilon*. **Robert W. Behle** (robert.behle@ ars.usda.gov)1 and Robert L. Harrison2, 1USDA - ARS, Peoria, IL, 2USDA - ARS, Beltsville, MD

**D3430** Combined impacts of viral pathogens and pesticides on bumble bee health. **Diana Cox-Foster** (diana. cox-foster@ars.usda.gov)1, Courtnee Eddington2, and Edwin Rajotte2, 1USDA - ARS, Logan, UT, 2Pennsylvania State Univ., University Park, PA

**D3431** Virulence fails to increase following artificial host shift of sigma virus to *Drosophila simulans*. **Luis F. Matos** (lmatos@ewu.edu)1, Jérémie Brusini2, and Marta Wayne3, 1Eastern Washington Univ., Cheney, WA, 2Univ. of California, Santa Cruz, CA, 3Univ. of Florida,

Gainesville, FL

**D3432** Development of an efficacious, practical, UV protectant formulation for entomopathogenic fungi. **Stefan T. Jaronski** (stefan.jaronski@ars.usda.gov)1, Katherine Rodgers2, and Steve Miller2, 1USDA - ARS, Sidney, MT, 2Ecopesticides International, Sante Fe, NM

**D3433** Effect of *Beauveria bassiana* on population parameters of *Bactrocera dorsalis*. **Zhiping Pan** (zhipingpan@126. com), Guangdong Academy of Agricultural Sciences, Guangzhou, China

**D3434** Quantification, molecular identification, and virulence of endemic *Beauveria bassiana* populations within kudzu soils. **Erika Niland** (e.niland@wingate.edu)1 and Wayne Gardner2, 1Wingate Univ., Wingate, NC, 2Univ. of Georgia, Griffin, GA

**D3435** The effect of *Beauveria bassiana* formulation on *Ips avulsus* and *Dendroctonus frontalis* bark beetles in a loblolly pine bolt assay. **Rabiu Olatinwo** (rolatinwo@ fs.fed.us), Steven Walters, and Brian Strom, USDA - Forest Service, Pineville, LA

**D3436** *Metarhizium anisopliae* and *Beauveria bassiana* as a pathogens of *Frankliniella invasor*

(Thysanoptera: Thripidae), a pest of mango flowers. **Ricardo Toledo-Hernández** (rtoledo@ecosur.edu.mx), José Ortiz, and Daniel Sánchez-Guillén, College of the Southern Border, Tapachula, Mexico

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* **D3437**Genetic and epizootiological characterization of naturally-occurring strains of *Beauveria* isolated from coffee berry borer on Hawaii Island. Louela Castrillo1, **Stephen Wraight** (steve.wraight@ars.usda.gov)2, Tracie Matsumoto3, and Lisa Keith3, 1Cornell Univ., Ithaca, NY, 2USDA - ARS, Ithaca, NY, 3USDA - ARS, Hilo, HI
* **D3438***Nomuraea rileyi* (Hypocreales: Clavicipitaceae) has potential for biological control of *Helicoverpa armigera* (Lepidoptera: Noctuidae) in Brazil. **Marcus Soares** (marcusasoares@yahoo.com.br)1, Victor Hugo Da Costa2, José Zanuncio3, and Fernando Valicente4, 1Federal Univ. of Vales do Jequitinhonha e Mucuri, Diamantina, Brazil, 2Federal Univ. of Lavras, Lavras, Brazil, 3Federal Univ. of Viçosa, Viçosa, Brazil, 4Embrapa, Sete Lagoas, Brazil
* **D3439**Commercial formulation of acaropathogenic fungus, *Metarhizium anisopliae*, as a possible biocontrol tool for cattle fever ticks. **Jason Tidwell** (jason.tidwell@ ars.usda.gov)1, Don Thomas1, and Adalberto A. Pérez de León2, 1USDA - ARS, Edinburg, TX, 2USDA - ARS, Kerrville, TX
* **D3440**Production of oxalic acid in submerged culture of *Aspergillus niger* F22 strain. **Sang Il Lee** (lsill@wikim. re.kr, haewoong@wikim.re.kr)1, Keon Jin Lee1, Sanghyun Ha1, Hyun Jung Gwak1, Ae Ri Han1,   
  Ho Hyun Chun1, Young Bae Chung1, Hyeong Hwan Kim2, Jin-Cheol Kim3, Teak Soo Shin4, and Hae Woong Park1, 1World Institute of Kimchi, Gwangju, South Korea, 2National Institute of Horticultural and Herbal Science, Wanju, South Korea, 3Chonnam National Univ., Gwangju, South Korea, 4Dongbu Advanced Research Institute, Nonsan, South Korea
* **D3441**Analysis of amino acids with crystal proteins of *Bacillus thuringiensis* CAB565 and CAB566 strains. **You-Kyoung Lee** (dldbrud119@hanmail.net), Na-Young Jin, Jun-Hack Jeon, Yu-Seop Kim, Bo-Ram Lee, Hee Ji Kim, Young-Nam Youn, and Yong-Man Yu, Chungnam National Univ., Daejeon, South Korea
* **D3442***Bacillus thurigneisis* serovar *aizawai* spray-dried formulations on the insecticidal effect of strain CAB566. **Tae-Wan Kim** (jxforever1@naver.com)1, Tae-Hwan Kim1, Young-Nam Youn2, and Yong-Man Yu2, 1WooGene B & G Co., Ltd, Gyeonggi, South Korea, 2Chungnam National Univ., Daejeon, South Korea
* **D3443**Phylogenetic analysis of insecticidal *Chromobacterium*. **Michael B. Blackburn** (mike.blackburn@ars.usda.gov), Daniel Kuhar, Michael Sparks, Robert R. Farrar, and Dawn E. Gundersen-Rindal, USDA - ARS, Beltsville, MD
* **D3444**Insecticidal activity of new isolates of *Chromobacterium* spp. **Robert R. Farrar** (robert.farrar@ars.usda.gov) and Michael B. Blackburn, USDA - ARS, Beltsville, MD
* **D3445**Host-level molecular responses to *Chromobacterium subtsugae* infection in a lepidopteran. **Michael Sparks** (michael.sparks@ars.usda.gov), Daniel Kuhar,  
  Robert Farrar, Michael B. Blackburn, and   
  Dawn E. Gundersen-Rindal, USDA - ARS, Beltsville, MD
* **D3446**LeapTM: A new dual-action, biorational pesticide for plant disease management and insect control. **Russell Eldridge** (russell.eldridge@valentbiosciences.com)1, Craig Campbell2, Gregory Clarke2, Fred Marmor2, Rick Hopkins2, Max Villalobos3, and Bala Devisetty1, 1Valent BioSciences Corporation, Libertyville, IL, 2Valent U.S.A., Walnut Creek, CA, 3Sumitomo Chemical Latin America, São Paulo, Brazil

**D3447** Association between *Bacillus thuringiensis* and *Eugenia uniflora* essential oil on *Alphitobius diaperinus* (Coleoptera: Tenebrionidae). **Everton Lozano** (evertonloz@gmail.com)1, Carla Pegorini1,

Michele Potrich1, Jackeline Lima1, Rodrigo Maciel1, Jucelaine Haas1, and Gislayne Vilas Boas2, 1Federal Technology Univ. of Paraná, Dois Vizinhos, Brazil, 2State Univ. of Londrina, Londrina, Brazil

**D3448** Enhancing biological control of the sugarcane borer in Brazil by using *Bacillus thuringiensis* and conserving naturally occurring predators. Odair Aparecido Fernandes1, Andrea Varella2, Lidiane Pavani1, Marcelo Lontro Júnior1, Luan dos Santos1, **Éllen Carbognin** (carbognin@hotmail. com)1, Rodrigo Rodrigues3, and Diogo Togni3, 1

São Paulo State Univ., Jaboticabal, Brazil, 2Montana State Univ., Bozeman, MT, 3Sumitomo Chemical of Brasil, São Paulo, Brazil

**D3449** Patch allocation manipulation by *Wolbachia* in a parasitic wasp. Hossein Kishani Farahani1,  
Ahmad Ashouri1, **Yasaman Moghaddasi** (ymoghaddassi@ ut.ac.ir)1, Lucy Alford2, Jean-Sebastien Pierre2, and Joan van Baaren2, 1Univ. of Tehran, Karaj, Iran, 2Univ. of Rennes, Rennes, France

**D3450** Assessment of the efficacy and synergism of entomopathogenic organisms associated with *Zonocerus variegatus*. **Funmilola Omoya** (fomoya@ yahoo.com), Federal Univ. of Technology, Akure, Nigeria

**D3451** Survey of *Nosema* spp. in central Texas native bees and feral honey bees, *Apis mellifera*. Forrest Mitchell1, **Cherilyn Porter** (cherilyn.porter@go.tarleton.edu)2, and Jeff Brady1, 1Texas A&M Univ., Stephenville, TX, 2Tarleton State Univ., Stephenville, TX

**D3452** Compatibility of *Steinernema feltiae* (Rhabditida: Steinernematida) and *Heterorhabditis* sp. (Rhabditida: Heterorhabditidae) with ciantraniliprole insecticide  
for the coffee berry borer control. Bruna Guide1,

**Pedro Neves** (pedroneves@uel.br)1, Matheus Campaner1, Thiago Fernandes1, and Viviane Alves2, 1State Univ. of Londrina, Londrina, Brazil, 2State Univ. of Northern Paraná, Cornélios Procópio, Brazil

**D3453** Preferred portal of entry of entomopathogenic nematodes (Steinernematidae, Heterorhabditidae) during the infection process. **Alexandra Roder** (alexandra2310@email.arizona.edu) and

S. Patricia Stock, Univ. of Arizona, Tucson, AZ

**D3454** Biological control potential of Korean entomopathogenic nematode isolates against the cabbageworm, *Pieris rapae* (Lepidoptera: Pieridae)*.* **Hae Woong Park** (haewoong@wikim.re.kr)1, Hyeong Hwan Kim2,

Dong Hwan Kim2, Myoung Rae Cho2, Jin-Cheol Kim3, Teak Soo Shin4, Sang Il Lee1, and Jung Beom Yoon2, 1World Institute of Kimchi, Gwangju, South Korea, 2National Institute of Horticultural and Herbal  
Science, Wanju, South Korea, 3Chonnam National Univ., Gwangju, South Korea, 4Dongbu Advanced Research Institute, Nonsan, South Korea

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* **D3455**Pathogenicity of *Steinernema brazilense* (Rhabditida: Steinernematidae) to Eucalyptus snout beetle, *Gonipterus platensis* (Coleoptera: Curculionidae).  
  **Silvia Wilcken** (srenata@fca.unesp.br)1, Andressa Brida1, Murici Candelaria1, Luiz Leite2, José Zanuncio3, and Carlos Wilcken1, 1São Paulo State Univ., Botucatu, Brazil, 2Biological Institute, Campinas, Brazil, 3Federal Univ. of Viçosa, Viçosa, Brazil
* **D3456**Successful commercial use of entomopathogenic nematodes: Two case studies. **Shaun Berry** (shaun. berry@basf.com)1, Mark Peacock1, Gareth Martin2, and Piet van Boven3, 1BASF, Research Triangle Park, NC, 2BASF, Littlehampton, United Kingdom, 3BASF, Arnhem, Netherlands
* **D3457**Mapping and identification of entomopathogenic  
  fungi associated with *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae) in *Eucalyptus* plantations. **Everton Soliman** (everton\_pires@hotmail. com)1, Ana Firmino2, Natalia Souza3, Thaise Karla Dias4, Edival Angelo Zauza1, and Carlos Wilcken3, 1Suzano Pulp and Paper, Itapetininga, Brazil, 2São Paulo State Univ., Dracena, Brazil, 3São Paulo State Univ., Botucatu, Brazil, 4Federal Univ. of Mato Grosso, Sinop, Brazil
* **D3458**Diapause in *Abrostola asclepiadis* (Lepidoptera: Noctuidae) may make for an ineffective weed biological control agent. **Lindsey Milbrath** (lindsey.milbrath@ars. usda.gov) and Jeromy Biazzo, USDA - ARS, Ithaca, NY
* **D3459**Assessment of the diversity of *Aphthona* flea beetles for biological control of leafy spurge on the prairies. **Kevin Floate** (kevin.floate@agr.gc.ca)1, Rob Bourchier1, Paul Coghlin1, Bev Dunlop2, Dustin Ostrander3, and Laurent LeSage (deceased)4, 1Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, 2Agriculture and Agri-Food Canada, Brandon, MB, Canada, 3Agriculture and Agri-Food Canada, Swift Current, SK, Canada, 4Agriculture and Agri-Food Canada, Ottawa, ON, Canada
* **D3460**Release of the planthopper *Megamelus scutellaris*  
  for biological control of water hyacinth in northern California. **Patrick J. Moran** (patrick.moran@ars.usda. gov)1 and Michael Pitcairn2, 1USDA - ARS, Albany, CA, 2California Dept. of Food and Agriculture, Sacramento, CA
* **D3461**The role of Musotiminae stem borers as potential biological control agents of the climbing fern, *Lygodium microphyllum,* in Florida USA. **Matthew Purcell** (matthew.purcell@csiro.au)1, Jeff Makinson1,   
  Ryan Zonneveld1, Bradley Brown1, Elizabeth Mattison2, and Paul Pratt3, 1CSIRO, Brisbane, Australia, 2USDA - ARS, Ft. Lauderdale, FL, 3USDA - ARS, Albany, CA
* **D3462**Evaluating the flight activity of the Comstock mealybug, *Pseudococcus comstocki*, using sex pheromone.  
  **Min Gyu Cho** (inception12@nate.com), Chungnam National Univ., Daejeon, South Korea
* **D3463**Regulation of invasive tree-of-heaven, *Ailanthus altissima*, by its native pest, *Eligma narcissus,* from Asia to Europe. **Gene-Sheng Tung** (gall@tfri.gov.tw) and Te-Pin Chang, Taiwan Forestry Research Institute, Taipei, Taiwan

**D3464** Does timing of release matter in early establishment  
of a galling insect for yellow toadflax biocontrol? **Rosemarie De Clerck-Floate** (rosemarie.declerck-floate@ agr.gc.ca), Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

**D3465** Diversity of *Encarsia* spp. (Hymenoptera: Aphelinidae) and their hosts on different plant species.  
**Antonio Busoli** (acbusoli@fcav.unesp.br) and Roseli Pessoa, São Paulo State Univ., Jaboticabal, Brazil

**D3466** Effects of the psyllid *Arytinnis hakani* on the  
invasive weed French broom, *Genista monspessulana*, in relation to plant size. **Brian Hogg** (brian.hogg@ars. usda.gov)1, Patrick J. Moran1, and Lincoln Smith2, 1USDA - ARS, Albany, CA, 2USDA - ARS, Montferrier-sur-Lez, France

**D3467** Eriophyid mites in weed biological control programs: A review of their host plant specialization and behavior. **Biljana Vidovic** (magud@agrif.bg.ac.rs)1,  
Massimo Cristofaro2, Enrico de Lillo3, Hariet Hinz4, Francesca Marini5, Radmila Petanović1, Brian G. Rector6, Urs Schaffner4, Sauro Simoni7, Anna Skoracka8, and Lincoln Smith9, 1Univ. of Belgrade, Belgrade, Serbia, 2ENEA, Rome, Italy, 3Univ. of Bari, Bari, Italy, 4CABI, Delémont, Switzerland, 5Biotechnology and Biological Control Agency, Rome, Italy, 6USDA - ARS, Reno, NV, 7CREA, Florence, Italy, 8Adam Mickiewicz Univ., Poznan, Poland, 9USDA - ARS, Montferrier-sur-Lez, France

**D3468** Fundamental host range of *Leptoypha hospita* (Hemiptera: Tingidae), a potential biological control agent of Chinese privet. **James Hanula** (jim.hanula@ gmail.com)1, Scott Horn1, S. Kristine Braman2, Cera Jones3, and Jianghua Sun4, 1USDA - Forest Service, Athens, GA, 2Univ. of Georgia, Griffin, GA, 3Univ. of Georgia, Athens, GA, 4Chinese Academy of Sciences, Beijing, China

**D3469** Engineering transgenic resistance to the four serotypes of dengue virus in *Aedes aegypti*. **Velmurugan Balaraman** (balaramanv@missouri.edu)1, Jinyin Lin1, Asher Kantor1, Hannah Gerlt1, and Alexander Franz2, 1Univ. of Missouri, Columbia, MO, 2Colorado State Univ., Fort Collins, CO

**D3470** Midgut infection and dissemination of chikungunya virus in *Aedes aegypti*, a detailed analysis. **Shengzhang Dong** (dongs@missouri.edu)1, Asher Kantor1, Jinyin Lin1, Rollie Clem2, Lorena Passarelli2, and Alexander Franz1, 1Univ. of Missouri, Columbia, MO, 2Kansas State Univ., Manhattan, KS

**Poster Session 2: Ecology and Population Dynamics**

***West Hall C (Convention Center)***

* **D3471**Comparing probing and feeding behavior of *Bemisia tabaci* (Hemiptera: Aleyrodidae) on tomato plants injected RNAi of *Bemisia tabaci*. Ji-Hyun Min,  
  Jeong Hee Kim, Yong-Man Yu, and **Young-Nam Youn** (youngnam@cnu.ac.kr), Chungnam National Univ., Daejeon, South Korea
* **D3472**A short-term exposure to predation affects body elemental content and geotaxis response in *Drosophila melanogaster*. **Indrikis Krams** (indrikis.krams@ut.ee), Tatjana Krama, Giedrius Trakimas, and Ronalds Krams, Daugavpils Univ., Daugavpils, Latvia
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**TUESDAY**

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* **D3473**Age-related differences in behaviour in the desert locust, *Schistocerca gregaria*. **Rien De Keyser** (rdk7@ leicester.ac.uk), Univ. of Leicester, Leicester, United Kingdom
* **D3474**Seasonal variability in the lipids of fall armyworm. **Mirian Hay-Roe** (mmhr@ufl.edu)1, Rodney N. Nagoshi2, and Robert L. Meagher2, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Gainesville, FL
* **D3475**Assessing the flight capabilities of Asian longhorned beetle, *Anoplophora glabripennis* (Coleoptera:   
  Cerambycidae), with computerized flight mills. **Vanessa Lopez** (lopezv@xavier.edu)1, Mark S. Hoddle2, Joseph Francese3, and Ann M. Ray1, 1Xavier Univ., Cincinnati, OH, 2Univ. of California, Riverside, CA, 3USDA - APHIS, Buzzards Bay, MA
* **D3476**The effect of plant diversity and seasonality on  
  spider community in the tropical dry forest of the Sierra de Huautla Biosfere Reserve, Mexico.  
  **Miguel Menéndez-Acuña** (menendezmigue@gmail.com), Gabriel Flores-Franco, and Efraín Tovar-Sánchez, Autonomous State Univ. of Morelos, Cuernavaca, Mexico
* **D3477**Modeling interactions between macroparasites (wasp and fly) and microparasites (*Escovopsis* sp*.*) within primitive fungus-growing ants (*Apterostigma* sp*.*) system. **Cely González** (celytg20@gmail.com) and Hermógenes Fernández-Marín, Institute of Research and Scientific Services of Alta Tecnología, Panama, Panama
* **D3478**Fungal pathogens diversity on the fungus growing ants *Atta colombica*, *Acromyrmex echinatior*, *Trachymyrmex zeteki* and *Apterostigma* spp. (Hymenoptera: Formicidae) of Panama.   
  **Yuliana Christopher** (yulianachristopher83@gmail. com) and Hermógenes Fernández-Marín, Institute of Research and Scientific Services of Alta Tecnología, Panama, Panama
* **D3479**Oviposition site selection by *Arhopala bazalus* (Lepidoptera: Lycaenidae). **Yukari Mochioka** (sunrise\_01745@jcom.home.ne.jp), Motoaki Kinoshita, Hidezumi Ohashi, and Makoto Tokuda, Saga Univ., Saga, Japan
* **D3480**Tetrastichinae wasps (Hymenoptera: Eulophidae) associated with *Stenodiplosis* Reuter (Diptera: Cecidomyiidae) in eastern South Dakota. **Juan Manuel Perilla López** (perillalopez.2@wright.edu)1,2,   
  Paul J. Johnson2, Zoya Yefremova3, and Arvid Boe2, 1Wright State Univ., Dayton, OH, 2South Dakota State Univ., Brookings, SD, 3Tel Aviv Univ., Tel Aviv, Israel
* **D3481**Ecology and evolution of *Asphondylia borrichiae*. **Anthony Rossi** (arossi@unf.edu)1, and Keith Stokes2, 1Univ. of North Florida, Jacksonville, FL, 2USDA - ARS, Albany, CA
* **D3482**Potential consequences of the exploitation of ant-acacia mutualisms by orb-weaver spiders. Anna Ledin and **John D. Styrsky** (styrsky.j@lynchburg.edu), Lynchburg College, Lynchburg, VA
* **D3483**Ant foraging pattern influenced by the variation in the attractiveness of extrafloral nectaries. **Eduardo Calixto Soares** (calixtos.edu@gmail.com)1, Denise Lange2,  
  and Kleber Del-Claro2, 1Univ. of São Paulo, Uberlândia, Brazil, 2Federal Univ. of Uberlândia, Uberlândia, Brazil

**D3484** Influence of four fall host plants on overwintering populations of *Lygus lineolaris*. **Katherine Parys** (katherine.parys@ars.usda.gov) and Gordon Snodgrass, USDA - ARS, Stoneville, MS

**D3485** Presentation withdrawn

**D3486** Pheromone trapping as a monitoring tool of brown stink bug, *Euschistus servus*, movement within cotton fields. **Vonny Barlow** (vmbarlow@ucanr.edu), Univ. of California, Blythe, CA

**D3487** Spatial and temporal variation population in commercial flower crops of *Frankliniella occidentalis.* **Jhon Avellaneda** (ecologia@unimilitar.edu.co),  
Daniel Rodriguez, Stephanie Numa, and  
Marco Diaz Tapias, Nueva Granada Military University, Cajica, Colombia

**D3488** Spatial variability in infestations of coffee berry  
borer, *Hypothenemus hampei* (Ferrari), in commercial coffee orchards of Hawaii Island. **Ishakh Pulakkatu-Thodi** (ishakpt@gmail.com)1, Rosemary Gutierrez2, and  
Mark Wright1, 1Univ. of Hawai’i, Honolulu, HI, 2Univ. of Hawai’i, Hilo, HI

**D3489** Multi-species spatio-temporal patterns of oviposition in fruits of *Schoepfia schreberi* J. F. Gmel. (Olacaceae). **Maurilio Lopez** (maulopez@uv.mx)1, Efren Dominguez2, and Francisco Diaz-Fleischer1, 1Univ. of Veracruzana, Xalapa, Mexico, 2Inbioteca Univ. of Veracruzana, Xalapa, Mexico

**D3490** Parthenogenesis of leafhopper, *Arboridia okamotonis*, caused by *Wolbachia*? Takuya Kurahashi,  
Shun Kumashiro, **Satoshi Kamitani** (kamitani@agr. kyushu-u.ac.jp) and Naomichi Ohara, Kyushu Univ., Fukuoka, Japan

**D3491** Parameter estimation for a temperature-dependent development model and an oviposition model of turnip aphid, *Lipaphis erysimi* Kaltenbach, on cabbage.  
**Soon Hwa Kwon** (shkwon@jejunu.ac.kr), Sung Oh Oh, and Dong-Soon Kim, Jeju National Univ., Jeju, South Korea

**Poster Session 2: Entomological Effects of Global Warming in Agriculture and Medical Entomology**

**West Hall C (Convention Center)**

**D3492** Effects of climate change on the efficiency of *Bacillus thuringiensis*. **Naiema Gorashi** (naiemaeltayeb@yahoo. com), National Centre for Research, Khartoum, Sudan

**D3493** Highly efficient site-specific mutagenesis in malaria mosquitoes. **Ming Li** (ming.li@ucr.edu) and Bradley White, Univ. of California, Riverside, CA

**D3494** Establishment and changes in the distribution of the leafminer fly, *Liriomyza huidobrensis* (Blanchard),  
in response to climate change forecast through spatial phenology modeling and GIS risk mapping. **Norma Mujica** (nmujica@cgiar.org), Jürgen Kroschel, and Pablo Carhuapoma, International Potato Center, Lima, Peru

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**Poster Session 2: Insect-Plant Interactions in a Changing Climate**

***West Hall C (Convention Center)***

* **D3495**Spatial synchrony analysis for the convergence of the distribution model of the pests and the crop. **Jung-Joon Park** (jungpark@gnu.ac.kr)1, Dong-Soon Kim2, and Kijong Cho3, 1Gyeongsang National Univ., Jinju, South Korea, 2Jeju National Univ., Cheju, South Korea, 3Korea Univ., Seoul, South Korea
* **D3496**A six-year study of bee (Apoidea) diversity and abundance in Georgia apple orchards during significantly different apple bloom periods. **Mark Schlueter** (mschluet@ggc.edu) and Nicholas Stewart, Georgia Gwinnett College, Lawrenceville, GA
* **D3497***Xylocopa varipuncta* and *X. virginica virginica* (Apidae) pierce nectarless *Hemerocallis* (Xanthorrhoeaceae) flowers from which *X. varipuncta* obtains cell fluid. **Edward Barrows** (barrowse@georgetown.edu), Georgetown Univ., Washington, DC
* **D3498**Development of some molecular and biochemical markers associated with tolerance to insect attacks in sugar beet, *Beta vulgaris*. Ibrahim El-Hawary1, Aysam Fayed2, **Sobhy Hamed** (sobhy\_hamed@yahoo.com)1, Ahmed Bassyouny3, and Nahed N. A. El-Mahalawy4, 1Tanta Univ., Tanta, Egypt, 2Univ. of Sadat City, Sadat City, Egypt, 3Sugar Crops Research Institute, Sakha, Egypt, 4Agricultural Research Center, Sakha, Egypt
* **D3499**A study on the host plant and the oviposition of *Ricania shantungensi* (Hemiptera: Ricaniidae) in Jeonbuk Province, Korea. **Su-Ji Jang** (jsjfeel88@korea.kr), Jeollabuk-do Agricultural Research and Extension Services, Iksan, South Korea
* **D3500**Functional relationships between geometrid larval density, crown defoliation, NDVI, and accumulated tree damage in a subarctic birch forest. **Malin Ek** (malin.ek@ uit.no)1, Jane Jepsen2, Ole-Petter Vindstad1, and   
  Rolf Ims1, 1Arctic Univ. of Norway, Tromsø, Norway, 2Norwegian Institute for Nature Research, Tromsø, Norway
* **D3501**Effects of white cabbage and broccoli hybrids on the life history traits of the cabbage moth, *Mamestra brassicae* (Lepidoptera: Noctuidae). **Tatiana Popova** (popovatatyana2016@yandex.ru) and Zieu Hoang, Russian Timiryazev State Agrarian Univ., Moscow, Russia
* **D3502**Cotton fleahopper, *Pseudatomoscelis seriatus,* omnivory. **Loriann Garcia** (lgarcia@austincollege.edu), Austin College, Sherman, TX
* **D3503**Transcriptome responses in maize-western corn rootworm interaction: A two-way approach.  
  **Saumik Basu** (saumbios@gmail.com) and Joe Louis, Univ. of Nebraska, Lincoln, NE
* **D3504**Multivariate analysis to assess potential oviposition and larval preferences of Monarch butterflies, *Danaus plexippus*, on roadside milkweeds. **Royce Bitzer** (mariposa@iastate.edu)1, Teresa Blader1, Sue Blodgett1, and Richard Hellmich2, 1Iowa State Univ., Ames, IA, 2USDA - ARS, Ames, IA
* **D3505**Greenhouse whitefly, *Trialeurodes vaporariorum* (Hemiptera: Aleyrodidae), interaction and the water stress effect. **Jaime Verdugo** (jverdugo@utalca.cl)1, Francisca González-Klenner2, Marta Albornoz3, Germán Ávila-Sakar4, and Eugenio López L.2, 1Univ. of Talca, Talca, Chile, 2Pontifical Catholic Univ., Quillota, Chile, 3Regional Center of Innovative Hurticulture of Valparaíso, Quillota, Chile, 4Univ. of Winnipeg, Winnipeg, MB, Canada
* **D3506**Host specialization of bryophagous insect: Analysis of key factors. **Petr Pyszko** (pyszko.petr@gmail.com), Katerina Kuravova, Sarka Grucmanova, Martin Sigut, Petr Kocarek, Vitezslav Plasek, and Pavel Drozd, Univ. of Ostrava, Ostrava, Czech Republic

**Symposium: Avocados, Blueberries, and Olives: Pests of Small Fruit in Florida**

***Room W223 A (Convention Center)***

**Moderators and Organizers:** Jennifer Gillett-Kaufman1 and Sandra A. Allan2, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Gainesville, FL

9:15 **1123**

9:30 **1124**  
species in Florida blueberries. **Oscar Liburd** (oeliburd@ ufl.edu), Univ. of Florida, Gainesville, FL

9:45 **1125** Pests and fungal organisms identified on olives (*Olea europaea*) in Florida. **Morgan Byron** (maconn00@ufl.edu)1, Jennifer Gillett-Kaufman1, and Sandra A. Allan2, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Gainesville, FL

10:00 **1126** Avocado pests in Florida: Not what you expected. **Octavio Menocal** (omenocal@ufl.edu)1, Rita E. Duncan1, Jonathan H. Crane1, Randy Ploetz1, Paul E. Kendra2, and Daniel Carrillo1, 1Univ. of Florida, Homestead, FL, 2USDA - ARS, Miami, FL

**10:15 BREAK**

10:30 **1127** Caribbean fruit fly (Diptera: Tephritidae) and small fruit in Florida. **Nancy D. Epsky** (nancy.epsky@ars. usda.gov) and Paul E. Kendra, USDA - ARS, Miami, FL

10:45 **1128** Strawberry pests in Florida: Learning from the past and predicting future pest problems. **Justin Renkema** (justin.renkema@ufl.edu), Univ. of Florida, Wimauma, FL

11:00 **1129** Management of native and introduced pollinators of small fruit in Florida. **Charles Stuhl** (charles.stuhl@ars.usda.gov), USDA - ARS, Gainesville, FL

11:15 **1130** Scale pests of small fruit in Florida: Native, introduced, and potential pests of concern. **Ian Stocks** (ian.stocks@freshfromflorida.com), Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

11:30 **1131** Citrus pests on olives in Florida: Should we be worried? Sandy Allan1 and **Jennifer Gillett-Kaufman** (gillett@ufl.edu)2, 1USDA - ARS, Gainesville, FL, 2Univ. of Florida, Gainesville, FL

11:45 **1132** Drones and strawberry production: New directions for Florida small fruit pest scouting. **Christopher Crockett** (crockettcd@ufl.edu), Univ. of Florida, Gainesville, FL

Presentation withdrawn

Overview of key pests and potential invasive



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**TUESDAY**

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**Symposium: Innovative Responses to the Global Homogenization of Plantation Pests**

***Room W331 D (Convention Center)***

**Moderators and Organizers:** Brett Hurley1, Timothy Paine2, and Simon Lawson3, 1Univ. of Pretoria, Pretoria, South Africa, 2Univ. of California, Riverside, CA, 3Univ. of the Sunshine Coast,  
Sippy Downs, Australia

9:15 **1133** Integrated approaches for managing forestry pests: Risks and benefits. **Timothy Paine** (timothy. paine@ucr.edu), Univ. of California, Riverside, CA

9:45 **1134** New technologies for surveying forest insect pests. **Andrea Battisti** (andrea.battisti@unipd.it), Univ. of Padova, Legnaro, Italy

10:00 **1135** Impact of cryptic diversity and misidentifications in managing invasions. **Jeff Garnas** (jeff.garnas@up.ac. za), Michael Wingfield, and Bernard Slippers, Univ. of Pretoria, Pretoria, South Africa

**10:15 BREAK**

10:30 **1136** Biological control of eucalypt pests: Benefits of diverse collaboration. **Simon Lawson** (slawson@ usc.edu.au)1, Manon Griffiths2, Helen Nahrung1, and Madaline Healey1, 1Univ. of the Sunshine Coast, Sippy Downs, Australia, 2Dept. of Agriculture and Fisheries, Dutton Park, Australia

10:45 **1137** Use of chemical and visual cues for plantation pest surveillance and monitoring. **Gonzalo Martinez** (gmartinez@tb.inia.org.uy) and Demian Gomez, National Institute of Agricultural Research, Tacuarembó, Uruguay

11:00 **1138** Microbial agents as endophytes to protect plants. **Thu Pham** (phamquangthu@vafs.gov.vn), Dinh Vu, and Binh Le, Vietnamese Academy of Forest Sciences, Hanoi, Vietnam

**Symposium: Spruce Budworm Genomics: From Basic Science to Outbreak Management**

***Room W340 A (Convention Center)***

**Moderator and Organizer:** Michel Cusson, Natural Resources Canada, Québec City, QC, Canada

9:15 **1139** Getting through the winter without protective clothing: Insights from the spruce budworm genome. Daniel Doucet1, Catherine Béliveau2, Brian Boyle3, Jérôme Laroche3, Ken Dewar4, Nikoleta Juretic4,  
Jessica Wasserscheid4, Lisa Lumley5, Felix Sperling6, Roger Levesque3, and **Michel Cusson** (michel.cusson@ canada.ca)2,3, 1Natural Resources Canada, Sault Ste. Marie, ON, Canada, 2Natural Resources Canada, Québec City, QC, Canada, 3Univ. Laval, Québec City, QC, Canada, 4McGill Univ., Montréal, QC, Canada, 5Royal Alberta Museum, Edmonton, AB, Canada, 6Univ. of Alberta, Edmonton, AB, Canada

9:30 **1140** The spruce budworm transcriptome and its use in identifying the molecular and endocrine correlates of early instar diapause. **Marcelo Brandão** (brandao. marcelo@gmail.com)1,2, Catherine Béliveau3,

Brian Boyle4, Daniel Doucet5, Fayuan Wen5,

Lisa Lumley3,4,6, Felix Sperling2, Nikoleta Juretic7,  
Ken Dewar7, Roger Levesque4, and Michel Cusson3,4, 1Univ. of Campinas, Campinas, Brazil, 2Univ. of Alberta, Edmonton, AB, Canada, 3Natural Resources Canada, Québec City, QC, Canada, 4Univ. Laval, Québec City, QC, Canada, 5Natural Resources Canada, Sault Ste. Marie, ON, Canada, 6Royal Alberta Museum, Edmonton, AB, Canada, 7McGill Univ., Montréal, QC, Canada

9:45 **1141** A genotyping-by-sequencing (GBS) linkage map for *Choristoneura fumiferana* and assessment of its synteny with the *Bombyx* genome. **Sandrine Picq** (sandrine.picq@gmail.com)1,2, Jérôme Laroche1,

Lisa Lumley1,2,3, Bryan Brunet4, Esther Pouliot2,  
Brian Boyle1, Felix Sperling4, Roger Levesque1, and Michel Cusson1,2, 1Univ. Laval, Québec City, QC, Canada, 2Natural Resources Canada, Québec City, QC, Canada, 3Royal Alberta Museum, Edmonton, AB, Canada, 4Univ. of Alberta, Edmonton, AB, Canada

10:00 **1142** Population genetic structure of the spruce budworm (*Choristoneura fumiferana*) across North America: Are SNP markers valuable for the detection of migrants? **Lisa Lumley** (lisa.lumley@hotmail.com)1,2,3, Esther Pouliot2, Gwylim Blackburn4, Bryan Brunet4, Brian Boyle3, Felix Sperling4, and Michel Cusson2,3, 1Royal Alberta Museum, Edmonton, AB, Canada, 2Natural Resources Canada, Québec City, QC, Canada, 3Univ. Laval, Québec City, QC, Canada, 4Univ. of Alberta, Edmonton, AB, Canada

**10:15 BREAK**

10:30 **1143** Phylogeny and species delimitation of the spruce budworm group: A historical perspective.  
**Felix Sperling** (felix.sperling@ualberta.ca)1, Julian Dupuis1, Giovanny Fagua1, Bryan Brunet1, Gwylim Blackburn1, Heather Leibel1, Lisa Lumley2,3,4, Brian Boyle2,  
Roger Levesque2, and Michel Cusson2,4, 1Univ. of Alberta, Edmonton, AB, Canada, 2Univ. Laval, Québec City, QC, Canada, 3Royal Alberta Museum, Edmonton, AB, Canada, 4Natural Resources Canada, Québec City, QC, Canada

10:45 **1144** Divergence with gene flow among incipient *Choristoneura* species: A landscape genomic comparative analysis. **Gwylim Blackburn** (gwylim.blackburn@gmail. com)1, Bryan Brunet1, Lisa Lumley2,3,4, Kevin Muirhead1, and Felix Sperling1, 1Univ. of Alberta, Edmonton, AB, Canada, 2Univ. Laval, Québec City, QC, Canada, 3Royal Alberta Museum, Edmonton, AB, Canada, 4Natural Resources Canada, Québec City, QC, Canada

11:00 **1145** Using spatial genomics to distinguish drivers of outbreak synchrony in an irruptive forest insect pest. **Patrick James** (patrick.ma.james@gmail.com)1, Colin Garroway1, Bryan Brunet2, Michel Cusson3,4, Robert Johns5, and Lisa Lumley3,4,6, 1Univ. of Montréal, Montréal, QC, Canada, 2Univ. of Alberta, Edmonton, AB, Canada, 3Univ. Laval, Québec City, QC, Canada, 4Natural Resources Canada, Québec City, QC, Canada, 5Natural Resources Canada, Fredericton, NB, Canada, 6Royal Alberta Museum, Edmonton, AB, Canada

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**TUESDAY**

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**Symposium: Biocontrol and Induced Plant Defences: A Tale of Three Trophic Levels**

***Room W230 C (Convention Center)***

**Moderators and Organizers:** Geoff Gurr1 and Olivia Reynolds2, 1Charles Sturt Univ., Orange, Australia, 2New South Wales Dept. of Primary Industries, Menangle, Australia

9:15 **1146** Plant defence induction and priming for conservation biological control of phytophagous insect pests by parasitoids. **John Pickett** (john.pickett@ rothamsted.ac.uk), Rothamsted Research, Harpenden, United Kingdom

9:45 **1147** Mycorrhiza-induced plant defense and mediated tritrophic interactions. **Rensen Zeng** (rszeng@ scau.edu.cn) and YuanYuan Song, Fujian Agriculture and Forestry Univ., Fuzhou, China

**10:15 BREAK**

10:30 **1148** Enhancing biological control of a root pest: Responses of entomopathogenic nematodes to chemical defenses of the western corn rootworm. **Angela Koehler** (angela.koehler@unine.ch)1, Christelle Robert2, Matthias Erb2, and Ted Turlings1, 1Univ. of Neuchâtel, Neuchâtel, Switzerland, 2Univ. of Bern, Bern, Switzerland

10:45 **1149** Silicon-augmented resistance of plants: Bi- and tri-trophic effects. **Olivia Reynolds** (olivia.reynolds@ dpi.nsw.gov.au)1 and Geoffrey Gurr2,3, 1New South Wales Dept. of Primary Industries, Menangle, Australia, 2Fujian Agriculture & Forestry Univ., Fuzhou, China, 3Charles Sturt Univ., Orange, Australia

11:00 **1150** Volatile-mediated tritrophic interactions and biological control. **Jian Liu** (liujianwh@gmail.com)1, Olivia Reynolds2, Pengjun Zhang3, Liwei Han1, Jinhong Wu1, Rensen Zeng1, and Geoffrey Gurr1,4, 1Fujian Agriculture & Forestry Univ., Fuzhou, China, 2New South Wales Dept. of Primary Industries, Menangle, Australia, 3Jiliang Univ., Hangzhou, China, 4Charles Sturt Univ., Orange, Australia

11:15 **1151** Chemistry of the invasive weed *Echium plantagineum*: Effects on arthropods. **Saiful Z. Jamil** (sfzaimi@gmail.com)1, Leslie A. Weston2, Paul A. Weston2, and Geoffrey Gurr1, 1Charles Sturt Univ., Orange, Australia, 2Charles Sturt Univ., Wagga Wagga, Australia

11:30 **1152** Co-occurring herbivore guilds compromise aphid biocontrol: Evidence from natural and true field experiments. **Carmen K. Blubaugh** (carmen.blubaugh@ wsu.edu) and William E. Snyder, Washington State Univ., Pullman, WA

**Symposium: Parasitoid Assemblages in Agroecosystems: Environmental Drivers Affecting Biocontrol**

***Room W231 A (Convention Center)***

**Moderators and Organizers:** Blas Lavandero1 and Michael Traugott2, 1Univ. of Talca, Talca, Chile, 2Univ. of Innsbruck, Innsbruck, Austria

9:15 **1153** Effect of management and landscape context on the interactions between predators and parasitoids in wheat fields. **Blas Lavandero** (blavandero@utalca. cl)1, Sebastián Ortiz-Martínez1, and Lucie Raymond2, 1Univ. of Talca, Talca, Chile, 2French National Centre for Science, Paris, France

9:30 **1154** Influence of landscape complexity on trophic interactions among primary and secondary parasitoids of the English grain aphid. **Sebastián Ortiz-Martínez** (sebastianortizmartinez@gmail.com) and

Blas Lavandero, Univ. of Talca, Talca, Chile

9:45 **1155** Understanding effects of fertilization management on aphid-parasitoid-endosymbiont networks. **Oskar Rubbmark** (oskar.rubbmark@uibk. ac.at)1, Zhengpei Ye1, Ines Vollhardt2, Daniela Sint1, Romina Reinpold1, Nadia Parth1, and Michael Traugott1, 1Univ. of Innsbruck, Innsbruck, Austria, 2Georg August Univ., Göttingen, Germany

10:00 **1156** Disentangling aphid food webs gives the key  
to biologically control *Aphis spiraecola* in citrus. **Alejandro Tena** (atena@ivia.es), Francesc Gómez-Marco, and Alberto Urbaneja, Valenciano Institue of Agarian Research, Moncada, Spain

**10:15 BREAK**

10:30 **1157** Parasitoid interactions from crop and non-crop resources. **Manuel Plantegenest** (manuel.plantegenest@ agrocampus-ouest.fr)1 and Stephane Derocles2, 1Agrocampus-Ouest, Rennes, France, 2Univ. of Rennes, Rennes, France

10:45 **1158** Keeping pest populations lower for longer: Connecting farms and natural systems. **Vesna Gagic** (vesna.gagic@slu.se)1 and Nancy Schellhorn2, 1CSIRO, Brisbane, Australia, 2CSIRO, Dutton Park, Australia

11:00 **1159** Ecological filters driving life-history traits in a guild of insect parasitoids. **Joan van Baaren** (joan. van-baaren@univ-rennes1.fr)1, Yannick Outreman2, Thiago Oliveira Andrade1, Philippe Louâpre3, and Cyrille Violle4, 1Univ. of Rennes, Rennes, France, 2Agrocampus-Ouest, Rennes, France, 3Univ. of Bourgogne, Dijon, France, 4National Center for Scientific Research, Montpellier, France

11:15 **1160** Physiological status of parasitoids affecting host selection. **Maria Velasco Hernández** (totli23@ hotmail.com)1, Nicolas Desneux2, and Ricardo Ramirez-Romero3, 1Univ. of Guadalajara, Jalisco, Mex- ico, 2INRA, Sophia Antipolis, France, 3Central Univ. of Biological Science and Agriculture, Guadalajara, Mexico

11:30 **1161** Parasitoid host range, establishment success, and biological control efficacy. **Joe Kaser** (kaser008@ umn.edu) and George Heimpel, Univ. of Minnesota, St. Paul, MN

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11:45 **1162** An innovative isotopic method to track the exploitation of trophic resources by parasitoids in the field. **Bruno Jaloux** (bruno.jaloux@agrocampus-ouest. fr)1 and Manuel Plantegenest2, 1Agrocampus-Ouest, Angers, France, 2Agrocampus-Ouest, Rennes, France

12:00 **1163** Assessing parasitoid assemblages in agro- ecosystems: What do molecular approaches offer? **Michael Traugott** (michael.traugott@uibk.ac.at)1, Zhengpei Ye1, and Ines Vollhardt2, 1Univ. of Innsbruck, Innsbruck, Austria, 2Georg August Univ., Göttingen, Germany

**Symposium: Climate Change: Preventing the Spread of Invasive Species in Agriculture**

***Room W230 A (Convention Center)***

**Moderators and Organizers:** Alvin M. Simmons1,  
Andrew Cuthbertson2, and Jesusa C. Legaspi3, 1USDA - ARS, Charleston, SC, 2Fera Science Ltd., York, United Kingdom, 3USDA - ARS, Tallahassee, FL

9:15 **1164** Modeling the effects of climate on the infestation patterns of a migratory crop pest insect. **Rodney N. Nagoshi** (rodney.nagoshi@ars.usda.gov)1, John Westbrook2, Robert L. Meagher1, and

Shelby J. Fleischer3, 1USDA - ARS, Gainesville, FL, 2USDA - ARS, College Station, TX, 3Pennsylvania State Univ., University Park, PA

9:30 **1165** *Bemisia tabaci* — preventing a global pest from establishing in the UK. **Andrew G. S. Cuthbertson** (andrew.cuthbertson@fera.co.uk), Fera Science, Ltd., York, United Kingdom

9:45 **1166** Comparison of temperature effects on three *Bemisia tabaci* parasitoids. Zhan He1, Fang Dang1, Ze-Yun Fan1, Andrew G. S. Cuthbertson2, Shun-Xiang Ren1, and **Bao-Li Qiu** (baileyqiu@scau.edu.cn)1, 1South China Agricultural Univ., Guangdong, China, 2Fera Science Ltd., York, United Kingdom

10:00 **1167** Agent-based model for simulation of Asian citrus psyllid spread across different landscapes. **Weiqi Luo** (weiqi.luo@ars.usda.gov) and Tim Gottwald, USDA - ARS, Ft. Pierce, FL

**10:15 BREAK**

10:30 **1168** Climate changes and biological pest control: From tri-trophic interactions to geographical distribution. **Moshe Coll** (moshe.coll@mail.huji.ac.il)1, Tarryn Schuldiner-Harpaz1, and Lesley Hughes2, 1The Hebrew Univ., Rehovot, Israel, 2Macquarie Univ., Sydney, Australia

10:45 **1169** Insect-proofing Fortress Ireland. **Archie Murchie** (archie.murchie@afbini.gov.uk)1, Stephen Jess1, and Rachel Wisdom2, 1Agri-Food and Biosciences Institute, Belfast, United Kingdom, 2Dept. of Agriculture, Food and the Marine, Kildare, Ireland

11:00 **1170** Effect of climate change on *Bemisia tabaci* in southeast USA. **Alvin M. Simmons** (alvin.simmons@ ars.usda.gov), USDA - ARS, Charleston, SC

**Symposium: Entomological Issues Beyond Borders: Challenges and Opportunities for Sustainable Solutions**

***West Hall F3 (WF3) (Convention Center)***

**Moderators and Organizers:** Suhas Vyavhare1, M. O. Way2,  
Raul Medina3, and Juliana Rangel3, 1Texas A&M AgriLife Research, Beaumont, TX, 2Texas A&M Univ., Beaumont, TX, 3Texas A&M Univ., College Station, TX

9:15 **1171** Agricultural intensification, crop protection technology, and the challenge of resistance management. **George Kennedy** (george\_kennedy@ ncsu.edu) and Anders Huseth, North Carolina State Univ., Raleigh, NC

9:45 **1172** Prospects of egg-killing defensive traits for sustainable crop protection. **Antonino Cusumano** (cusumanoantonino@unipa.it)1, Stefano Colazza2, and Nina Fatouros3, 1Wageningen Univ. and Research Centre, Wageningen, Netherlands, 2Univ. of Palermo, Palermo, Italy, 3Freie Univ., Berlin, Germany

10:00 **1173** The use of best management practices for optimizing sustainable corn rootworm management programs. **Shannon Morsello** (shannon.morsello@ syngenta.com)1 and Tony Burd2, 1Syngenta, Greensboro, NC, 2Syngenta Crop Protection, Research Triangle Park, NC

**10:15 BREAK**

10:30 **1174** From Mexico, Switzerland, and the USA, the effects of early induction on the performance of the seeds and fruit predators, changing the physiological state of the seeds and fruits. **Johnattan Hernández- Cumplido** (johnattan.hernandez@unine.ch)1,

Betty Berney2, and Cesar Rodriguez3, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2Univ. of Neuchâtel, Neuchâtel, Switzerland, 3Rutgers, The State Univ. of New Jersey, Chatsworth, NJ

10:45 **1175** *Nezara viridula* (L.) – an agricultural pest without borders. **Jesus F. Esquivel** (jesus.esquivel@ ars.usda.gov)1, J. E. McPherson2, Jocelia Grazia3,  
Jeremy Greene4, Walker A. Jones5, Robert M. McPherson6, Dmitry Musolin7, Wolfgang Rabitsch8, Cristiano Schwertner9, and Michael Toews6, 1USDA - ARS, College Station, TX, 2Southern Illinois Univ., Carbondale, IL, 3Federal Univ. of Rio Grande do Sul, Porto Alegre, Brazil, 4Clemson Univ., Blackville, SC, 5USDA - ARS, Stoneville, MS, 6Univ. of Georgia, Tifton, GA, 7Saint Petersburg State Forest Technical Univ., St. Petersburg, Russia, 8Environmental Agency Austria, Vienna, Austria, 9Federal Univ. of São Paulo, Diadema, Brazil

11:00 **1176** Invasive species, globalization, and climate change: Challenges and solutions? **George Roderick** (roderick@berkeley.edu), Univ. of California, Berkeley, CA

11:30 **1177** Pest management challenges in managed honey bees (*Apis mellifera*) in the southern United States. Lauren Ward1, Juliana Rangel1 and **Meghan Milbrath** (mpi@msu.edu)2, 1Texas A&M University, College Station, TX, 2Michigan State University, East Lansing, MI

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**TUESDAY**

**Tuesday, September 27 • MORNING •**

11:45 **1178** Development of an early detection system for exotic honey bee species and novel pests. **Mark Dykes** (mdykes@tamu.edu)1, Mary Reed2, and Bill Baxter2, 1Texas A&M Univ., College Station, TX, 2Texas Apiary Inspection Service, College Station, TX

**Symposium: Microbial Modulation of Insect Immunity**

***Room W331 B (Convention Center)***

**Moderators and Organizers:** Elizabeth McGraw1 and  
Kerry M. Oliver2, 1Monash Univ., Melbourne, Australia, 2Univ. of Georgia, Athens, GA

9:15 **1179** Insects’ little helpers: Symbiont-produced secondary metabolites for pathogen defense. **Martin Kaltenpoth** (mkaltenpoth@ice.mpg.de), Max Planck Institute for Chemical Ecology, Jena, Germany

9:45 **1180** Mechanism of symbiont-mediated defense against parasitic nematodes. **Steve J. Perlman** (stevep@uvic.ca) and Phineas Hamilton, Univ. of Victoria, Victoria, BC, Canada

**10:15 BREAK**

10:30 **1181** Symbiont-based protection against parasitoids in aphids. **Kerry M. Oliver** (kmoliver@uga.edu), Stephanie Weldon, and Adam J. Martinez, Univ. of Georgia, Athens, GA

10:45 **1182** The impact of the bee gut microbiota on plant secondary compound conversion, and its potential role in modulating susceptibility to parasites. **Hauke Koch** (hauke.koch@utexas.edu), The Univ. of Texas, Austin, TX

11:00 **1183** Transcriptomics of the *Spiroplasma* defense against parasitoids of *Drosophila*. **Mariana Mateos** (mmateos@tamu.edu)1, Victor Higareda-Alvear2, and Esperanza Martínez-Romero2, 1Texas A&M Univ., College Station, TX, 2National Autonomous Univ. of México, Cuernavaca, Mexico

11:15 **1184** On *Wolbachia*, immunity and pathogen blocking. **Elizabeth McGraw** (beth.mcgraw@monash. edu), Monash Univ., Melbourne, Australia

11:30 **1185** The bacterium *Wolbachia* exploits host innate immunity to establish a symbiotic relationship with the dengue vector mosquito *Aedes aegypti*. **Xiaoling Pan** (xpan@msu.edu)1, Andrew Pike1, Deepak Joshi1,

Guowu Bian1, Michael McFadden1, Peng Lu1,  
Fengrui Zhang1, Xiao Liang1, Zhiyong Xi1, and  
Alexander Raikhel2, 1Michigan State Univ., East Lansing, MI, 2Univ. of California, Riverside, CA

**Symposium: Reproductive Interference and its Applications**

***Room W224 G (Convention Center)***

**Moderators and Organizers:** Noriyuki Suzuki1 and Norikuni Kumano2, 1Univ. of California, Berkeley, CA, 2Obihiro Univ. of Agriculture and Veterinary Medicine, Obihiro, Japan

9:15 **1186** Satyrization and satyrization-resistance in competitive displacements of invasive mosquito species. **Irka E. Bargielowski** (irka@ufl.edu), Univ. of Florida, Vero Beach, FL

9:30 **1187** Causes and consequences of reproductive interference between two closely related insect species. **Jennifer Hamel** (jhamel2@elon.edu)1 and  
Christine W. Miller2, 1Elon Univ., Elon, NC, 2Univ. of Florida, Gainesville, FL

9:45 **1188** Conspecific sperm precedence does not work as a barrier against reproductive interference. **Noriyuki Suzuki** (fvgnoriyuki@gmail.com), Univ. of California, Berkeley, CA

10:00 **1189** Noisy neighbors can hamper the evolution of reproductive isolation by reinforcing selection. **Daniel Matute** (dmatute@email.unc.edu), Univ. of North Carolina, Chapel Hill, NC

**10:15 BREAK**

10:30 **1190** Sperm marking using the trace element rubidium to improve the monitoring of the sterile sperm usage in the sterile insect technique.  
**Norikuni Kumano** (nrkumano@obihiro.ac.jp)1,2, Kiyohito Teruya2, Kaori Tsurui3, and Tetsuya Toyosato2,4, 1Obihiro Univ. of Agriculture and Veterinary Medicine, Obihiro, Japan, 2Okinawa Prefectural Plant Protection Center, Naha, Japan, 3Univ. of the Ryukyus, Nishihara, Japan, 4Ryukyu-Sankei Co. Ltd., Naha, Japan

10:45 **1191** Suppression and eradication of invasive pest species using reproductive interference with congeneric sterilized species. **Atsushi Honma** (honma.tetrix@gmail.com), Univ. of the Ryukyus, Okinawa, Japan

11:00 **Discussion**

**Symposium: Unmanned Aerial Systems (Drones) for Precision Mosquito Control and Agricultural Use**

***Room W315 B (Convention Center)***

**Moderators and Organizers:** Ary Faraji1, Randy Gaugler2, and Greg Williams3, 1Salt Lake City Mosquito Abatement District,  
Salt Lake City, UT, 2Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 3Hudson County Mosquito Control, Jersey City, NJ

9:15 **1192** Project PREMONITION: Autonomous systems for emerging infectious disease surveillance.  
**Ethan Jackson** (ejackson@microsoft.com)1 and Douglas E. Norris2, 1Microsoft, Redmond, WA,

2Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

9:45 **1193** Unmanned aerial systems for vector surveillance and control. **Greg Williams** (gwilliams@ hudsonregionalhealth.org)1, Randy Gaugler2,  
Ary Faraji3, and Scott Crans2, 1Hudson County Mosquito Control, Jersey City, NJ, 2Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 3Salt Lake City Mosquito Abatement District, Salt Lake City, UT

10:00 **1194** Optimizing surveillance protocols in cropping systems using unmanned aircraft systems.  
**Brian McCornack** (bmccornack@gmail.com) and Travis Balthazor, Kansas State Univ., Manhattan, KS

**10:15 BREAK**

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**TUESDAY**

**Tuesday, September 27 • MORNING •**



10:30 **1195** Remote scouting of insects in agricultural systems. **Ian MacRae** (imacrae@umn.edu)1,  
Robert Koch2, Tim Baker1, and Zach Marston3, 1Univ. of Minnesota, Crookston, MN, 2Minnesota Dept. of Agriculture, St. Paul, MN, 3Univ. of Minnesota, St. Paul, MN

10:45 **1196** Remote piloted aircraft: Operational surveillance and application technology. **Bill Reynolds** (breynolds@leateam.com), Leading Edge Associates, Inc., Fletcher, NC

**Symposium: Genomic and Genetic Strategies Toward Integrated Pest Management**

***Room W315 A (Convention Center)***

**Moderators and Organizers:** Fang (Rose) Zhu and Laura C. Lavine, Washington State Univ., Pullman, WA

9:15 **1197** Enabling technologies for next generation pest management. **Subba Reddy Palli** (rpalli@uky.edu), Univ. of Kentucky, Lexington, KY

9:30 **1198** Genome maps to complement genome sequence. **Susan Brown** (sjbrown@k-state.edu), Kansas State Univ., Manhattan, KS

9:45 **1199** Potential of RNAi-based transgenic maize for locust management. **Enbo Ma** (maenbo2003@sxu.edu. cn), Daqi Li, and Jianzhen Zhang, Shanxi Univ., Taiyuan, China

10:00 **1200** Insects and their viruses originated small RNAs as potential insecticidal molecules. **Raj Bhatnagar** (raj@icgeb.res.in), Bindiya Sachdev, and Naresh Arora, International Centre for Genetic Engineering and Biotechnology, New Delhi, India

**10:15 BREAK**

10:30 **1201** Insecticide resistance: Impact, mechanisms, and research directions. **Nannan Liu** (liunann@auburn.edu), Auburn Univ., Auburn, AL

10:45 **1202** Use of RNAi to validate genes involved in insecticide tolerance as a proactive resistance monitoring strategy. **John Clark** (jclark@vasci.umass.edu), Univ. of Massachusetts, Amherst, MA

11:00 **1203** Interaction of *Anopheles* mosquito with a maternally inherited *Wolbachia* symbiont and its potential use in malaria control. **Deepak Joshi** (djoshi. email@yahoo.com), Zhiyong Xi, Xiaoling Pan, Michael McFadden, David Bevins, Xiao Liang, and Peng Lu, Michigan State Univ., East Lansing, MI

11:15 **1204** Termite translational genomics and development of pest management technology. **Michael E. Scharf** (mscharf@purdue.edu), Purdue Univ., West Lafayette, IN

11:30 **1205** Colony collapse in termites — disruption of social homeostasis using behavioral genomics toolsets. **Xuguo Zhou** (xuguozhou@uky.edu), Univ. of Kentucky, Lexington, KY

11:45 **1206** Different pathogenicities of Rice stripe virus from the insect vector and from viruliferous plants. **Feng Cui** (cuif@ioz.ac.cn), Wan Zhao, Pengcheng Yang, and Le Kang, Chinese Academy of Sciences, Beijing, China

**Symposium: Genetic Architecture of Species Differences**

***Room W414 B (Convention Center)***

**Moderator and Organizer:** Jürgen Gadau, Arizona State Univ., Tempe, AZ

9:15 **1207** The genetics of male-female coevolution of communication behaviors. Kerry Shaw and **Mingzi Xu** (mx52@cornell.edu), Cornell University, Ithaca, NY

9:45 **1208** Transcriptional plasticity and host specific trade-offs in larval performance along the *Rhagoletis* speciation continuum. Gregory Ragland1,2,  
Kristin Almskaar3, Kim Vertacnik3,4, Harlan Gough3, Jeffrey Feder2, Daniel Hahn5, and **Dietmar Schwarz** (dietmar.schwarz@wwu.edu)3, 1Kansas State Univ., Manhattan, KS, 2Univ. of Notre Dame, South Bend, IN, 3Western Washington Univ., Bellingham, WA, 4Univ. of Kentucky, Lexington, KY, 5Univ. of Florida, Gainesville, FL

**10:15 BREAK**

10:30 **1209** Aggression and allele specific expression in hybrid honey bees. **Joshua Gibson** (gibson85@purdue. edu)1, Greg Hunt1, Miguel E. Arechavaleta-Velasco2, and Jennifer M. Tsuruda3, 1Purdue Univ., West Lafayette, IN, 2National Institute of Forestry, Agriculture and Livestock, Ajuchitlan, Mexico, 3Univ. of California, Davis, CA

10:45 **1210** The genetics of species differences in the *Drosophila virilis* group. **Yasir Ahmed** (yahmed2@ ur.rochester.edu), Univ. of Rochester, Rochester, NY

11:00 **1211** Genetic differences between social parasites and their hosts. **Jürgen Gadau** (jgadau@asu.edu)1, Chris R. Smith2, Sara Helms Cahan3, Seán Brady4, Erich Bornberg-Bauer5, Martin Helmkampf1,  
Andrew Suarez6, and Alexander Mikheyev7, 1Arizona State Univ., Tempe, AZ, 2Earlham College, Richmond, IN, 3Univ. of Vermont, Burlington, VT, 4Smithsonian Institution National Museum of Natural History, Washington, DC, 5Univ. of Münster, Münster, Germany, 6Univ. of Illinois, Champaign, IL, 7Okinawa Institute of Science and Technology, Onna, Japan

11:15 **1212** Recruitment and evolution of parasitoid wasp venoms. **Ellen Martinson** (e.martinson@rochester.edu), Univ. of Rochester, Rochester, NY

**Symposium: Cross-Continental Patterns of Chemical Communication Among Subcortical Insects**

***Room W330 A (Convention Center)***

**Moderators and Organizers:** Kamal Gandhi1, Christiane Helbig2, and Michael Müller2, 1Univ. of Georgia, Athens, GA, 2Technical Univ., Tharandt, Germany

9:15 **1213** Multi-trophic semiochemical interactions within the pine beetle guild in the southern U.S. **Kamal Gandhi** (kjgandhi@uga.edu)1, Jenny Staeben1, Daniel Miller2, and John Nowak3, 1Univ. of Georgia, Athens, GA, 2USDA - Forest Service, Athens, GA, 3USDA - Forest Service, Asheville, NC

**1214** Why is there so much variation among semiochemical systems of aggressive bark beetles? **Brian T. Sullivan** (briansullivan@fs.fed.us)1, Alicia Niño-Domínguez2, Amanda Grady3, Richard Hofstetter4, and Deepa Pureswaran5, 1USDA - Forest Service, Pineville, LA, 2College of the Souther Border, Tapachula, Mexico, 3USDA - Forest Service, Flagstaff, AZ, 4Northern Arizona Univ., Flagstaff, AZ, 5Natural Resources Canada, Québec City, QC, Canada

10:00 **1215** Use of allochthonous kairomones for nature- based management of bark beetles. **Michael Müller** (michael.mueller@tu-dresden.de)1 and Michael Wehnert2, 1Technical Univ., Tharandt, Germany, 2East German Society of Forest Planning mbH, Kesselsdorf, Germany

**10:15 BREAK**

10:30 **1216** Attraction of bark and woodboring insects to loblolly pines as based on tree health. **Christiane Helbig** (chr.helbig@web.de)1, David Coyle2, Kier Klepzig3,  
John Nowak3, and Kamal Gandhi2, 1Technical Univ., Tharandt, Germany, 2Univ. of Georgia, Athens, GA, 3USDA - Forest Service, Asheville, NC

10:45 **1217** Modification of the action of semiochemicals by altered conditions due to climate change.  
**Stefan Schütz** (stefan.schuetz@forst.uni-goettingen. de), Georg August Univ., Göttingen, Germany

11:00 **Discussion**

**Symposium: Worldwide Use of Kairomones to Enhance Management of Tortricids in Fruit Crops: New Opportunities and New Problems**

***Room W330 C (Convention Center)***

**Moderators and Organizers:** Alan L. Knight1 and Peter Witzgall2, 1USDA - ARS, Wapato, WA, 2Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

9:15 **1218** Codling moth and pear ester: The kairomone paradigm for pest management. **Douglas Light** (doug. light@ars.usda.gov), USDA - ARS, Albany, CA

9:30 **1219** Does acetic acid finally give us the focus for following female tortricids? **Alan L. Knight** (alan. knight@ars.usda.gov), USDA - ARS, Wapato, WA

9:45 **1220** Potential of herbivore-induced volatiles  
as attractants for leaf-feeding tortricids.  
**Valentino Giacomuzzi** (valentino.giacomuzzi@natec. unibz.it) and Sergio Angeli, Freie Univ., Bolzano, Italy

10:00 **1221** Boosting bisexual moth catches of oriental fruit moth in sex pheromone-treated orchards. **Eduardo Fuentes-Contreras** (efuentes@utalca.cl)1, Liliana Cichón2, Esteban Basoalto3,

Wilson Barros-Parada1, and Alan L. Knight4, 1Univ. of Talca, Talca, Chile, 2INTA, General Roca, Argentina, 3Austral Univ., Valdivia, Chile, 4USDA - ARS, Wapato, WA

**10:15 BREAK**

10:30 **1222** Plant and microbial volatiles as potential behaviour modifying chemicals for the grapevine moth, *Lobesia botrana*. **Marco Tasin** (marco.tasin@ slu.se), Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

10:45 **1223** Integrating kairomonal tools into a codling moth area-wide SIT program. **Gary Judd** (gary.judd@agr.gc. ca), Agriculture and Agri-Food Canada, Summerland, BC, Canada

11:00 **1224** Whole transcriptome analysis and functional characterization of chemosensory receptors in the codling moth, *Cydia pomonella*. **William B. Walker** (william.b.walker.iii@slu.se), Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

11:15 **1225** Similarities of microbial and plant-based cues as tortricid attractants. **Peter Witzgall** (peter.witzgall@ ice3.se), Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

**Symposium: Wound Healing and Damage Signals in Insects**

***Room W330 B (Convention Center)***

**Moderators and Organizers:** Ulrich Theopold1 and Will Wood2, 1Stockholm Univ., Stockholm, Sweden, 2Univ. of Bristol, Bristol, United Kingdom

9:15 **1226** Epigenetic regulation of wound closure in *Drosophila* larvae. **Michael Galko** (mjgalko@mdanderson. org) and Aimee Anderson, The Univ. of Texas MD Anderson Cancer Center, Houston, TX

9:30 **1227** Taranis protects regenerating tissue from fate changes induced by the wound response in *Drosophila*. **Rachel Smith-Bolton** (rsbolton@illinois.edu) and Keaton Schuster, Univ. of Illinois, Champaign, IL

9:45 **1228** Epidermal wound response and *Drosophila* genetics. **Michelle Juarez** (mjuarez@med.cuny.edu), City College of New York, New York, NY

10:00 **1229** Basement membrane secretion, assembly, and fibrotic misassembly in *Drosophila melanogaster*.  
**Jose Pastor-Pareja** (jose.pastor@biomed.tsinghua.edu. cn), Tsinghua Univ., Beijing, China

**10:15 BREAK**

10:30 **1230** Presentation withdrawn

10:45 **1231** Blood cell migration during inflammation, wounding, and infection. **Will Wood** (w.wood@bristol. ac.uk), Univ. of Bristol, Bristol, United Kingdom

11:00 **1232** Nucleotide metabolism and danger signals. **Michal Zurovec** (zurovec@entu.cas.cz), Czech Academy of Sciences, České Budějovice, Czech Republic

11:15 **1233** The *Drosophila* chitinase-like protein IDGF3 is involved in protection against nematodes and wound healing. **Ulrich Theopold** (uli.theopold@su.se)1, Lucie Kucerova1, Badrul Arefin1, Michal Zurovec2, 1Stockholm Univ., Stockholm, Sweden, 2Czech Academy of Sciences, České Budějovice, Czech Republic

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**TUESDAY**

**Tuesday, September 27 • MORNING •**

**Symposium: Insect-Plant Interactions in a Changing Arctic**

***Room W224 F (Convention Center)***

**Moderator and Organizer:** Ashley Asmus, The Univ. of Texas, Arlington, TX

9:15 **1234** Characterizing the responses and roles of mosquitoes in a rapidly changing Arctic.  
**Lauren E. Culler** (leculler@gmail.com)1, Toke Høye2, Alex Stendahl1, David Polashenski1, Angie Spickard1, Matthew Ayres1, and Ross Virginia1, 1Dartmouth College, Hanover, NH, 2Aarhus Univ., Rønde, Denmark

9:30 **1235** High spatial variation in terrestrial arthropod species diversity and composition near the Greenland ice cap. **Rikke Hansen** (rrh@bios.au.dk)1, Oskar Hansen1, Joseph Bowden1, Signe Normand1, Christian Bay1, Jesper Sørensen1, and Toke Høye2, 1Aarhus Univ., Aarhus, Denmark, 2Aarhus Univ., Rønde, Denmark

9:45 **1236** Plant reproduction and the role of pollinators near poleward range margins. **Christine Urbanowicz** (christine.m.urbanowicz.gr@dartmouth.edu)1 and Rebecca E. Irwin2, 1Dartmouth College, Hanover, NH, 2North Carolina State Univ., Raleigh, NC

10:00 **1237** Arthropod food web collapse following an insect herbivore outbreak in Arctic tundra. **Ashley Asmus** (ashley.asmus@gmail.com)1, Rikke Hansen2,  
Oskar Hansen2, Katrine Raundrup2, Josephine Nymand3, and Peter Aastrup2, 1The Univ. of Texas, Arlington, TX, 2Aarhus Univ., Aarhus, Denmark, 3Greenland Institute of Natural Resources, Nuuk, Greenland

**10:15 BREAK**

10:30 **1238** High-Arctic butterflies become smaller with rising temperatures. **Joseph Bowden** (joey.bowden@ gmail.com)1, Anne Eskildsen1, Rikke Hansen1, Kent Olsen1, Carolyn Kurle2, and Toke Høye3, 1Aarhus Univ., Aarhus, Denmark, 2Univ. of California, La Jolla, CA, 3Aarhus Univ., Rønde, Denmark

10:45 **1239** Mobile arthropods link ecologically disparate habitats in Arctic ecosystems. **Jamin Dreyer** (jamin. dreyer@gmail.com)1, David Hoekman2, Claudio Gratton3, Hilary Bultman3, Ejgil Gravesen4, and James D. Harwood1, 1Univ. of Kentucky, Lexington, KY, 2Southern Nararene Univ., Bethany, OK, 3Univ. of Wisconsin, Madison,

WI, 4Greenland Institute of Natural Resources, Nuuk, Greenland

11:00 **1240** History and future of the Kenelm W. Philip Lepidoptera Collection. **Kathryn Daly** (kmdaly@alaska. edu) and Derek S. Sikes, Univ. of Alaska, Fairbanks, AK

11:15 **1241** Measuring invertebrate herbivory in tundra. **Isabel Barrio** (icbarrio@gmail.com), Univ. of Iceland, Reykjavik, Iceland

11:30 **1242** Distributed experiments as the ultimate challenge for ecology and ecologists. **Tomas Roslin** (tomas.roslin@helsinki.fi)1,2 and Bess Hardwick1, 1Univ. of Helsinki, Helskinki, Finland, 2Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

**Symposium: Insect-Plant Interactions in a Changing Climate**

***Room W222 A (Convention Center)***

**Moderator and Organizer:** Bonnie Pendleton, West Texas A&M Univ., Canyon, TX

9:15 **1243** Climate change and crop production. **B. A. Stewart** (bstewart@wtamu.edu), West Texas A&M Univ., Canyon, TX

9:45 **1244** Temperature-dependent feeding behavior of *Halyomorpha halys* and implications for crop damage. **Nik G. Wiman** (nik.wiman@oregonstate.edu), Oregon State Univ., Aurora, OR

10:00 **1245** Lipid, phytohormone, and the resistance of wheat to Hessian fly under heat stress. **Lieceng Zhu** (lzhu@uncfsu.edu), Fayetteville State Univ., Fayetteville, NC

**10:15 BREAK**

10:30 **1246** Interactions between drought stress and the use of neonicotinoids can lead to banks grass mite outbreaks in corn. Alice Ruckert and **Ricardo Ramirez** (ricardo.ramirez@usu.edu), Utah State Univ., Logan, UT

10:45 **1247** The effects of urbanization on insect herbivores and their street tree hosts. **Adam Dale** (agdale2@ncsu. edu) and Steven Frank, North Carolina State Univ., Raleigh, NC

11:00 **1248** Hot in the city: Insect pests and the future of warmer urban trees. **Emily K. Meineke** (ekmeinek@ ncsu.edu), Elsa Youngsteadt, Rob R. Dunn, and Steven Frank, North Carolina State Univ., Raleigh, NC

**Symposium: Biological Control under Climate Change (IOBC)**

***Room W222 B (Convention Center)***

**Moderators and Organizers:** Jianqing Ding and Xinmin Lu, Chinese Academy of Sciences, Wuhan, China

9:15 **1249** Predicting the impacts of biological control agents under climate change. **Evan Siemann** (siemann@rice.edu)1, James Henriksen1, Xinmin Lu2, and Jianqing Ding2, 1Rice Univ., Houston, TX, 2Chinese Academy of Sciences, Wuhan, China

9:45 **1250** Conservation biological control of arthropod pests under a changing climate. **Klaus Birkhofer** (klaus.birkhofer@biol.lu.se), Lund Univ., Lund, Sweden

**10:15 BREAK**

10:30 **1251** Potential benefits and risks of the ragweed beetle under climate change. **Heinz Müller-Schärer** (heinz.mueller@unifr.ch)1, Yan Sun1, Urs Schaffner2, and S.T.E. Lommen1, 1Univ. of Fribourg, Fribourg, Switzerland, 2CABI, Delémont, Switzerland

10:45 **1252** Climate warming increases non-target effects of a biocontrol agent on a native species. **Xinmin Lu** (lxm3412@wbgcas.cn)1, Jianqing Ding1, Evan Siemann2, Minyan He3, Hui Wei3, and Xu Shao3, 1Chinese Academy of Sciences, Wuhan, China, 2Rice Univ., Houston, TX, 3Wuhan Botanical Garden, Chinese Academy of Sciences, Wuhan, China

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**TUESDAY**

**Tuesday, September 27 • MORNING •**

11:00 **1253** Can forests take the heat? Managing pests and ecosystem services in a warming climate. **Steven D. Frank** (steven\_frank@ncsu.edu), North Carolina State Univ., Raleigh, NC

11:15 **1254** Demographic and population changes in insects under climate warming: Implications for biological c ontrol. **Chunsen Ma** (machunsen@caas.cn)1 and  
Gang Ma2, 1Institute of Plant Protection, Beijing, China, 2Chinese Academy of Agricultural Sciences, Beijing, China

11:30 **1255** Quantifying the risk of synchronization loss between natural enemies and their hosts under climate change. **Guy Boivin** (boiving@agr.gc.ca)1, Jacques Brodeur2, and Gaétan Bourgeois3, 1Agriculture and Agri-Food Canada, Québec, QC, Canada, 2Univ. of Montréal, Montréal, QC, Canada, 3Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada

11:45 **1256** Climate change and biological control: The challenges for island nations. **Pip Gerard** (pip.gerard@ agresearch.co.nz), AgResearch Ltd, Hamilton, New Zealand

12:00 **1257** Predicted European range of potential ragweed biocontrol agents. **Yan Sun** (yan.sun@unifr.ch)1,  
Heinz Müller-Schärer1, Brönnimann Olivier2,  
George Roderick3, and Alexander Poltavsky4, 1Univ. of Fribourg, Fribourg, Switzerland, 2Univ. of Lausanne, Lausanne, Switzerland, 3Univ. of California, Berkeley, CA, 4Southern Federal Univ., Russia

12:15 **1258** Thermal stress effects on herbivores and  
their predators: Implications for biological control. **Arnaud Sentis** (arnaud.sentis@gmail.com)1,  
Jacques Brodeur2, David S Boukal3, and Jean-Louis Hemptinne4, 1Univ. of Toulouse, Toulouse, France, 2Univ. of Montréal, Montréal, QC, Canada, 3Univ. of South Bohemia, České Budějovice, Czech Republic, 4Univ. of Toulouse, Castanet-Tolosan, France

**Symposium: Bt Crops and Best Management Practices: Influence on the Technology Durability**

***West Hall F1 (WF1) (Convention Center)***

**Moderators and Organizers:** Antonio C. Santos and Dwain M. Rule, Dow AgroSciences, Indianapolis, IN

9:15 **1259** Bt crops and best management practices: Influence on the technology durability. **Antonio C. Santos** (acsantos1@dow.com), Dow AgroSciences, Indianapolis, IN

9:45 **1260** Corn rootworm management: Current status and best management practices implementation in North America. **Dwain M. Rule** (ddrule@dow.com), Dow AgroSciences, Indianapolis, IN

**10:15 BREAK**

10:30 **1261** Bt soybean IPM in Brazil: Current and  
future implications for IRM on the main pests.  
**Renato A. de Carvalho** (renato.a.carvalho@monsanto. com)1, Patrick Dourado1, Samuel Martinelli2, and Graham P. Head2, 1Monsanto of Brasil Ltda., São Paulo, Brazil, 2Monsanto Company, St. Louis, MO

10:45 **1262** Resistance characterization of *Spodoptera frugiperda* (Lepidoptera: Noctuidae) to the Vip3Aa20 protein from *Bacillus thuringiensis* and its impact on IRM strategy. **Julio Fatoretto** (julio.fatoretto@syngenta. com)1, Oderlei Bernardi2, Daniel Bernardi2,

Renato Horikoshi2, Daniela Okuma2, Leonardo Miraldo2, Tony Burd3, Fernanda Medeiros1, and Celso Omoto2, 1Syngenta Crop Protection, São Paulo, Brazil,  
2Univ. of São Paulo, Piracicaba, Brazil, 3Syngenta Crop Protection, Research Triangle Park, NC

11:00 **1263** Excellence through stewardship: Resistance management and the global industry commitment. **Boris A. Castro** (bacastro@dow.com)1, Nicholas Storer1, and Ana Correa2, 1Dow AgroSciences, Indianapolis, IN, 2Dow AgroSciences, Ribeirão Preto, Brazil

11:15 **1264** Bt cotton: Current and future products and implications on IRM. **Geraldo Papa** (gpapa@bio.feis. unesp.br), São Paulo State Univ., Ilha Solteira, Brazil

**Symposium: Challenges and Opportunities for Management of Western Corn Rootworm**

***Room W414 A (Convention Center)***

**Moderators and Organizers:** Aaron Gassmann1, Lance Meinke2, and Matthew Carroll3, 1Iowa State Univ., Ames, IA, 2Univ. of Nebraska, Lincoln, NE, 3Monsanto Company, St. Louis, MO

9:15 **1265** A former extension entomologist’s look in  
the rear-view mirror at the potholes of western corn rootworm mismanagement: Will the road ahead be smoother? **Michael Gray** (megray@illinois.edu), Univ. of Illinois, Champaign, IL

9:45 **1266** Selection of resistance in western corn rootworm to Cry3Bb1, mCry3a, eCry3.1Ab, and Cry34/35Ab1 transgenic corn: Variations in traits in  
the laboratory and the field. **Bruce Hibbard** (bruce. hibbard@ars.usda.gov)1, Dalton Ludwick2, Lisa Meihls1, Jennifer Dietloff3, and Aaron Gassmann4, 1USDA - ARS, Columbia, MO, 2Univ. of Missouri, Columbia, MO, 3Lock Haven Univ., Lock Haven, PA, 4Iowa State Univ., Ames, IA

10:00 **1267** Field-evolved resistance to Bt maize by western corn rootworm. **Aaron J. Gassmann** (aaronjg@iastate. edu)1, Eric H. Clifton1, John Doudna1, Mike W. Dunbar2, Amanda Hoffmann1, David A. Ingber1, Siva R. K. Jakka1, Ryan S. Keweshan1, Kenneth E. Masloski1, Aubrey Paolino1, Jennifer L. Petzold-Maxwell1, Ram Shrestha1, and

Coy St. Clair1, 1Iowa State Univ., Ames, IA, 2South Dakota State Univ., Brookings, SD

**10:15 BREAK**

10:30 **1268** Evolution and mechanisms of rootworm resistance to Cry3Bb1 maize. **Nicholas Miller** (millern@ uic.edu)1, Gérald Bermond1, Leslie Rault2, Haichuan Wang2, Blair Siegfried3, Lance Meinke2, Simon Baxter4, Aaron J. Gassmann5, and Bruce Hibbard6, 1Univ. of Illinois, Chicago, IL, 2Univ. of Nebraska, Lincoln, NE, 3Univ. of Florida, Gainesville, FL, 4Univ. of Adelaide, Adelaide, Australia, 5Iowa State Univ., Ames, IA, 6USDA - ARS, Columbia, MO

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**TUESDAY**

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10:45 **1269** Evidence of pyrethroid resistance evolution in western corn rootworm populations from the western U.S. Corn Belt. **Lance Meinke** (lmeinke1@unl.edu)1, Adriano Pereira1, Dariane Souza1, John Wang1,

Blair Siegfried2, Nicholas Miller3, Sarah Zukoff4, and Julie Peterson5, 1Univ. of Nebraska, Lincoln, NE, 2Univ. of Florida, Gainesville, FL, 3Univ. of Illinois, Chicago, IL, 4Kansas State Univ., Manhattan, KS, 5Univ. of Nebraska, North Platte, NE

11:00 **1270** Optimizing the use of entomopathogenic nematodes for a better control of corn rootworm larvae. **Stefan Toepfer** (stoepfer@gmx.net)1, Ralf-Udo Ehlers2, Michael Zellner3, and Ulrich Kuhlmann4, 1Chinese Ministry of Agriculture, Beijing, China, 2e-nema, Schwentinental, Germany, 3Bavarian State Research Centre for Agriculture, Freising, Germany, 4CABI, Delémont, Switzerland

11:15 **1271** To resist or not to resist? An insect dilemma serving western corn rootworm integrated pest management on Bt maize. **Ivan Hiltpold** (i.hiltpold@ uws.edu.au)1 and Bruce Hibbard2, 1Univ. of Western Sydney, Penrith, Australia, 2USDA - ARS, Columbia, MO

11:30 **1272** Novel application methods of beneficial organisms against *Diabrotica virgifera virgifera*. **Geoffrey Jaffuel** (geoffrey.jaffuel@unine.ch)1,  
Nicola Imperiali2, Christoph Keel3, Kent S. Shelby4, Bruce Hibbard4, Raquel Campos-Herrera5, and  
Ted Turlings1, 1Univ. of Neuchâtel, Neuchâtel, Switzerland, 2Univ. of Lausanne, Lausanne, Switzerland, 3Agroscope, Zürich, Switzerland, 4USDA - ARS, Columbia, MO, 5Center for Biological Resources and Food Mediterranean, Faro, Portugal

11:45 **1273** Opportunities for integration: Perspectives on industry integrating resistance management into IPM. **Clinton D. Pilcher** (clint.pilcher@pioneer.com),  
J. Lindsey Flexner, and Amit Sethi, DuPont Pioneer, Johnston, IA

12:00 **1274** RNAi strategies to address corn rootworm control challenges. **William Moar** (william.moar@ monsanto.com), Paula A. Price, Chitvan Khajuria, Sean Evans, Alan Willse, Matthew Carroll, and Graham P. Head, Monsanto Company, St. Louis, MO

**Symposium: Global Spread and Management of the South American Tomato Leafminer, *Tuta absoluta***

***Room W224 H (Convention Center)***

**Moderators and Organizers:** Amer Fayad1 and Elvis Heinrichs2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Univ. of Nebraska, Lincoln, NE

9:15 **1275** *Tuta absoluta* programs in the IPM Innovation Lab. **Stephanie Parker** (sparker1@vt.edu)1, Elvis Heinrichs2, and Rangaswamy R. Muniappan1, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Univ. of Nebraska, Lincoln, NE

9:30 **1276** Biology and spread of *Tuta absoluta*.  
Nicolas Desneux1 and **Antonio Biondi** (antonio.biondi@ unict.it)2, 1INRA, Sophia Antipolis, France, 2Univ. of California, Berkeley, CA

9:45 **1277** Monitoring the spread of *T. absoluta* using a multi-layered network based modeling framework. **Ahijin Adiga** (abhijin@vbi.vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

10:00 **1278** The role of human mobility and infrastructures in pest and disease modeling. **Madhav Marathe** (mmarathe@vbi.vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

**10:15 BREAK**

10:30 **1279** Status of current and proposed regulatory responses by USDA - APHIS to the threat of tomato leaf miner (*Tuta absoluta* Meyrick) invasion into the United States. **Joseph Vorgetts** (joseph.l.vorgetts@ aphis.usda.gov)1, Julieta Brambila2,

Devaiah A. Muruvanda1, and Amy L. Roda3, 1USDA - APHIS, Riverdale, MD, 2USDA - APHIS, Gainesville, FL, 3USDA - APHIS, Miami, FL

10:45 **1280** *Tuta absoluta* in Central Asia. **Harry Bottenberg** (hbottenberg@usaid.gov), USAID, Washington, DC

11:00 **1281** *Tuta absoluta* in India. **R. Asokan** (r\_asokan@ iihr.ernet.in)1, V. Sridhar1, S. Venugopalan1, and Yenumula. Prasad2, 1Indian Institute of Horticultural Research, Bangalore, India, 2Agricultural Technology Application Research Institute, Hyderabad, India

11:15 **1282** *Tuta absoluta* in North Africa and the Near East. **Homam Bekheet Homam** (homambekheet@ gmail.com)1 and Shoki Al-Dobai2, 1Plant Protection Research Institute, Giza, Egypt, 2Food and Agriculture Organization of the United Nations, Cairo, Egypt

11:30 **1283** Invasion of the tomato leafminer, *Tuta absoluta*, in West Africa: Spatial dynamics, ecological niche, and potential for biological control. Thierry Brévault1, **Serigne Sylla** (syllaserigne2@gmail.com)2, and Karamoko Diarra2, 1BIOPASS, Dakar, Senegal, 2Univ. Cheikh Anta Diop, Dakar, Senegal

11:45 **1284** Management of *Tuta absoluta*. **Shakir Al-Zaidi** (shakir@russellipm.net), Russell IPM, Flintshire, United Kingdom

**Symposium: Chagas Disease: A Neglected Disease of Public Health Importance**

***Room W230 B (Convention Center)***

**Moderators and Organizers:** Mustapha Debboun1 and Shripat Kamble2, 1Harris County Public Health & Environmental Services, Houston, TX, 2Univ. of Nebraska, Lincoln, NE

9:15 **Introductory Remarks**

9:30 **1285** The challenges of controlling Chagas disease vectors where thriving sylvatic triatomine populations abound. **Claudia Nieto** (cn048511@ohio.edu)1 and Mario Grijalva2, 1Tropical Disease Institute, Athens, OH, 2Pontifical Catholic Univ., Quito, Ecuador

9:45 **1286** A history of Chagas vectors in the United States: A public health perspective. **Ellen Dotson** (ebd6@cdc.gov), Gena Lawrence, and Susan Montgomery, Centers for Disease Control and Prevention, Atlanta, GA

10:00 **1287** Clinical manifestations of Chagas disease in the United States. **Melissa Garcia** (mnolan@bcm.edu), Baylor College of Medicine, Houston, TX

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**10:15 BREAK**

10:30 **1288** Semi-sylvatic habitats: A key environment for Chagas disease amplification and bug reinfestation. **Gonzalo Vazquez-Prokopec** (gmvazqu@emory.edu), Emory Univ., Atlanta, GA

10:45 **1289** Chagas disease in Texas: Targeted outreach and education for awareness with healthcare providers. **Paula Stigler Granados** (paula.e.stigler@uth.tmc.edu), The Univ. of Texas, San Antonio, TX

11:00 **1290** Ecohealth interventions provide promise for the interruption of Chagas transmission in Central America. **Patricia Dorn** (dorn@loyno.edu)1, Dulce M. Bustamante2, Lori Stevens3, and M. Carlota Monroy4, 1Loyola Univ., New Orleans, LA, 2California Dept. of Public Health, Sacramento, CA, 3Univ. of Vermont, Burlington, VT, 4Univ. of San Carlos, Guatemala City, Guatemala

11:15 **1291** Spatial analysis of triatomine vectors of Chagas disease in Texas. Rachel Curtis-Robles1, Sarah Hamer1, Sage Lane1, Michael Levy2, and **Gabriel Hamer** (ghamer@ tamu.edu)1, 1Texas A&M Univ., College Station, TX, 2Univ. of Pennsylvania, Philadelphia, PA

11:30 **1292** *Trypanosoma cruzi i*nfection prevalence and blood meal analysis in vectors of Chagas disease from rural peridomestic locations in Texas, 2013-2014,  
and from Houston, Texas, 2016. **Rodion Gorchakov** (rodion@bcm.edu)1, Lillian Trosclair1, Edward Wozniak2, Melissa Garcia1, Teresa Feria3, Sarah Gunter4,

Mustapha Debboun5, and Kristy Murray1, 1Baylor College of Medicine, Houston, TX, 2Texas Dept. of

State Health Services, Uvalde, TX, 3The Univ. of Texas, Edinburg, TX, 4The Univ. of Texas, Houston, TX,  
5Harris County Public Health & Environmental Services, Houston, TX

**Symposium: Mechanistic Insights into Mosquito- Parasite Interactions**

***Room W224 E (Convention Center)***

**Moderators and Organizers:** Kristin Michel1 and Michael Povelones2, 1Kansas State Univ., Manhattan, KS, 2Univ. of Pennsylvania, Philadelphia, PA

9:15 **1293** The effects of type 2 diabetes on *Plasmodium* infection and transmission. **Nazzy Pakpour** (nazzy. pakpour@csueastbay.edu)1 and Shirley Luckhart2, 1California State Univ., Hayward, CA, 2Univ. of California, Davis, CA

9:30 **1294** The role of *Plasmodium falciparum* Pfs47 mediating evasion of the mosquito immune system and adaptation to different vectors. **Alvaro Molina Cruz** (alvaro.molina-cruz@nih.gov)1, Gaspar Canepa1,  
Noelle Pavlovic1, Jose Ramirez1, and Carolina Barillas-Mury2, 1National Institute of Allergy and Infectious Diseases, Rockville, MD, 2National Institutes of Health, Bethesda, WA

9:45 **1295** Mosquito resistance to malaria parasites. **Stephanie Blandin** (sblandin@unistra.fr), Christopher Batram, Katharina Ehrhardt,

Alice-Anne Goetz, Albert Bayibeki, Randy Clayton, Anais Vittu, Noemie Jelly, and Marie Staub, Inserm Anopheles Group, Strasbourg, France

10:00 **1296** Specificity of complement-like pathway activation in *Anopheles gambiae*. **Michael Povelones** (mpove@vet.upenn.edu)1, Katie Farrant2, Valeria Reyes Ruiz1, and George Christophides2, 1Univ. of Pennsylvania, Philadelphia, PA, 2Imperial College London, London, United Kingdom

**10:15 BREAK**

10:30 **1297** The structure of *Anopheles gambiae* thioester- containing protein 1 and its role in the anti-*Plasmodium* immune response. **Richard Baxter** (richard.baxter@ yale.edu), Yale Univ., New Haven, CT

10:45 **1298** Structural and functional analysis of *Anopheles gambiae* prophenoloxidases. **Haobo Jiang** (haobo. jiang@okstate.edu), Oklahoma State Univ., Stillwater, OK

11:00 **1299** Structural analysis of SRPN6 provides insight into its anti-Plasmodial function. **David Meekins** (dmeekins@ksu.edu), Melissa Gulley, and Kristin Michel, Kansas State Univ., Manhattan, KS

11:15 **1300** Mosquito hemocytes mediate late-phase immune responses that limit *Plasmodium* oocyst survival. **Ryan Smith** (smithr@iastate.edu), Iowa State Univ., Ames, IA

**Symposium: Opportunities and Challenges for Biological Control of Disease Vectors (IOBC)**

***Room W230 D (Convention Center)***

**Moderators and Organizers:** Matthew B. Thomas1 and  
Michael R. Strand2, 1Pennsylvania State Univ., University Park, PA, 2Univ. of Georgia, Athens, GA

9:15 **1301** Perspectives on biocontrol of disease vectors. **Matthew B. Thomas** (mbt13@psu.edu), Pennsylvania State Univ., University Park, PA

9:30 **1302** Modelling to support the biological control of disease vectors. **Charles Godfray** (charles.godfray@ zoo.ox.ac.uk), Oxford Univ., Oxford, United Kingdom

9:45 **1303** Parasites and pathogens beyond Bt.  
**James J. Becnel** (james.becnel@ars.usda.gov), USDA - ARS, Gainesville, FL

10:00 **1304** Possibilities for novel control using symbionts and endoparasites. **Serap Aksoy** (serap.aksoy@yale. edu), Yale Univ., New Haven, CT

**10:15 BREAK**

10:30 **1305** Exploiting the slow speed of kill of entomopathogenic fungi. **Marit Farenhorst** (marit@ in2care.org), In2Care B.V., Wageningen, Netherlands

10:45 **1306** Mosquito natural enemies and biological control. **Michael R. Strand** (mrstrand@uga.edu), Univ. of Georgia, Athens, GA

11:00 **1307** How lethal, nonlethal, and complex effects  
of predators and competitors may impact biological control of vectors. **Steven Juliano** (sajulian@ilstu.edu), Illinois State Univ., Normal, IL

11:15 **1308** Biological control of disease vectors on the landscape. **Bernard D. Roitberg** (roitberg@sfu.ca), Simon Fraser Univ., Burnaby, BC, Canada

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11:30 **1309** The release of the yellow fever mosquito, *Aedes aegypti*, containing a naturally occurring strain of *Wolbachia pipientis* — a question of regulatory responsibility. **Paul DeBarro** (paul.debarro@csiro.au), CSIRO, Dutton Park, Australia

**Symposium: Repellents**

***Room W224 D (Convention Center)***

**Moderators and Organizers:** Nicole L. Achee1 and Theeraphap Chareonviriyaphap2, 1Univ. of Notre Dame, South Bend, IN, 2Kasetsart Univ., Bangkok, Thailand

9:15 **1310** A critical path of development for repellents. **Kathryn Aultman** (kathryn.aultman@stelmaconsulting. com), Stelma Consulting LLC, Redmond, WA

9:30 **1311** Human and non-human approaches to testing repellent products for EPA registration. **Kevin Sweeney** (sweeney.kevin@epamail.epa.gov), U.S. Environmental Protection Agency, Washington, DC

9:45 **1312** Novel repellent chemical structures — driving the discovery of novel tools. **Maia Tsikolia** (maia.tsikolia@ ars.usda.gov)1, Ulrich R. Bernier2, Natasha Agramonte1, Kenneth J. Linthicum2, Spyros E. Zagraphos3,

Christina E. Drakou3, Patrick M. Guerin4, Thomas Krober4, and Jeffrey R. Bloomquist1, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Gainesville, FL, 3National Hellenic Research Foundation, Athens, Greece, 4Univ. of Neuchâtel, Neuchâtel, Switzerland

10:00 **1313** An application of a smart-friendly, non-contact repellent assay system (NCRAS) for chemical screening. **Rungarun Tisgratog** (rungarun\_tis@hotmail.com), Katsetsart Univ., Bangkok, Thailand

**10:15 BREAK**

**Symposium: Recent Advances in the Study of the Neuropterida**

***Room W331 C (Convention Center)***

**Moderators and Organizers:** David E. Bowles1,  
Atilano Contreras-Ramos2, and John D. Oswald3, 1U.S. National Park Service, Republic, MO, 2National Autonomous Univ. of México, Mexico City, Mexico, 3Texas A&M Univ., College Station, TX

9:15 **1322** An updated molecular phylogeny of the Neuropterida. **Shaun Winterton** (swinterton@cdfa. ca.gov), California Dept. of Food and Agriculture, Sacramento, CA

9:45 **1323** Taxonomic status of New World chrysopids (Neuroptera: Chrysopidae). **Catherine A. Tauber** (cat6@cornell.edu), Cornell Univ., Davis, CA

10:00 **1324** Advances in the systematics, morphology, and biology of the green lacewing genus *Leucochrysa*. **Gilberto Albuquerque** (gsa@uenf.br), State Univ. of Northern Rio de Janeiro, Campos, Brazil

**10:15 BREAK**

10:30 **1325** Coniopterygidae associated to Mexican lime trees in Tecomán, Colima, Mexico.

**Mariza A. Sarmiento-Cordero** (marizilla@hotmail. com)1 and Atilano Contreras-Ramos2, 1National Reference Center for Biological Control, Tecomán, Mexico, 2National Autonomous Univ. of México, Mexico City, Mexico

10:45 **1326** Taxonomic review of the subtribe Periclystina (Myrmeleontidae: Dendroleontini). **Renato Machado** (rjpmachado@neo.tamu.edu), Texas A&M Univ., College Station, TX

11:00 **1327** Prospects for a revision of the genus *Myrmeleon* Linnaeus 1767 (Neuroptera: Myrmeleontidae) of North and Central America. **Roberto Lopez-Garcia** (exoddous@ hotmail.com), National Autonomous Univ. of México, Mexico City, Mexico

11:15 **1328** Progress in the systematics of Myrmeleontiformia (antlions and allies) with a focus on Ascalaphidae (owlflies). **Joshua Jones** (doc.jones.research@gmail.com), Texas A&M Univ., College Station, TX

11:30 **1329** Diversity of Chrysopidae, Hemerobiidae, and Mantispidae of tropical dry forests of the Mexican Pacific. **Rodolfo Cancino-López** (tk\_57@hotmail.com) and Atilano Contreras-Ramos, National Autonomous Univ. of México, Mexico City, Mexico

11:45 **1330** Progress on work towards a global monograph of the Neuropterida. **John D. Oswald** (joswald@ag.tamu. edu), Texas A&M Univ., College Station, TX

**Symposium: Duplications, Deletions, and Other Mutations: Deciphering the Molecular Basis of Insecticide Resistance**

***West Hall F2 (WF2) (Convention Center)***

**Moderators and Organizers:** Jeffrey G. Scott1 and Ralf Nauen2, 1Cornell Univ., Ithaca, NY, 2Bayer CropScience, Monheim, Germany

9:15 **1331** Metabolic and target site resistance to pyrethroids. **Shinji Kasai** (kasacin@nih.go.jp), National Institute of Infectious Diseases, Tokyo, Japan

10:30 **1314**

10:45 **1315**

Presentation withdrawn  
Presentation withdrawn  
Repellent and irritant effects of Kaffir lime

11:00 **1316**  
(*Citrus hystrix*) leaf and peel essential oils against *Aedes aegypti* and *Anopheles minimus*. **Montathip Kongmee** (nokcool@hotmail.com), Katsetsart Univ., Nakhon Pathom, Thailand

11:15 **1317** Role of insecticide resistance in repellent bioefficacy. **Joseph Wagman** (joseph.m.wagman@ gmail.com), Univ. of Notre Dame, Notre Dame, IN

11:30 **1318** Impact of repellents on vector life history traits. **John Grieco** (jgrieco@nd.edu), Univ. of Notre Dame, South Bend, IN

11:45 **1319** Mathematical modeling of repellents as a support tool for trial design, evaluation, and for public health rollout. **Alex Perkins** (taperkins@nd.edu), Univ. of Notre Dame, South Bend, IN

12:00 **1320** Outreach projects and malaria reduction collaborations that include repellents by SC Johnson, A Family Company. **Maude Meier** (mcmeier@scj.com), S. C. Johnson & Son, Racine, WI

12:15 **1321** Vector control intervention using biorepellent products and biomarkers to evaluate their effectiveness. **Theeraphap Chareonviriyaphap** (faasthc@ku.ac.th), Kasetsart Univ., Bangkok, Thailand



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**TUESDAY**

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9:45 **1332** Mutation and duplication of arthropod acetylcholinesterase: Insights into pesticide resistance and tolerance. **Si Hyeock Lee** (shlee22@snu.ac.kr), Seoul National Univ., Seoul, South Korea

10:00 **1333** nAChR mutations involved in insecticide resistance. **Thomas C. Sparks** (tcsparks@dow.com), Nick Wang, Gerald B. Watson, and Michael R. Loso, Dow AgroSciences, Indianapolis, IN

**10:15 BREAK**

10:30 **1334** Multiple mechanisms for changing a target site. **Jeffrey G. Scott** (jgs5@cornell.edu)1, Haina Sun1,2, Khanh Tong1, and Shinji Kasai3, 1Cornell Univ., Ithaca, NY, 2Nanjing Agricultural Univ., Nanjing, China, 3National Institute of Infectious Diseases, Tokyo, Japan

10:45 **1335** Mechanisms of diamide insecticide resistance with special reference to ryanodine receptor target-site mutations. **Ralf Nauen** (ralf.nauen@bayer.com)1, Denise Steinbach2, Daniela Okuma3, Oliver Gutbrod1, Chris Bass4, Emyr Davies5, Bartek Troczka5,

Martin Williamson5, Emmanouil Roditakis6,  
Anastasia Tsagkarakou6, and John Vontas7, 1Bayer CropScience, Monheim, Germany, 2Martin Luther Univ., Halle, Germany, 3Univ. of São Paulo, Piracicaba, Brazil, 4Univ. of Exeter, Penryn, United Kingdom, 5Rothamsted Research, Harpenden, United Kingdom, 6Hellenic Agricultural Organisation, Heraklion, Greece, 7Univ. of Crete, Heraklion, Greece

11:00 **1336** Mutations in chitin synthase-1 (CHS-1) confer resistance to a range of structurally diverse acaricides and insecticides. **Thomas Van Leeuwen** (thomas. vanleeuwen@ugent.be)1,2 and Richard Clark3, 1Ghent Univ., Ghent, Belgium, 2Univ. of Amsterdam, Amsterdam, Netherlands, 3Univ. of Utah, Salt Lake City, UT

11:15 **1337** Metabolic resistance to natural and  
synthetic xenobiotics in the aphid *M. persicae*.  
**Chris Bass** (c.bass@exeter.ac.uk)1, Christoph Zimmer1, Bartek Troczka2, Kumar Singh1, Leonela Carabajal Paladino3, Petr Nguyen4, Frantisek Marec3,  
Martin Williamson2, and Ralf Nauen5, 1Univ. of Exeter, Penryn, United Kingdom, 2Rothamsted Research, Harpenden, United Kingdom, 3Czech Academy of Sciences, České Budějovice, Czech Republic, 4Univ. of South Bohemia, České Budějovice, Czech Republic, 5Bayer CropScience, Monheim, Germany

11:30 **1338** Evaluation of candidate insecticide resistance- associated genes and mutations via ectopic expression and CRISPR/Cas9-mediated genome modification in *Drosophila*. **John Vontas** (vontas@imbb.forth.gr)1,2, Rafaela Panteleri3, Iason Christou4, Athanasia Zampouka4, Stella Kounadi4, Maria Riga4, Yiannis Livadaras5, Thomas Van Leeuwen6, Ralf Nauen7, and Douris Vasalis5, 1FORTH Institute of Molecular Biology and Biotechnology, Heraklio, Greece, 2Agricultural Univ. of Athens, Athens, Greece, 3Univ. of Crete, Heraklio, Greece, 4Univ. of

Crete, Crete, Greece, 5National Institute of Molecular Biology and Biotechnology, Heraklion, Greece, 6Ghent Univ., Ghent, Belgium, 7Bayer CropScience, Monheim, Germany

11:45 **1339** Dissecting the molecular mechanisms of insecticide resistance in the brown planthopper, *Nilaparvata lugens*. **Christoph Zimmer** (c.zimmer@ exeter.ac.uk)1, William Garrood2, Maxie Kohler3, Oliver Gutbrod3, Svend Matthiesen3, Emyr Davies2, Ralf Nauen3, and Chris Bass1, 1Univ. of Exeter, Penryn, United Kingdom, 2Rothamsted Research, Harpenden, United Kingdom, 3Bayer CropScience, Monheim am Rhein, Germany

12:00 **1340** Understanding molecular mechanisms of resistance to promote future resistance mangement strategies in the western corn rootworm, *Diabrotica virgifera virgifera*. **Blair Siegfried** (bsiegfried1@ufl. edu)1, Haichuan Wang2, Hong Chen3, and Brad Coates4, 1Univ. of Florida, Gainesville, FL, 2Univ. of Nebraska, Lincoln, NE, 3USDA - ARS, Lincoln, NE, 4USDA - ARS, Ames, IA

**Symposium: From Molecules to Management: New Tools for Understanding Locust Swarms across Species and Research Disciplines**

***Room W331 A (Convention Center)***

**Moderators and Organizers:** Arianne Cease and Stephen Rogers, Arizona State Univ., Tempe, AZ

9:15 **1341** Mechanisms of phase change in the Australian plague locust, *Chortoicetes terminifera*. **Stephen Rogers** (stvrgrs0@gmail.com)1, Stephen Simpson2, and Andrew B. Barron3, 1Arizona State Univ., Tempe, AZ, 2The Univ. of Sydney, Camperdown, Australia, 3Macquarie Univ., Sydney, Australia

9:30 **1342** Molecular mechanisms underlying olfactory plasticity during phase transition in the migratory locust, *Locusta migratoria*. **Xianhui Wang** (wangxh@ ioz.ac.cn), Zhifeng Wang, Wei Guo, Pengcheng Yang, and Le Kang, Chinese Academy of Sciences, Beijing, China

9:45 **1343** Locust migration in coupled natural human systems: Connecting soil nitrogen, outbreaks, livelihoods, and livestock markets. **Arianne Cease** (acease@asu. edu)1, James Elser1, Joleen Hadrich2, Brian Robinson3, Eli Fenichel4, and Jon Harrison1, 1Arizona State Univ., Tempe, AZ, 2Colorado State Univ., Fort Collins, CO, 3McGill Univ., Montréal, QC, Canada, 4Yale Univ.,

New Haven, CT

10:00 **1344** From individuals to mass migration in locust hopper bands. **Jerome Buhl** (jerome.buhl@adelaide. edu.au)1, Gregory Sword2, and Stephen Simpson3,  
1The Univ. of Adelaide, Adelaide, Australia, 2Texas A&M Univ., College Station, TX, 3The Univ. of Sydney, Camperdown, Australia

**10:15 BREAK**

10:30 **1345** Emission patterns reveal that aromatic compounds are key metabolites associated with the phase changes in *Locusta migratoria*. **Jianing Wei** (weijn@ioz.ac.cn), Wenbo Shao, Xianhui Wang, and Le Kang, Chinese Academy of Sciences, Beijing, China

10:45 **1346** Mixed or specialized livestock grazing strategies: Which provides the greatest opportunity to mitigate locust outbreaks? **Joleen Hadrich** (joleen. hadrich@colostate.edu) and Anne Byrne, Colorado State Univ., Fort Collins, CO

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**TUESDAY**

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11:00 **1347** Presentation withdrawn

11:15 **1348** Remote sensing in locust monitoring in Central Asia: Accomplishments and perspectives. **Alexandre Latchininsky** (latchini@uwyo.edu), Univ. of Wyoming, Laramie, WY

11:30 **1349** The locust liability: A case of stoichiometric externalities. **Kevin Berry** (kevin.berry@yale.edu)1, Arianne Cease2, Eli Fenichel1, and James Elser2, 1Yale Univ., New Haven, CT, 2Arizona State Univ., Tempe, AZ

11:45 **1350** Transgenerational inheritance of population crowding and the underlying epigenetic mechanisms in the migratory locust *Locusta migratoria*. **Bing Chen** (chenbing@ioz.ac.cn) and Le Kang, Chinese Academy of Sciences, Beijing, China

12:00 **1351** Grassland governance to mitigate locust outbreaks in China. **Brian Robinson** (brian.e.robinson@ mcgill.ca), McGill Univ., Montréal, QC, Canada

**Symposium: Advances in Hermetic Storage for Smallholder Farms**

***Room W224 A (Convention Center)***

**Moderators and Organizers:** Dieudonne Baributsa, Jacob Ricker-Gilbert, and Scott Williams, Purdue Univ., West Lafayette, IN

*This symposium is generously sponsored by the Purdue Improved Crop Storage (PICS3) Project, Purdue University.*

9:15 **1352** Hermetic storage for food and seed. **Dieudonne Baributsa** (dbaribut@purdue.edu)1 and Scott Williams2, 1Purdue Improved Crop Storage Lab, West Lafayette, IN, 2Purdue Univ., West Lafayette, IN

9:30 **1353** Farmers’ incentives to adopt hermetic storage. Jacob Ricker-Gilbert and **Stacy Prieto** (mccoy20@ purdue.edu), Purdue Univ., West Lafayette, IN

9:45 **1354** Hermetic storage: An important strategy for pest management in Portugal and Mozambique. Rafael Guenha1 and **Maria Carvalho** (motiliac@isa. ulisboa.pt)2, 1Eduardo Mondlane Univ., Maputo, Mozambique, 2Univ. of Lisbon, Lisbon, Portugal

10:00 **1355** Improving the availability of hermetic technologies among farmers: The experience of PICS bags. **Jean Njiru** (jeannjiru@gmail.com)1 and Dieudonne Baributsa2, 1Purdue Univeristy, Nairobi, Kenya, 2Purdue Univ.,

West Lafayette, IN

**10:15 BREAK**

10:30 **Panel Discussion: The future of hermetic storage**

* **SD1356**Comparative effects of hypoxia on four grain storage insect pest species. **Antoine Sanon** (sanonant@yahoo. fr)1, Scott Williams2, L. Dabire3, and Larry Murdock2, 1Univ. of Ouagadougou, Ouagadougou, Burkina Faso, 2Purdue Univ., West Lafayette, IN, 3INERA, Niger, Niger
* **SD1357**Promoting PICS technology to smallholder farmers in Burkina Faso, the experience of Catholic Relief Service. **Adama Sienou** (adama.sienou@crs.org)1, Amidou Traore1, and Louise Sperling2, 1Catholic Relief Service, Ouagadougou, Burkina Faso, 2Catholic Relief Service, Baltimore, MD

**SD1358** Hermetic storage for controlling postharvest losses and aflatoxin poisoning. James Ng’ang’a1, Christopher Mutungi2, Samuel Imathiu3, and **Hippolyte Affognon** (haffognon@icipe.org)1, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Egerton Univ., Egerton, Kenya, 3Jomo Kenyatta Univ. of Agriculture and Technology, Juja, Kenya

**SD1359** Seed viability and oxygen depletion rate of hermetically stored maize infested by *P. truncatus* (Horn) and *S. zeamais* (Mot). **Jacob Anankware** (anankware@yahoo. com)1, Martin Bornu-Ire2, and Daniel Obeng-Ofori2, 1Kwame Nkrumah Univ. of Science and Technology, Kumasi, Ghana, 2Univ. of Ghana, Accra, Ghana

**SD1360** Lessons mitigating post-harvest losses in Tanzania. **John Macharia** (jmacharia@agra.org) and Mellyne Ongango, Alliance for a Green Revolution in Africa, Nairobi, Kenya

**SD1361** Reproductive behavior and egg development of cowpea bruchids (*Callosobruchus maculatus*) under hypoxia. **Yan Yan** (yanyancau@hotmail.com)1, Scott Williams2, Dieudonne Baributsa3, and

Larry Murdock2, 1China Agricultural Univ., Beijing, China, 2Purdue Univ., West Lafayette, IN, 3Purdue Improved Crop Storage Lab, West Lafayette, IN

**SD1362** Presentation withdrawn

**SD1363** Bioacoustics of some post-harvest insect pests. **Anastasia Njoroge** (anjoroge@icipe.org)1, Hippolyte Affognon1, Christopher Mutungi2, Uwe Richter3,  
Oliver Hensel3, and Richard W. Mankin4, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Egerton Univ., Egerton, Kenya, 3Univ. of Kassel, Witzenhausen, Germany, 4USDA - ARS, Gainesville, FL

**SD1364** Implementing climate-smart dry chain technology  
for improving livelihoods of the maize farming community in Pakistan. **Irfan Afzal** (iafzal@uaf.edu. pk), Amir Bakhtavar, Muhammad Sagheer, and Ishfaq Muhammad, Univ. of Agriculture, Faisalabad, Pakistan

**SD1365** An improved hermetic storage bag for the control of boring insects that break the hermetic seal of current bags. Pierre Guillet1, **Hubert Coffi** (hubert@vectorhealth. com)2, and Johnson Odera2, 1AtoZ Textile Mills, Ltd., Arusha, Tanzania, 2Africa Technical Research Center, Arusha, Tanzania

**SD1366** Evaluation of maize quality and aflatoxin contamination in some markets of Benin and Niger. Ousmane Bakoye1, **Ibrahim Baoua** (baoua.ibrahim@gmail.com)2,  
H. H. Seyni3, Laouali Amadou1, Dieudonne Baributsa4, and Larry Murdock4, 1National Institute for Agricultural Research of Niger, Maradi, Niger, 2Univ. of Maradi, Maradi, Niger, 3Univ. Abdou Moumouni, Niamey, Niger, 4Purdue Univ., West Lafayette, IN

**SD1367** Triple bagging for safe storage of chickpea and pigeonpea seeds at the farmers’ level. **Hari Sudini** (h.sudini@cgiar.org), G. V. Rao, and C. H. Reddy,

International Crops Research Institute for the Semi-Arid Tropics, Patancheru, India

**SD1368** Assessment of hermetic storage of maize under different environmental conditions. **Brett Lane** (lane31@purdue.edu) and Charles Woloshuk, Purdue Univ., West Lafayette, IN

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**TUESDAY**

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* **SD1369**Evaluation of sealed storage for the control of stored-grain insect pests. **Sam Cook** (cooks@ksu.edu)1   
  and Dirk Maier2, 1Kansas State Univ., Manhattan, KS, 2Iowa State Univ., Ames, IA
* **SD1370**Controlling weevils in stored maize by means of physical disturbance. Carl Bern, **Denis Bbosa** (dbbosa@iastate.edu), Thomas Brumm,   
  Kurt Rosentrater, D. Raman, and Rashid Suleiman, Iowa State Univ., Ames, IA
* **SD1371**Hermetic control of *Sitophilus zeamaisin* in stored maize in Ghana: Evidence from Purdue Improved Crops Storage (PICS) bags. **Isaac Nunoo** (nunooisaac88@ gmail.com)1, Abigail Agyeiwaa Darkwa1, Anyebe Onu2, Abdoulaye Tahirou2, and Dieudonne Baributsa3, 1Rural Education and Agriculture Development International, Kumasi, Ghana, 2International Institute of Tropical Agriculture, Ibadan, Nigeria, 3Purdue Univ., West Lafayette, IN

11:15 **Poster Session: Efforts to mitigate postharvest losses in developing countries**

**Symposium: Stored Product Entomology: Challenges that Transcend Borders**

***Room W224 B (Convention Center)***

**Moderator and Organizer:** Brent Elliott, Canadian Grain Commission, Winnipeg, MB, Canada

9:15 **1372** Survey of pest management practices for rice mills in the U.S. **Tanja McKay** (tmckay@astate.edu)1, Luis Espino2, Frank Arthur3, James Campbell3,  
Lloyd T. Wilson4, Yubin Yang4, and Julien Beuzelin5, 1Arkansas State Univ., Jonesboro, AR, 2Univ. of California Cooperative Extension, Colusa, CA, 3USDA  
- ARS, Manhattan, KS, 4Texas A&M AgriLife Research, Beaumont, TX, 5Louisiana State Univ. AgCenter, Baton Rouge, LA

9:30 **1373** Control of *Plodia interpunctella* infesting a chocolate factory: Combining mating disruption and the parasitoid *Habrobracon hebetor*. **Pasquale Trematerra** (trema@unimol.it), Univ. of Molise, Campobasso, Italy

9:45 **1374** Post-harvest losses — challenges of scaling new technologies. **Georgina V. Bingham** (gvb@ vestergaard.com), Vestergaard Frandsen SA, Lausanne, Switzerland

10:00 **1375** Ecology of *Cryptolestes ferrugineus*: New findings using conventional and population genetic approaches into a pest of growing importance.  
**Greg Daglish** (greg.daglish@daf.qld.gov.au)1,  
Andrew Ridley2, Philip Burrill3, Gimme H. Walter4, Alicia Toon4, Joanne Holloway5, and Robert Emery6, 1Queensland Dept. of Agriculture and Fisheries, Brisbane, Australia, 2Dept. of Agriculture and Fisheries, Brisbane, Australia, 3Dept. of Agriculture and Fisheries, Warwick, Australia, 4Univ. of Queensland, Brisbane, Australia, 5New South Wales Dept. of Primary Industries, Wagga Wagga, Australia, 6Dept. of Agriculture and Food, South Perth, Australia

**10:15 BREAK**

10:30 **1376** Dust to weevils, weevils to dust: Diatomaceous earth, weevil water balance, and personality.  
**Raul Geddes** (guedes@ufv.br), Federal Univ. of Viçosa, Viçosa, Brazil

10:45 **1377** Susceptibility of various life stages of stored product insects to high concentration of ozone. **Rizana M. Mahroof** (rmahroof@scsu.edu), South Carolina State Univ., Orangeburg, SC

11:00 **1378** Efficacy of a high concentration of chlorine dioxide gas against laboratory and field strains of five stored product insect species. Xinyi E., Beibei Li, and **Bhadriraju Subramanyam** (sbhadrir@ksu.edu), Kansas State Univ., Manhattan, KS

11:15 **1379** The use of ozone to protect food and property. **Linda J. Mason** (lmason@purdue.edu), James Feston, Ameya D. Gondhalekar, and Mahsa Fardisi, Purdue Univ., West Lafayette, IN

11:30 **1380** Challenges facing fumigation of stored products and research for solutions. **Thomas Phillips** (twp1@ksu.edu), Kansas State Univ., Manhattan, KS

**Symposium: Advancements in Resistance and Aversion Management for Urban Pests**

***Room W224 C (Convention Center)***

**Moderators and Organizers:** Jason Meyers1 and Robert Hickman2, 1BASF, Kansas City, MO, 2BASF, Maitland, FL

9:15 **1381** Recent advances in German cockroach resistance management. **Ameya D. Gondhalekar** (ameyag@purdue. edu), Mahsa Fardisi, and Michael Scharf, Purdue Univ., West Lafayette, IN

9:30 **1382** Resistance issues affecting German cockroach bait performance. **Jules Silverman** (jules\_silverman@ ncsu.edu), Alexander Ko, Kim Jensen, Ayako Katsumata, and Coby Schal, North Carolina State Univ., Raleigh, NC

9:45 **1383** Resistance and aversion managment for urban mosquitoes. **Mark Paine** (mark.paine@lstmed.ac.uk), Liverpool School of Tropical Medicine, Liverpool, United Kingdom

10:00 **1384** Historical perspective: Aspects of resistance management in roaches and fleas. **William A. Donahue** (srl@clearwire.net), Sierra Research Laboratories, Modesto, CA

**10:15 BREAK**

10:30 **1385** Staying ahead of the curve: A manufacturer’s perspective on resistance management. **Kenneth S. Brown** (kenneth.s.brown@basf.com)1, Clark Klein2,  
Vincent Salgado1, and Barbara Wedel2, 1BASF, Research Triangle Park, NC, 2BASF, Durham, NC

10:45 **1386** A successful protocol: Controlling resistant German cockroaches, *Blattella germanica* (Linnaeus), while avoiding resistance development. **Thomas Jarzynka** (tjarzynka@masseyservices.com), Massey Services, Inc., Orlando, FL

11:00 **1387** Mechanisms of insecticide resistance in the bed bug: Implications for resistance management. **Kenneth F. Haynes** (khaynes@uky.edu), Univ. of Kentucky, Lexington, KY

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11:15 **1388** Understanding residual efficacy of insecticides on bed bugs: What does formulation and substrate have to do with it? **Alvaro Romero** (aromero2@nmsu. edu), New Mexico State Univ., Las Cruces, NM

**Undergraduate Student Oral Competition: Ecology and Population Dynamics**

***Room W231 C (Convention Center)***

**Moderators:** Palaniswami MariSivaswami1 and  
Heather J. McAuslane2, 1ENTOMON, India, 2Univ. of Florida, Gainesville, FL

**Graduate Student Oral Competition: Apidology, Sericulture, and Social Insects: Ants**

***Room W240 B (Convention Center)***

**Moderator:** Linda Hooper-Bui, Louisiana State Univ., Baton Rouge, LA



9:15 **1389** *Mesocyclops edax* as the potential first intermediate host for *Gnathostoma turgidum*.  
**José Zazueta-Moreno** (marcialzazueta\_moreno@ hotmail.com)1, Xochitl Galaviz-Rentería1, Edith Torres- Montoya1, HIpolito Castillo Ureta1, Lorenzo Osuna- Martínez1, Héctor López-Moreno1, Ignacio Osuna Ramírez1, Gabriela Silva-Hidalgo1, Sylvia Diaz-Camacho1, Yukifumi Nawa2, and José Rendon Maldonado1,

9:15

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**10:15**

10:30

10:45 11:00

11:15

11:30 11:45

**1397** Keeping stock: Support for leaf-piles as buffering mechanisms in *Atta* colonies. **Courtney Rockenbach** (c.rockenbach@rutgers.edu)1, Chris Reid2, William Wcislo3, Cameron Currie4, and Simon Garnier5, 1Rutgers, The State Univ. of New Jersey, Newark, NJ, 2The Univ. of Sydney, Sydney, Australia, 3Smithsonian Tropical Research Institute, Panama City, Panama, 4Univ. of Wisconsin, Madison, WI, 5New Jersey Institute of Technology, Newark, NJ

**1398** Relationship between surface object properties and sunlight exposure in nests of meat ants, *Iridomyrmex purpureus*. **Subash Ray** (rayk.subash@gmail.com)1, Chris Reid2, Tanya Latty2, Simon Garnier3, and

Michael Holmes2, 1Rutgers, The State Univ. of New Jersey, Newark, NJ, 2The Univ. of Sydney, Syndey, Australia, 3New Jersey Institute of Technology, Newark, NJ

**1399** How individuals play their part in collective choice in the seed harvester ant, *Pogonomyrmex californicus*. **Ioulia Bespalova** (ibespalo@asu.edu) and Jennifer H. Fewell, Arizona State Univ., Tempe, AZ

**1400** Thermoregulatory responses to thermal clines: Bivouac function across the wide elevational range of a Neotropical army ant (Formicidae: Dorylinae: *Eciton burchellii parvispinum*). **Kaitlin Baudier** (kmb478@ drexel.edu) and Sean O’Donnell, Drexel Univ., Philadelphia, PA

**BREAK**

**1401** Do *Temnothorax rugatulus* (Hymenoptera: Formicidae) recruiters inform nestmates about the quality of the target? **John Cho** (john.cho@asu.edu) and Stephen C. Pratt, Arizona State Univ., Tempe, AZ

**1402** Colony personality links to plant health in the *Azteca-Cecropia* mutualism. **Peter Marting** (pmarting@asu.edu), Arizona State Univ., Tempe, AZ

**1403** Connectivity and nest site availability influence arboreal ant communities. **Benjamin Adams** (benjamin. adams@louisville.edu) and Stephen Yanoviak, Univ. of Louisville, Louisville, KY

**1404** Examining the microbiomes of two sympatric ants, *Trachymyrmex septentrionalis* and *T. turrifex*. **Mattea Allert** (mallert@patriots.uttyler.edu), Katrin Kellner, Kate Hertweck, and Jon Seal, The Univ. of Texas, Tyler, TX

**1405** Oogenesis and embryogenesis in fungus- gardening ants. **Chi-Chun Fang** (ccfang@utexas.edu) and Ulrich G. Mueller, The Univ. of Texas, Austin, TX

**1406** Ant assemblages and co-occurrence patterns in the swamp. **Xuan Chen** (chenxuan1128@gmail.com), Benjamin Adams, Alexander Sabo, Theresa Crupi, and Linda Hooper-Bui, Louisiana State Univ., Baton Rouge, LA



1Autonomous Univ. of Sinaloa, Culiacán, Mexico, 2Khon Kaen Univ., Khon Kaen, Thailand

9:30 **1390** A novel trap for the continuous collection of carrion-feeding flies. **James Willett** (jrw023@shsu. edu), Sibyl Bucheli, Michelle L. Lewis, and Natalie K. Lindgren, Sam Houston State Univ., Huntsville, TX

9:45 **1391** Flies as bioindicators of grazing pressures in Mongolia. **Rebecca Clement** (rebeclem@gmail.com) and C. Riley Nelson, Brigham Young Univ., Provo, UT

10:00 **1392** Evidence for transstadial carriage of bacteria across house fly (*Musca domestica* L.) life history. **Klara Zurek** (kzurek@ksu.edu)1 and Dana Nayduch2, 1Kansas State Univ., Manhattan, KS, 2USDA - ARS, Manhattan, KS

**10:15 BREAK**

10:30 **1393** Dung beetles’ attendance based on the age differences of dung. **Etik Susanti** (etiksusanti53@ gmail.com), Ardita Tri Anugrah Budaya, Dian Sartika, and R. C. Hidayat Soesilohadi, Gadjah Mada Univ., Yogyakarta, Indonesia

10:45 **1394** Identifying cocirculating hemoparasites in the West Nile Virus system. **Dayvion Adams** (ajadams968@ tamu.edu), Matthew Medeiros, Andrew Golnar, and Gabriel Hamer, Texas A&M Univ., College Station, TX

11:00 **1395** Interspecific competition behavior and circadian rhythm of ground ants in the subtropical forest (Hymenoptera: Formicidae). **Chunhan Shih** (harry820902@gmail.com) and Chung-Chi Lin, National Changhua Univ. of Education, Changhua, Taiwan

11:15 **1396** When host color matters for egg parasitoids. **Mathilde Gaudreau** (mathilde.gaudreau@umontreal. ca), Paul Abram, and Jacques Brodeur, Univ. of Montréal, Montréal, QC, Canada

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**TUESDAY**

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**Graduate Student Oral Competition: Apidology, Sericulture, and Social Insects: Honey Bees II**

***Room W240 A (Convention Center)***

**Moderator:** Elizabeth Grafton-Cardwell, Univ. of California, Exeter, CA

9:15 **1407** Honey bee viruses in unexpected places. **Megan Colwell** (colwellm@myumanitoba.ca)1,  
Rob Currie1, and Stephen Pernal2, 1Univ. of Manitoba, Winnipeg, MB, Canada, 2Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada

9:30 **1408** Plant assisted self-medication: Virus- challenged bees improve survival with caffeine nectar consumption. **Saundra A. Wheeler** (saundra\_wheeler22@ yahoo.com)1, Diana Cox-Foster2, and Edwin Rajotte1, 1Pennsylvania State Univ., University Park, PA, 2USDA - ARS, Logan, UT

9:45 **1409** Host-pathogen interactions in the hive: A study of honey bee behavior during IAPV-infection. **Amy Geffre** (acgeffre@iastate.edu), Adam Dolezal, Bryony Bonning, and Amy L. Toth, Iowa State Univ., Ames, IA

10:00 **1410** Understanding pathogen dynamics in bee communities. **Briana Ezray** (bde125@psu.edu) and Heather M. Hines, Pennsylvania State Univ, University Park, PA

**10:15 BREAK**

10:30 **1411** Pathogen transmission in plant-pollinator networks. **Laura Figueroa** (llf44@cornell.edu)1,  
Peter Graystock2, Heather Connelly1, Quinn McFrederick2, and Scott McArt1, 1Cornell Univ., Ithaca, NY, 2Univ. of California, Riverside, CA

10:45 **1412** Development of *Varroa destructor in vitro* rearing methods. **Cameron Jack** (cjack@ufl.edu) and James D. Ellis, Univ. of Florida, Gainesville, FL

11:00 **1413** An improved assay for determining deformed wing virus titres in the European honeybee (*Apis mellifera*) and *Varroa destructor*. **Emma Bradford** (r01elb14@abdn.ac.uk), Ewan Campbell, and

Alan Bowman, Univ. of Aberdeen, Aberdeen, United Kingdom

11:15 **1414** Cues that contribute to triggering *Varroa*- sensitive hygiene behaviour in *Apis mellifera* colonies. **Seo Hyun Kim** (kimseohyun01@gmail.com)1,  
Fanny Mondet2, and Alison Mercer1, 1Univ. of Otago, Dunedin, New Zealand, 2INRA, Avignon, France

11:30 **1415** Interaction of the insecticide clothianidin and the parasitic mite *Varroa destructor* on honey bee (*Apis mellifera*) health. **Nuria Morfin-Ramirez** (nmorfinr@uoguelph.ca), Ernesto Guzman, and

Paul H. Goodwin, Univ. of Guelph, Guelph, ON, Canada

**Graduate Student Oral Competition: Ecology of Pesticides, Resistance, Toxicology, and Genetically Modified Crops: Bt Toxins**

***Room W240 D (Convention Center)***

**Moderator:** Amanda Jacobson, Dow AgroSciences, Greenville, MS

9:15 **1416** Effects of transgenic corn hybrids expressing Bt toxins on the development and fecundity of *Helicoverpa zea*. **Thomas Bilbo** (bilbothomas@gmail. com)1, Francis Reay-Jones2, Jeremy Greene3,

Dominic Reisig4, and Fred Musser5, 1Clemson Univ., Clemson, SC, 2Clemson Univ., Florence, SC, 3Clemson Univ., Blackville, SC, 4North Carolina State Univ., Plymouth, NC, 5Mississippi State Univ., Mississippi State, MS

9:30 **1417** Bt susceptibility and oviposition preferences of fall armyworm (Lepidoptera: Noctuidae) host strains. **David Ingber** (ingber@udel.edu) and Charles Mason, Univ. of Delaware, Newark, DE

9:45 **1418** Susceptibility of the fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae), to  
Bt toxins and conventional pesticides among different populations in the US and Mexico. **Rebeca Gutierrez** (gutie131@msu.edu)1, David Mota-Sanchez1,  
Carlos A. Blanco2, and Mark E. Whalon1, 1Michigan State Univ., East Lansing, MI, 2USDA - APHIS, Riverdale, MD

10:00 **1419** Type of fitness cost influences the rate of evolution of resistance to transgenic Bt crops. **Sean Hackett** (sean.hackett@zoo.ox.ac.uk) and Michael Bonsall, Univ. of Oxford, Oxford, United Kingdom

**10:15 BREAK**

10:30 **1420** Presentation withdrawn

10:45 **1421** Risk assessment for the non-target species *Drosophila melanogaster* — establishment of a test system and evaluation of the impacts of Bt toxins and GE plant material. **Simone Haller** (simone.haller@ agroscope.admin.ch), Michael Meissle, and

Jörg Romeis, Agroscope, Zürich, Switzerland

11:00 **1422** Abundance of western corn rootworm, injury to corn, and Bt resistance in local landscapes.  
**Coy St. Clair** (cstclair@iastate.edu)1, Graham P. Head2, and Aaron J. Gassmann1, 1Iowa State Univ., Ames, IA, 2Monsanto Company, St. Louis, MO

11:15 **1423** Spatial variation in western corn rootworm susceptibility to Bt corn events in Nebraska.  
**Jordan Reinders** (jordan.reinders3@gmail.com) and Lance Meinke, Univ. of Nebraska, Lincoln, NE

11:30 **1424** Does Cry3Bb1 resistance persist following removal from selection? **Dalton Ludwick** (dclmrd@ mail.missouri.edu)1, Sarah Zukoff2, Lisa Meihls3, Man Huynh1, Ken Ostlie4, and Bruce Hibbard3,

1Univ. of Missouri, Columbia, MO, 2Kansas State Univ., Manhattan, KS, 3USDA - ARS, Columbia, MO, 4Univ. of Minnesota, St. Paul, MN

11:45 **1425** Testing western corn rootworm (Coleoptera: Chrysomelidae) for cross-resistance between Cry toxins and soil insecticides. **Kenneth E. Masloski** (masloski@iastate.edu), Joel R. Coats, and

Aaron J. Gassmann, Iowa State Univ., Ames, IA

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**TUESDAY**

**Tuesday, September 27 • MORNING •**

12:00 **1426** Effect of transgenic corn hybrids and a soil insecticide on corn rootworm (Coleoptera: Chrysomelidae) beetle emergence in North Dakota. **Veronica Calles Torrez** (veronica.callestorre@ndsu.edu)1, Janet Knodel1, Mark A. Boetel1, Bryan French2,

Billy Fuller3, and Joel Ransom1, 1North Dakota State Univ., Fargo, ND, 2USDA - ARS, Brookings, SD, 3South Dakota State Univ., Brookings, SD

**Graduate Student Oral Competition: Genetics and Evolutionary Entomology: Behavior**

***Room W240 C (Convention Center)***

**Moderator:** Jerome A. Hogsette, USDA - ARS, Gainesville, FL

9:15 **1427** Discovery of *Anopheles daciae* in the Moscow region of Russia*.* **Anastasia N. Naumenko** (naumenko@ vt.edu)1, Mikhail Gordeev2, Igor Sharakhov1,3, and Maria Sharakhova1,3, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Moscow Regional State Univ., Moscow, Russia, 3Tomsk State Univ., Tomsk, Russia

9:30 **1428** *In vivo* functional genetic analysis of insecticide resistance in the malaria mosquito *Anopheles gambiae*. **Adriana Adolfi** (adriana.adolfi@lstmed.ac.uk),  
Amy Lynd, Hilary Ranson, and Gareth Lycett, Liverpool School of Tropical Medicine, Liverpool, United Kingdom

9:45 **1429** Teasing apart the ovipositional responses  
of *Culex tarsalis* to semiochemicals associated with fish for use in vector control. **Adena Why** (awhy001@ ucr.edu) and William E. Walton, Univ. of California, Riverside, CA

10:00 **1430** Mutual intra- and interspecific social parasitism between parapatric sister species of eusocial wasps and the process of its evolution. **Tatsuya Saga** (tatsuya. saga@gmail.com)1,2, Minoru Kanai3, Yasukazu Okada1, and Masakazu Shimada1, 1The Univ. of Tokyo, Tokyo, Japan, 2Gifu Prefectural Ogaki Sakura Senior High School, Ogaki, Japan, 3Fujimi-Cho, Suwa-Gun, Japan

**10:15 BREAK**

10:30 **1431** The population genomics of primitively social paper wasps (*Polistes dominula*). **Kathleen Dogantzis** (kdogantzis@gmail.com)1, Amy Toth2, and  
Amro Zayed1, 1York Univ., Toronto, ON, Canada, 2Iowa State Univ., Ames, IA

10:45 **1432** Asymmetric hybrid dysgenesis in crosses of different host-food plant complex sources of the parasitic wasp, *Cotesia congregata*. **Justin Bredlau** (bredlauj@vcu.edu) and Karen Kester, Virginia Commonwealth Univ., Richmond, VA

11:00 **1433** From population to speciation: Evolution of  
the *Peristenus pallipes* (Hymenoptera: Braconidae) complex. **Miles Zhang** (yuanmeng.zhang@gmail.com)1, Diana Fernández2, and Barbara Sharanowski1, 1Univ.

of Central Florida, Orlando, FL, 2Univ. of Lethbridge, Lethbridge, AB, Canada

11:15 **1434** Diversification of plant-feeding insects is positively correlated with natural enemy pressure. **Mayrolin García Morales** (mzg0043@auburn.edu) and Nate Hardy, Auburn Univ., Auburn, AL

11:30 **1435** Understanding variation in molting hormone synthesis pathways through comparative genome analysis. **Caitlyn Perry** (c.perry2@student.unimelb. edu.au) and Charles Robin, The Univ. of Melbourne, Melbourne, Australia

11:45 **1436** Presentation withdrawn

12:00 **1437** Sugar feeding behaviour of male mosquitoes from sympatric, sibling species *Culex pipiens* and *Culex torrentium.* **Richard Halfpenny** (richard.halfpenny@ research.staffs.ac.uk), Angela Priestman, John Dover, and Kevin Reiling, Staffordshire Univ., Stoke-on-Trent, United Kingdom

12:15 **1438** Delineation of the population genetic structure of *Culicoides imicola* in east and south Africa.  
**Maria Onyango** (gorreti.m@gmail.com)1,  
George Ngondi2, Moses Ogugo2, Gert Venter3,

Miguel Miranda4, Nohal Elissa5, Appolinaire Djikeng2, Stephen Kemp2, Peter Walker1, and Jean-Bernard Duchemin1, 1CSIRO, Geelong, Australia, 2International Livestock Research Institute, Nairobi, Kenya, 3Agricultural Research Council, Onderstepoort, South Africa, 4Univ. of the Balearic Islands, Palma, Spain, 5Pasteur Institute, Ambatofotsikely, Madagascar

**Graduate Student Oral Competition: Medical and Veterinary Entomology: Livestock Pests and Decomposers**

Room W232 A (Convention Center)  
**Moderator:** Nancy Hinkle, Univ. of Georgia, Athens, GA

9:15 **1439** What way did they go!? Examining the directional movement of house flies (*Musca domestica* L.) **Levi Zahn** (levi.zahn@ucr.edu) and Alec Gerry, Univ. of California, Riverside, CA

9:30 **1440** *Musca domestica* larvae used in poultry waste bioprocessing: Fate of *Escherichia coli* and *Salmonella* spp*.* **Nichelle Lomas** (nlomas@uoguelph.ca),  
Stephen A. Marshall, Marc Habash, and Youbin Zheng, Univ. of Guelph, Guelph, ON, Canada

9:45 **1441** Contact and fumigant toxicities of aliphatic methyl ketones to filth flies. **Jean Marcel Deguenon** (jdeguen@ncsu.edu), Jiwei Zhu, Anirudh Dhammi, Steven Denning, Michael Reiskind, Wes Watson, and R. Michael Roe, North Carolina State Univ., Raleigh, NC

10:00 **1442** Oviposition behavior of *Phormia regina* (Diptera: Calliphoridae) is mediated by temperature and the presence of other species. **Krystal R. Hans** (hansk@ uwindsor.ca) and Sherah L. VanLaerhoven, Univ. of Windsor, Windsor, ON, Canada

**10:15 BREAK**

10:30 **1443** Seasonal effects on insect succession in carrion in northern California. **Alex Dedmon** (acdedmon@ ucdavis.edu), Univ. of California, Davis, CA

10:45 **1444** Chemical, mechanical, and biological control of the lesser mealworm, *Alphitobius diaperinus* (Panzer) (Coleoptera: Tenebrionidae), in broiler houses.  
**Brent Phelan** (bphelan@uga.edu), Brian D. Fairchild, and Nancy Hinkle, Univ. of Georgia, Athens, GA

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11:00 **1445** Presentation withdrawn

11:15 **1446** The role of the emerging entotechnology sector to treat urban and rural organic wastes in attaining the 2022 landfilling ban policy of Québec, Canada. **Louise Hénault-Ethier** (louisehenaultethier@hotmail. com)1, Paula Cabrera1, Béatrice Lefebvre1,  
Sophie Taillefer2, Marie-Hélène Deschamps3, and Grant Vandenberg3, 1Univ. of Québec, Montréal, QC, Canada, 2Recyc-Québec, Montréal, QC, Canada,  
3Univ. Laval, Québec City, QC, Canada

**Graduate Student Oral Competition: Physiology and Biochemistry: Physiology**

***Room W232 B (Convention Center)***

**Moderators:** Dov Borovsky1 and Sherah VanLaerhoven2, 1USDA - ARS, Fort Pierce, FL, 2Univ. of Windsor, Windsor, ON, Canada

9:15 **1447** Silkworm ortholog of the *Drosophila* eye color gene, *brown*, controls riboflavin transport in Malpighian tubules. **Haokun Zhang** (zhanghaokun@ss.ab.a.u-tokyo. ac.jp), The Univ. of Tokyo, Tokyo, Japan

9:30 **1448** Functional study of two adenosine metabolic genes, *adgf-d* and *ada*, in *Drosophila melanogaster.* **Yu-Hsien Lin** (r99632012@gmail.com)1,2, Tomas Filip1,2, and Michal Zurovec1,2, 1Univ. of South Bohemia,

České Budějovice, Czech Republic, 2Czech Academy of Sciences, České Budějovice, Czech Republic

9:45 **1449** Evolution, prey-specificity, and venom in assassin flies. **Charlotte Herbert** (ceherb11@gmail. com)1 and Karl McKnight2, 1Univ. of California, Davis, CA, 2St. Lawrence Univ., Canton, NY

10:00 **1450** The molecular expression of aquaporins in the northern house mosquito, *Culex pipiens*. **Liu Yang** (yang.554@osu.edu) and Peter Piermarini, The Ohio State Univ., Wooster, OH

**10:15 BREAK**

10:30 **1451** Roles of secreted salivary gland proteins of Hessian fly larvae *Mayetiola destructor* (Say) in insect physiology and plant interactions. **Zainab A. A. Al-jbory** (aliz@ksu.edu)1, Mustapha El-Bouhssini2, R. Jeff Whitworth1, and Ming-Shun Chen1,3, 1Kansas State Univ., Manhattan, KS, 2INRA, Rabat, Morocco, 3USDA - ARS, Manhattan, KS

10:45 **1452** Endocrine basis for divergent life history timing between two host races of the apple maggot fly *Rhagoletis pomonella*. **Qinwen Xia** (qxia1989@ufl. edu)1, Thomas Powell1, Hans Alborn2, Jeffrey Feder3, Gregory Ragland4, and Daniel Hahn1, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Gainesville, FL, 3Univ.

of Notre Dame, South Bend, IN, 4Kansas State Univ., Manhattan, KS

11:00 **1453** Gap junctions and the mosquito blood meal. **Travis Calkins** (calkins.21@osu.edu) and Peter Piermarini, The Ohio State Univ., Wooster, OH

11:15 **1454** Anarchy in the honey bee colony: The genetic basis of worker sterility. **Isobel Ronai** (isobel.ronai@ sydney.edu.au), Benjamin Oldroyd, Deborah Barton, and Vanina Vergoz, The Univ. of Sydney, Sydney, Australia

11:30 **1455** A pinch of salt for honey bees (*Apis mellifera*)? **Raquel Teixeira-Sousa** (r.teixeira-de-sousa@newcastle. ac.uk)1,2 and Geraldine A. Wright1, 1Newcastle Univ., Newcastle upon Tyne, United Kingdom, 2Univ. of Porto, Porto, Portugal

11:45 **1456** Identifying genes involved in pheromone biosynthesis in *Neoclytus m. mucronatus* (Coleoptera: Cerambycidae) using a differential gene expression approach. **Gabriel Hughes** (ghughes@purdue.edu) and Matthew Ginzel, Purdue Univ., West Lafayette, IN

12:00 **1457** Comprehensive analysis of the venom gland transcriptome of the ectoparasitoid *Bracon hebetor*. **Atif Manzoor** (atif1903@yahoo.com)1, Bruce Webb2, Zain Ul Abdin1, and Hoor Shaina1, 1Univ. of Agriculture, Faisalabad, Pakistan, 2Univ. of Kentucky, Lexington, KY

12:15 **1458** Gene identification and physiological regulation of the *B*-oxidation pathway in *Rhodnius prolixus*.  
**Iron De Paula** (iron@bioqmed.ufrj.br), Daniela Arêdes, David Majerowicz, and Katia Gondim, Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

**Graduate Student Oral Competition: RNAi and Gene Expression Control in Insects**

***Room W232 C (Convention Center)***

**Moderator:** Lia Marchwerle, Univ. of Nebraska, Lincoln, NE

9:15 **1459** Elucidating the molecular modes of action of juvenile hormone. **Joliene Lindholm** (lindholm.jr1@ gmail.com)1, Jun Wang1, Anthony Orth2, D. Willis1, and Walter Goodman1, 1Univ. of Wisconsin, Madison, WI, 2Genomics Institute of the Novartis Research Foundation, San Diego, CA

9:30 **1460** An expedition in search of effective RNAi targets in aphids via comparative transcriptomics. **Amol Ghodke** (aghodke@student.unimelb.edu.au)1, Robert Good1, John Golz1, Derek Russell1,

Owain R. Edwards2, Bernard Carroll3, and  
Charles Robin1, 1The Univ. of Melbourne, Melbourne, Australia, 2CSIRO, Wembley, Australia, 3Univ. of Queensland, Brisbane, Australia

9:45 **1461** The sphingolipids pathway regulates the reproduction of the brown planthopper, *Nilaparvata lugens* (Stål), the most important insect pest of rice in Asia. **Xiaoxiao Shi** (shixiao6656@163.com) and Zeng-Rong Zhu, Zhejiang Univ., Hangzhou, China

10:00 **1462** An *in vivo* experimental analysis on the putative magnetic receptor Cry/MagR of the brown planthopper, *Nilaparvata lugens*. **Jingjing Xu** (xujingjing@mail.iee.ac.cn), Chinese Academy of Sciences, Beijing, China

**10:15 BREAK**

10:30 **1463** Identification of potential target genes for RNAi-mediated control of the small hive beetle. **Steven Reyna** (smreyna@ncsu.edu) and Marcé Lorenzen, North Carolina State Univ., Raleigh, NC

10:45 **1464** The extent of RNAi in the arbovirus vector, *Culicoides sonorensis*. **Mary Mills** (mm02463@ksu.edu)1, Kristin Michel1, and Dana Nayduch2, 1Kansas State Univ., Manhattan, KS, 2USDA - ARS, Manhattan, KS

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11:00 **1465** Enhancement of dengue virus replication in transgenic mosquitoes *Aedes aegypti* expressing anti-thioester containing protein 1 (TEP1) microRNA. **Chi-Chuan Li** (ligigi1026@gmail.com)1,2, 1National Health Research Institutes, Miaoli, Taiwan, 2National Tsing Hua Univ., Hsinchu, Taiwan

11:15 **1466** Challenges in developing RNAi as a method of mosquito control. **Paul Airs** (airs@wisc.edu) and Lyric Bartholomay, Univ. of Wisconsin, Madison, WI

11:30 **1467** Expression analysis and RNAi depletion of genes encoding *Amblyomma americanum* tick cement proteins. **Taylor Hollmann** (thollmann@cvm.tamu.edu), Zeljko Radulovic, Tae Kim, and Albert Mulenga, Texas A&M Univ., College Station, TX

11:45 **1468** Gene knockdown by RNA interference in the cat flea (*Ctenocephalides felis)*: Utilising *de novo* transcriptome data for developing drug target identification strategies. **Catriona McIntosh** (r01chm14@abdn.ac.uk)1, Sophie Shaw1, Debra Woods2, Erich Zinser2, John Baird1, Ewan Campbell1, and

Alan Bowman1, 1Univ. of Aberdeen, Aberdeen, United Kingdom, 2Zoetis, Kalamazoo, MI

12:00 **1469** Environmental fate of dsRNA in an aqueous system. **Colin Wong** (cwong1@iastate.edu),  
Vurtice Albright, and Joel R. Coats, Iowa State Univ., Ames, IA

**Contributed Papers: Apidology, Sericulture, and Social Insects: Physiology, Genetics, and Genomics**

***Room W314 A (Convention Center)***

**Moderators:** Madeleine Beekman and Benjamin Oldroyd, The Univ. of Sydney, Sydney, Australia

9:15 **1470** Characterization of major royal jelly protein 1 and 2 of the western honey bee, *Apis mellifera*.  
**Anja Buttstedt** (anja.buttstedt@zoologie.uni-halle.de)1, and Carmen Muresan1,2, 1Martin Luther Univ.,

Halle, Germany, 2Univ. of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania

9:30 **1471** Presentation withdrawn

9:45 **1472** Nitrogen metabolism in an ancient nutritional symbiosis between *Cephalotes* ants and core gut bacteria. **Yi Hu** (yh332@drexel.edu)1, Jon G. Sanders2, Piotr Lukasik1, Corrie Moreau3, and Jacob Russell1, 1Drexel Univ., Philadelphia, PA, 2Harvard Univ., Cambridge, MA, 3The Field Museum of Natural History, Chicago, IL

10:00 **1473** Comparative genomic within the *Apis* genomes. **Olav Rueppell** (olav\_rueppell@uncg.edu) and  
Bertrand Fouks, Univ. of North Carolina, Greensboro, NC

**10:15 BREAK**

10:30 **1474** Comparing brain development and neurochemistry in social and solitary individuals of the sweat bee *Megalopta genalis*. **Adam Smith** (adam\_smith@gwu.edu), The George Washington Univ., Washington, DC

10:45 **1475** *Varroa*, deformed wing virus, and virulence – using a naïve host to study the evolution of virulence of RNA viruses. Emily Remnant, Thomas Gillard, and **Madeleine Beekman** (madeleine.beekman@sydney. edu.au), The Univ. of Sydney, Sydney, Australia

11:00 **1476** Genetic architecture of the thelytokous phenotype in *Apis mellifera capensis*.

**Benjamin Oldroyd** (benjamin.oldroyd@sydney.edu.au)1, Nadine Chapman1, Mike Allsopp2, and Madeleine Beekman1, 1The Univ. of Sydney, Sydney, Australia, 2Agricultural Research Council, Stellenbosch, South Africa

11:15 **1477** Evolution and caste plasticity of brain architecture in Neotropical Army Ants (Formicidae: Ecitoninae). **Sean O’Donnell** (so356@drexel.edu), Susan Bulova, Elisabeth Sulger, and Vishakha Hariawala, Drexel Univ., Philadelphia, PA

11:30 **1478** The population genetics of acaricide resistance in *Varroa destructor*. **Robin Moritz** (r.moritz@zoologie. uni-halle.de)1, Alexis Beaurepaire1, and Klemens Krieger2, 1Martin Luther Univ., Halle, Germany, 2Bayer CropScience, Leverkusen, Germany

11:45 **1479** Effects of early developmental exposure  
on *Apis mellifera*. **Carlos Vega Meléndez** (cjvegame@ uncg.edu), Univ. of North Carolina, Greensboro, NC

12:00 **1480** Insights from methylomic and transcriptomic analyses of lethal IAPV infection in honeybee pupae. **Hongmei Li-Byarlay** (hlibyar@ncsu.edu), North Carolina State Univ., Raleigh, NC

12:15 **1481** Honey bee RNA-mediated antiviral responses. Laura Brutscher, Katie Daughenbaugh, and  
**Michelle Flenniken** (michelleflenniken@gmail.com), Montana State Univ., Bozeman, MT

**Contributed Papers: Bioinformatics and Comparative Genomics of Arthropods: Genomes and Databases**

***Room W225 A (Convention Center)***

**Moderators:** Nicholas M. Teets1 and Alexie Papanicolaou2, 1Univ. of Kentucky, Lexington, KY, 2Hawkesbury Institute for the Environment, Richmond, Australia

9:15 **1482** The genome of whitefly, *Bemisia tabaci*, an important plant pest and virus vector. **Zhangjun Fei** (zf25@cornell.edu), Cornell Univ., Ithaca, NY

9:30 **1483** Genome assembly and annotation of the io moth, *Automeris io* (Lepidoptera: Saturniidae). **Deborah Triant** (dtriant@flmnh.ufl.edu), Vincent Ficarrotta,  
Jesse Breinholt, Lei Xiao, Marianne Espeland,

Andrei Sourakov, and Akito Kawahara, Univ. of Florida, Gainesville, FL

9:45 **1484** Making a genome work for you and the community. Hui-Jie Zhang1 and **Alexie Papanicolaou** (a.papanicolaou@westernsydney.edu.au)2, 1CSIRO, Black Mountain, Australia, 2Hawkesbury Institute for the Environment, Richmond, Australia

10:00 **1485** Mitochondrial genomes in *Liposcelis*: Fragmentation with great gene rearrangement.  
**Dan Dan Wei** (weidandande@163.com), Jin-Jun Wang, and Wei Dou, Southwest Univ., Chongqing, China

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**10:15 BREAK**

10:30 **1486** Genome assembly of the soybean aphid (*Aphis glycines*) via hybrid approach. **Jacob Wenger** (jawenger@csufresno.edu)1, Andrew Michel2,  
Fabrice Legeai3, Raman Bansal2, J. Spencer Johnston4, Vitor Pavinato2, Ashley Yates2, and Brian Cassone5, 1California State Univ., Fresno, CA, 2The Ohio State Univ., Wooster, OH, 3INRA, Le Rheu, France, 4Texas A&M Univ., College Station, TX, 5Brandon Univ., Brandon, MB, Canada

10:45 **1487** InsectBase: A resource for insect genomes and transcriptomes. **Fei Li** (lifei18@zju.edu.cn), Zhejiang Univ., Hangzhou, China

11:00 **1488** Linking metagenomics and phylogenetics  
for the study of insect biodiversity. **Alfried Vogler** (a.vogler@imperial.ac.uk)1,2, 1Imperial College London, London, United Kingdom, 2The Natural History Museum, London, United Kingdom

11:15 **1489** Regulation of honey bee queen (*Apis mellifera*) reproductive changes. **Elina Nino** (elnino@ucdavis. edu), Univ. of California, Davis, CA

11:30 **1490** The impacts of feeding in a resistant tree on the Asian longhorned beetle (*Anoplophora glabripennis*) and its gut microbiota. **Erin Scully** (erin.scully@ars. usda.gov)1, Scott Geib2, and Kelli Hoover3, 1USDA - ARS, Manhattan, KS, 2USDA - ARS, Hilo, HI, 3Pennsylvania State Univ., University Park, PA

11:45 **1491** HymenopteraMine: A data mining warehouse for genomes of ants, bees, and wasps. **Christine Elsik** (elsikc@missouri.edu), Aditi Tayal, Deepak Unni, Colin Diesh, Darren Hagen, Hung Nguyen, and Marianne Emery, Univ. of Missouri, Columbia, MO

**Contributed Papers: Ecology and Population Dynamics: Power of Prediction**

***Room W314 B (Convention Center)***

**Moderators:** Shelby J. Fleischer1 and Andrew Kalyebi2, 1Pennsylvania State Univ., University Park, PA, 2NaCRRI, Kampala, Uganda

9:15 **1492** Plant trait variability and the performance of phytophagous insects: A meta-analysis. **William Wetzel** (wcwetzel@cornell.edu)1, Heather Kharouba2,  
Moria Robinson3, Marcel Holyoak3, and Richard Karban3, 1Cornell Univ., Ithaca, NY, 2Univ. of Washington, Seattle, WA, 3Univ. of California, Davis, CA

9:30 **1493** Phenology and dynamics of the invasive brown marmorated stink bug, *Halyomorpha halys*, as revealed in an agent-based model. **Shelby J. Fleischer** (sjf4@ psu.edu)1, Anne Nielsen2, and Shi Chen3, 1Pennsylvania State Univ., University Park, PA, 2Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, 3North Carolina State Univ., Raleigh, NC

9:45 **1494** Modeling temperature-dependent development of pistachio psyllid, *Agonoscena pistaciae* (Hemiptera: Psyllidae). **Mohammad Reza Hassani** (mhassanim@ gmail.com)1 and Abbas Arbab2, 1Islamic Azad Univ., Rafsanjan, Iran, 2Islamic Azad Univ., Takestan, Iran

10:00 **1495** Slow down tiger! Rapid temporal genetic change of the Asian tiger mosquito in the Torres Strait Islands. **Andrew Maynard** (andrew.maynard@uqconnect. edu.au)1, Luke Ambrose1, Robert Cooper2, Joseph Davis3, Odwell Muzari3, George Hapgood3, Andrew van den Hurk4, Sonja Hall-Mendelin4, Jeomhee Hasty5, Tom Burkot6, Scott Ritchie7, Michael J. Bangs8, Lisa Reimer9,

Charles Butafa10, Neil Lobo11, Din Syafruddin12, and  
Nigel Beebe1, 1Univ. of Queensland, Brisbane, Australia, 2Australian Army Malaria Institute, Brisbane, Australia, 3Cairns and Hinterland Hospital and Health Service, Cairns, Australia, 4Queensland Health Forensic and Scientific Services, Brisbane, Australia, 5Hawai’i Dept. of Health, Honolulu, HI, 6Centers for Disease Control and Prevention, Atlanta, GA, 7James Cook Univ., Cairns, Australia, 8Public Health & Malaria Control Freeport McMoRan Copper and Gold, Papua, Indonesia, 9Liverpool School of Tropical Medicine, Liverpool, United Kingdom, 10Ministry of Health, Honiara, Solomon Islands, 11Univ. of Notre Dame, Notre Dame, IN, 12Eijkman Institute for Molecular Biology, Jakarta, Indonesia

**10:15 BREAK**

10:30 **1496** Evidence for an epigenetic effect of kinship on fertility of flies (*Drosophila melanogaster)* induced by folic acid with reference to a possible similar mechanism in *Homo sapiens* at clinical dose levels. **Marshall Herbert** (mlherbert@aol.com), Pinellas Country Public Health Dept., Largo, FL

10:45 **1497** Remarkable generation separation appears  
in extra-ordinary long-term surveillance records of  
a moth pest all across Japan. **Takehiko Yamanaka** (apple@affrc.go.jp)1, Yasushi Sato2, Ottar Bjornstad3, William Nelson4, and Jun Tabata1, 1National Institute for Agro-Environmental Sciences, Tsukuba, Japan, 2National Institute of Vegetable and Tea Science, Shimada, Japan, 3Pennsylvania State Univ., University Park, PA, 4Queen’s Univ., Kingston, ON, Canada

11:00 **1498** TAPPAS: Modelling long-distance wind dispersal made easy. Rieks Van Klinken1, Peter Durr2, Kerryne Graham2, Duan Beckett3, Justin Freeman3, and **Dean Paini** (dean.paini@csiro.au)4, 1CSIRO, Brisbane, Australia, 2CSIRO, Geelong, Australia, 3Australian Bureau of Meteorology, Melbourne, Australia, 4CSIRO, Canberra, Australia

11:15 **1499** Impact of cassava genotypes on colonization of cassava by the whitefly, *Bemisia tabaci* (Hemiptera: Aleyrodidae). **Andrew Kalyebi** (akalyebi@yahoo. com)1, Sarina Macfadyen2, Cate Paull3, Paul de Barro3, and John Colvin4, 1NaCRRI, Kampala, Uganda, 2CSIRO, Canberra, Australia, 3CSIRO, Brisbane, Australia, 4Univ. of Greenwich, Chatham, United Kingdom

11:30 **1500** Detection of gene flow between Korean and Chinese population in *Laodelphax striatellus*.  
**Deok Ho Kwon** (jota486@snu.ac.kr)1, In-Hong Jeong2,3, Si-Woo Lee4, and Si Hyeock Lee1, 1Seoul National Univ., Seoul, South Korea, 2National Institute of Agricultural Sciences, Wanju, South Korea, 3National Institute of Agricultural Sciences, Jeonju, South Korea, 4National Institute of Agricultural Science and Technology, Suwon, South Korea

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11:45 **1501** The cost of sex and *Wolbachia* infection in *Trichogramma kaykai* populations. **James Russell** (jrussell@ggc.edu), Michael Saum, Victoria Burgess, and Keval Bollavaram, Georgia Gwinnett College, Lawrenceville, GA

12:00 **1502** Presentation withdrawn

**Contributed Papers: Ecology of Pesticides, Re- sistance, Toxicology, and Genetically Modified Crops**

***Room W414 C (Convention Center)***

**Moderators:** Anders Huseth1 and Andrew Frewin2, 1North Carolina State Univ., Raleigh, NC, 2Univ. of Guelph, Guelph, ON, Canada

9:15 **1503** Characterizing spatial distribution and host crop association of neonicotinoid resistant *Frankliniella fusca* (Thysanoptera: Thripidae) in the Southeastern United States. **Anders Huseth** (ashuseth@ncsu.edu)1, Thomas Chappell1, Anitha Chitturi2, Alana Jacobson2, and George G. Kennedy1, 1North Carolina State Univ., Raleigh, NC, 2Auburn Univ., Auburn, AL

9:30 **1504** Modification in nAChR beta subunit is associated with imidacloprid resistance in *Aphis gossypii*. **Kim Juil** (forweek@korea.kr)1,2, Young Ho Koh3, Gil-Hah Kim4, Si-Hyeock Lee5, and Min Kwon2,  
1Max Planck Institute for Chemical Ecology, Jena, Germany, 2National Institute of Crop Science, Pyeongchang, South Korea, 3Hallym Univ., Chuncheon, South Korea, 4Chungbuk National Univ., Cheongju, South Korea, 5Seoul National Univ., Seoul, South Korea

9:45 **1505** Damage of cowpea mild mottle virus and incidence of *Bemisia tabaci* biotype B in transgenic common bean lines resistant to bean golden mosaic virus. **Eliane Quintela** (eliane.quintela@embrapa.br), Marcus Vinícius Santana, Thiago Souza, Josias Faria, and Maria José Peloso, Embrapa Rice and Beans, Santo António de Goiás, Brazil

10:00 **1506** Presentation withdrawn

**10:15 BREAK**

10:30 **1507** Insecticidal activity, cytotoxicity, and metabolism of lemongrass oil in larvae and a cell line of the cabbage looper, *Trichoplusia ni*. **Jun-hyung Tak** (saturnpg7@yahoo.com) and Murray B. Isman, The Univ. of British Columbia, Vancouver, BC, Canada

10:45 **1508** Mutation and transcriptional expression of nicotinic acetylcholine receptor subunit 6 associated with spinosad resistance in *Rhyzopertha dominica*. **Mei-Er Chen** (meirchen@dragon.nchu.edu.tw) and Han-Tang Wang, National Chung Hsing Univ., Taichung, Taiwan

11:00 **1509** The nicotinic acetylcholine receptor gene family of the western flower thrips (*Frankliniella occidentalis*). **Qingjun Wu** (wuqingjun@caas.cn), Youjun Zhang, and Bingqing He, Chinese Academy of Agricultural Sciences, Beijing, China

11:15 **1510** Annual bluegrass weevil, *Listronotus maculicollis* (Coleoptera: Curculionidae), insecticide resistance: Baseline susceptibility, cross-resistance patterns, and possible mechanisms. **Olga Kostromytska** (kolgaent@ rci.rutgers.edu), Shaohui Wu, and Albrecht Koppenhöfer, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

11:30 **1511** Progress towards standardized risk assessment methodology for *Megachile rotundata*. **Andrew Frewin** (afrewin@uoguelph.ca), Cynthia Scott-Dupree, and Angela Gradish, Univ. of Guelph, Guelph, ON, Canada

11:45 **1512** Investigating mechanisms of resistance to acaricides in populations of the bee mite, *Varroa destructor*. **Joel González-Cabrera** (joel.gonzalez@ uv.es)1,2, Sonia Rodríguez-Vargas2,3, T. G. Emyr Davies2, Lin Field2, Daniel Schmehl4,5, Klemens Krieger6, and Martin Williamson2, 1Univ. of València, Burjassot, Spain, 2Rothamsted Research, Harpenden, United Kingdom, 3Institute of Agricultural Chemistry and Food Technology, Paterna, Spain, 4Bayer CropScience, Research Triangle Park, NC, 5Univ. of Florida, Gainesville, FL, 6Bayer CropScience, Leverkusen, Germany

12:00 **1513** Laboratory bioassays, baseline toxicity (LD50’s), and field efficacy of spinosad on Colorado potato beetle (*Leptinotarsa decemlineata*) (Coleoptera: Chrysomelidae). **Philippos Ioannidis** (filioan@otenet. gr) and Anastasia Sachinoglou, Institute of Industrial and Fodder Crops, Volos, Greece

12:15 **1514** Modeling the potential for hot spot remediation to resistance in western corn rootworm (*Diabrotica virgifera virgifera* LeConte). **Jeannette Martinez** (martinez.jeannette@epa.gov)1, Nicholas Friedenberg2, and Michael Caprio3, 1U.S. Environmental Protection Agency, Washington, DC, 2Applied Biomathematics, Setauket, NY, 3Mississippi State Univ., Mississippi State, MS

**Contributed Papers: Frontiers in Entomology: Uses and Symbiosis**

***Room W223 B (Convention Center)***

**Moderators:** Mukti N. Ghimire1 and Maria Pappas2, 1USDA - APHIS, Buzzards Bay, MA, 2Democritus Univ. of Thrace, Orestiada, Greece

9:15 **1515** Swapping symbionts: Consequences of bacterial partner replacement in a nested mealybug mutualism. **Stephanie Weldon** (s.r.weldon@gmail.com) and John McCutcheon, Univ. of Montana, Missoula, MT

9:30 **1516** The natural occurrence of aphid symbionts and effects of plant diversity. **Sharon Zytynska** (sharon. zytynska@tum.de) and Wolfgang Weisser, Technical Univ., Freising, Germany

9:45 **1517** Evolutionary shifts of symbiotic associates and their alkaloidal weaponry. **Rachelle Adams** (adams.1970@osu.edu)1 and Tappey Jones2, 1The Ohio State Univ., Columbus, OH, 2Virginia Military Institute, Lexington, VA

10:00 **1518** Like honey bees, Mexican honey wasps are associated with unique bacterial species. **Jo-anne Holley** (jo.holley@utexas.edu) and Nancy Moran, The Univ. of Texas, Austin, TX

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**10:15 BREAK**

10:30 **1519** The effect of fertilization type on trophic interaction networks and pest control in cereal fields. **Daniela Sint** (daniela.sint@uibk.ac.at), Oskar Rubbmark, Lena Manzl, and Michael Traugott, Univ. of Innsbruck, Innsbruck, Austria

10:45 **1520** Use of carmine scale insects (Margarodidae: *Porphyrophora* spp.) in Eurasia: From the past to current time. **Roman Jashenko** (romajashenko@yahoo. com), Al-Farabi Kazakh National Univ., Almaty, Kazakhstan

11:00 **1521** IPM program in Texas: Role and relevance now and in the future. **Charles Allen** (ctallen@ag.tamu.edu), Texas A&M Univ., San Angelo, TX

11:15 **1522** Crop wild relatives as genetic resources for pollination and herbivore resistance. **Paul Egan** (paul.egan@slu.se)1, Anne Muola2, Daniela Weber1, Amy Parachnowitsch3, and Johan Stenberg1, 1Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, 2Swedish Univ. of Agricultural Sciences, Uppsala, Sweden, 3Evolutionary Biology Centre, Uppsala, Sweden

11:30 **1523** Promoting pollinator diversity in agriculture by planting specialty oilseed crops. **Matthew Thom** (matt.thom@ars.usda.gov)1, Carrie Eberle2, and Frank Forcella1, 1USDA - ARS, Morris, MN, 2Univ. of Wyoming, Laramie, WY

11:45 **1524** Multitrophic interactions in a lettuce crop covered with UV-absorbing nets. **Saioa Legarrea** (saioalegarrea@gmail.com)1, Eduardo Velazquez2, Elisa Viñuela3, and Alberto Fereres4, 1Institute for Biodiversity and Ecosystem Dynamics, Amsterdam, Netherlands, 2Intercultural Univ. of Chiapas, San Cristóbal de las Casas, Mexico, 3Polytechnic Univ., Madrid, Spain, 4Instituto de Ciencias Agrarias, Madrid, Spain

12:00 **1525** Functions of soil arthropods in reclaimed mine spoil ecosystem: A case study of the Kathara coalfield area of Jharkhand, India. **Braj Sinha** (b\_kishoresinha@ yahoo.co.in) and Amita Hembrom, Ranchi Univ., Ranchi, India

12:15 **1526** Current knowledge of anhydrobiosis in the sleeping chironomid *Polypedilum vanderplanki*. **Takahiro Kikawada** (kikawada@affrc.go.jp)1, Richard Cornette1, and Oleg Gusev2, 1National Institute of Agrobiological Sciences, Tsukuba, Japan, 2RIKEN, Yokohama, Japan

**Contributed Papers: Genetics and Evolutionary Entomology: Mating and Competition**

***Room W414 D (Convention Center)***

**Moderators:** Omaththage P. Perera1 and Marco Gebiola2, 1USDA - ARS, Stoneville, MS, 2Univ. of Arizona, Tucson, AZ

9:15 **1527** Cytogenetic characteristics of pseudococcids (Hemiptera: Coccoidea: Pseudococcidae) of Indian origin. **Sompalyam Ramakrishna** (srkbuz@ymail.com), Bangalore Univ., Bangalore, India

9:30 **1528** Interplay between rapid evoluion of leaf beetle host use and arthropod community dynamics. **Shunsuke Utsumi** (utsumi@fsc.hokudai.ac.jp), Hokkaido Univ., Horokanai, Japan

9:45 **1529** Resistance of western corn rootworm to Cry3Bb1-expressing corn. **Lisa Meihls** (lisa.meihls@ ars.usda.gov)1, Vered Tzin2, Bruce Hibbard1, and Georg Jander2, 1USDA - ARS, Columbia, MO,

2Boyce Thompson Institute for Plant Research, Ithaca, NY

10:00 **1530** QTL mapping of w*hite pupae* in a genetic sexing strain of melon fly, *Bactrocera cucurbitae* (Coquillett) (Diptera: Tephritidae), and applications for Sterile Insect Technique. **Sheina Sim** (ssim8@hawaii. edu) and Scott Geib, USDA - ARS, Hilo, HI

**10:15 BREAK**

10:30 **1531** Unorthodox reproductive strategies in *Cataglyphis* desert ants: Hybridizing lineages with genetic caste determination. **Hugo Darras** (hgdarras@ gmail.com), Alexandre Kuhn, and Serge Aron, Free Univ. of Brussels, Brussels, Belgium

10:45 **1532** The genetic architecture of host races in the generalist aphid parasitoid *Aphidius ervi* Haliday (Hymenoptera: Braconidae). **Gabriel Ballesteros** (gballesteros@utalca.cl)1, Jürgen Gadau2, Fabrice Legeai3, Daniela Sepulveda1, Lucía Briones1, Blas Lavandero1, and Christian Figueroa1, 1Univ. of Talca, Talca, Chile, 2Arizona State Univ., Tempe, AZ, 3INRA, Le Rheu, France

11:00 **1533**

11:15 **1534**  
required for *Myzus persicae* colonisation of diverse plant species. **Yazhou Chen** (yazhou.chen@jic.ac.uk)1, Tom Mathers2, Sam Mugford1, Cock Van Oosterhout3, David Swarbreck2, and Saskia A. Hogenhout1, 1The John Innes Centre, Norwich, United Kingdom, 2The Genome Analysis Centre, Norwich, United Kingdom, 3Univ. of East Anglia, Norwich, United Kingdom

11:30 **1535** Determining the role of selection and drift in reproductive character displacement causing rapid diversification of montane crickets. **Ismail Saglam** (iksaglam@hacettepe.edu.tr)1, Michael Miller2,

Sean O’Rourke2, and Selim Caglar1, 1Hacettepe Univ., Ankara, Turkey, 2Univ. of California, Davis, CA

11:45 **1536** Promiscuous hosts and faithful cheaters: The role of mating systems in the evolution of obligate social parasitism. **Romain Dahan** (romain.a.dahan@ gmail.com) and Christian Rabeling, Univ. of Rochester, Rochester, NY

12:00 **1537** Exploring sesquiterpenoid pheromone biosynthetic pathways in stink bugs (Pentatomidae). **Jason Lancaster** (jlancas7@vt.edu)1, Ashot Khrimian2, Dawn Gundersen-Rindal2, Donald Weber2, and Dorothea Tholl1, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2USDA - ARS, Beltsville, MD

Presentation withdrawn

Aphid-specific expanded gene families are

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12:15 **1538** Differential bracovirus gene expression among host-foodplant complex sources of the braconid parasitoid wasp, *Cotesia congregata*, likely reflects adaptations to host species and diet. **Karen Kester** (kmkester@vcu.edu)1, Justin Bredlau1, Daniel Kuhar2, and Dawn Gundersen-Rindal2, 1Virginia Commonwealth Univ., Richmond, VA, 2USDA - ARS, Beltsville, MD

**Contributed Papers: Insect Immunology: Environment**

***Room W231 B (Convention Center)***

**Moderators:** Franziska Dickel1 and Nathan Jones2, 1Univ. of Jyväskylä, Jyväskylä, Finland, 2The Univ. of Texas, Austin, TX

9:15 **1539** Immune defence in context — the missing piece. **Paul Schmid-Hempel** (psh@env.ethz.ch), ETH Zürich, Zürich, Switzerland

9:30 **1540** Microscopic analyses of larval *Aedes aegypti* reveal the essential role of gut microbiota in regulating growth and metabolism. **Luca Valzania** (valzania@ uga.edu), Mark R. Brown, and Michael Strand, Univ. of Georgia, Athens, GA

9:45 **1541** Responses of *Galleria mellonella* immune system to ink injections and neem essential oil.  
**Maciej A. Pszczolkowski** (mpszczolkowski@missouristate. edu) and Katherine Haszcz, Missouri State Univ., Mountain Grove, MO

10:00 **1542** Mixed diets — the key to a healthy life? **Franziska Dickel** (franziska.dickel@jyu.fi)1, Johanna Mappes1, and Dalial Freitak2, 1Univ. of Jyväskylä, Jyväskylä, Finland, 2Univ. of Helsinki, Helsinki, Finland

**10:15 BREAK**

10:30 **1543** Immune system and antimicrobial secretion use by the leaf cutting ants, *Atta* spp. (Formicidae: Attini), during a fungal infection. **Ernesto Bonadies** (ernestobonadies@hotmail.com)1,2 and Hermógenes Fernández-Marín2, 1Univ. of Panamá, Panama City, Panama, 2Institute for Scientific Research and High Technology Services, Panama, Panama

10:45 **1544** Parasitoids, caste, social form, and immune investment in the red imported fire ant, *Solenopsis invicta*. **Nathan Jones** (insectnate.nj@gmail.com), Robert Plowes, and Lawrence E. Gilbert, The Univ. of Texas, Austin, TX

11:00 **1545** Bedbug cellular immunity. **William Hentley** (w.hentley@sheffield.ac.uk), Michael T. Siva-Jothy, and Sophie Evison, Univ. of Sheffield, Sheffield, United Kingdom

11:15 **1546** Evolution of host immune responses and parasitoid virulence in a spatial context.  
**Peter Hambäck** (peter.hamback@su.se)1, Lisa Fors1, Robert Markus2, and Ulrich Theopold1, 1Stockholm Univ., Stockholm, Sweden, 2Univ. of Nottingham, Nottingham, United Kingdom

11:30 **1547** Presentation withdrawn

11:45 **1548** Oral priming with *Bacillus thuringiensis* induces a shift in the immune response of *Tribolium castaneum*. **Barbara Milutinovic** (barbara.milutinovic@ ist.ac.at)1, Jennifer Greenwood2, Robert Peuß2,

Philip Rosenstiel3, Hinrich Schulenburg3, and Joachim Kurtz2, 1Institute of Science and Technology Austria, Klosterneuburg, Austria, 2Univ. of Münster, Münster, Germany, 3Kiel Univ., Kiel, Germany

12:00 **1549** Collaboration between a soluble C-type lectin and calreticulin facilitates white spot syndrome virus infection in shrimp. Xian-Wei Wang, Yi-Hui Xu, Jin-Dong Xu, and **Jin-Xing Wang** (jxwang@sdu.edu. cn), Shandong Univ., Jinan, China

12:15 **1550** The effect of starvation on gypsy moth (*Lymantria dispar* L.) immune parameters and on activation of covert to overt form of nucleopolyhedrovirus. **Sergey Pavlushin** (sergey-pavlushin@mail.ru),

Irina Belousova, Ekaterina Chertkova, Yuriy Ahanaev, and Viatcheslav Martemyanov, Institute of Systematics and Ecology of Animals, Novosibirsk, Russia

**Contributed Papers: Invasive and Exotic Entomology: Control and Tools**

***Room W340 B (Convention Center)***

**Moderators:** Clifford Sadof1 and Feng Zhang2, 1Purdue Univ., West Lafayette, IN, 2Chinese Academy of Agricultural Sciences, Beijing, China

9:15 **1551** A new host of the brown marmorated stink bug, *Halyomorpha halys*: Pest management lessons from studies on host phenology and pest dynamics on southern pea. **Beatrice Dingha** (bndingha@ncat.edu) and Louis E. N. Jackai, North Carolina A&T State Univ., Greensboro, NC

9:30 **1552** Coconut rhinoceros beetle (*Oryctes rhinoceros*) and its management effort on Oahu in Hawaii. **Zhiqiang Cheng** (cheng241@hawaii.edu)1, Matthew Kellar1, Arnold Hara2, and Roshan Manandhar1, 1Univ. of Hawai'i, Honolulu, HI, 2Univ. of Hawai’i, Hilo, HI

9:45 **1553** Biotype, plant virus, and insecticide resistance status of *Bemisia tabaci* populations in China.  
**Shaoli Wang** (wangshaoli@caas.cn), Yang Yang, and Youjun Zhang, Chinese Academy of Agricultural Sciences, Beijing, China

10:00 **1554** Is cold tolerance plasticity in *Epiphyas postvittana* (Lepidoptera: Tortricidae) related to variation in phosphoglucose isomerase? **Amy C. Morey** (morey041@umn.edu)1 and Robert Venette2, 1Univ. of Minnesota, St. Paul, MN, 2USDA - Forest Service, St. Paul, MN

**10:15 BREAK**

10:30 **1555** Influence of clementine cultivar on tolerance  
of *Ceratitis capitata* to cold treatment. **Elena Llacer** (ellacer@ivia.es)1, Miquel Alonso1, Josep Jaques2, and Alberto Urbaneja1, 1Valencian Institute of Agricultural Research, Moncada, Spain, 2Univ. Jaume I, Castelló de la Plana, Spain

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10:45 **1556** Developing effective rootstock recommendations and disinfestation protocols for genetically diverse strains of grape phylloxera, *Daktulosphaira vitifoliae*. **Kevin Powell** (kevin.powell@ecodev.vic.gov.au), Dept. of Economic Development, Rutherglen, Australia

11:00 **1557** Tools for staging and managing the emerald ash borer in an urban forest. **Clifford S. Sadof** (csadof@purdue.edu), Matthew Ginzel, Gabriel Hughes, Adam Witte, and Donnie Peterson, Purdue Univ., West Lafayette, IN

11:15 **1558** Protocol for foreign exploration and field studies in the biological control of invasive weeds in the United States. Massimo Cristofaro1, **Matthew Augé** (matthew.auge@gmail.com)2 and Francesca Marini2, 1ENEA, Rome, Italy, 2Biotechnology and Biological Control Agency, Rome, Italy

11:30 **1559** Genetic and behavioral differentiation between two closely related whitefly parasitoids. **Muhammad Ahmed** (zaheerento@gmail.com)1, Antonio Francis2, Gregory Evans3, Eric Rohrig4, Lance Osborne5, and Catharine M. Mannion1, 1Univ. of Florida, Homestead, FL, 2Florida Dept. of Agriculture and Consumer Services, Apopka, FL, 3USDA - APHIS, Beltsville, MD, 4Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, 5Univ. of Florida, Apopka, FL

11:45 **1560** Egg parasitoids of stink bugs infesting fruit trees in Japan, with special reference to the egg parasitoid guild of *Halyomorpha halys* (Hemiptera: Pentatomidae). **Kazunori Matsuo** (matsuosudachi@ scs.kyushu-u.ac.jp)1, Marisa Tomita2, Tomohiro Honda3, Akihiko Takahashi4, Shunsuke Furihata5, Toshiharu Mita1, Ken Tabuchi4, Kyo Itoyama3, Masatoshi Toyama6, Norman Johnson7, and Yoshimi Hirose1, 1Kyushu Univ., Fukuoka, Japan, 2Tokyo Univ. of Agriculture, Kanagawa, Japan, 3Meiji Univ., Kanagawa, Japan, 4NARO Tohoku Agricultural Research Center, Iwate, Japan, 5National Institute for Environmental Studies, Ibaraki, Japan, 6NARO Institute of Fruit Tree Science, Hiroshima, Japan, 7The Ohio State Univ., Columbus, OH

12:00 **1561** Potential classical biological control of  
spotted wing drosophila, *Drosophila suzukii* (Diptera: Drosophilidae), with parasitoids from China.  
**Feng Zhang** (f.zhang@cabi.org)1,2, Jinping Zhang1,2, Ren-Ya Liao2, Pierre Girod3, Marc Kenis3, Guo-Hua Chen4, Laureline Rossignaud3, Chun Xiao4, Tim Haye3, and

Yi Yu5, 1CABI, Beijing, China, 2Chinese Academy of Agricultural Sciences, Beijing, China, 3CABI, Delémont, Switzerland, 4Yunnan Agricultural Univ., Kunming, China, 5Shandong Academy of Agricultural Sciences, Jinan, China

12:15 **1562** The unusual dual reproductive strategy of *Lepidapion argentatum* (Col. Brentidae), a prospective biological control agent of French broom. **René Sforza** (rsforza@ars-ebcl.org)1, Elven Kerdellant1, and

Thierry Thomann2, 1USDA - ARS, Saint-Gély-du-Fesc, France, 2CSIRO, Saint-Gély-du-Fesc, France

**Contributed Papers: Medical and Veterinary Entomology: Mosquito ‘Omics and Biological Control**

***Chapin Theater (Convention Center)***

**Moderators:** Shavonn Whiten1 and Heather Coatsworth2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Simon Fraser Univ., Burnaby, BC, Canada

9:15 **1563** Mosquito salivary gland architecture: Implications for disease transmission and vector control. **Michael Wells** (mwells24@jhmi.edu) and Deborah Andrew, Johns Hopkins Univ., Baltimore, MD

9:30 **1564** The adult *Aedes aegypti* midgut peritrophic matrix proteome: A novel approach to vector and vector-borne disease control. **Shavonn Whiten** (shavonnw@vt.edu)1,2, Zach Adelman3, Richard Helm1, and W. Ray1, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Texas A&M Univ., College Station, TX, 3Texas A&M Univ., College Station, TX

9:45 **1565** Characterization of two mosquito ortholog alpha-glucosidases that play a differential role in the susceptibility to *Lysinibacillus sphaericus* biolarvicides. Nathaly Nascimento, Ligia Ferreira, Tatiany Romão, Darleide Correia, Osvaldo de-Melo-Neto, and

**Maria Helena Silva-Filha** (mhneves@cpqam.fiocruz. br), Oswaldo Cruz Foundation, Recife, Brazil

10:00 **1566** Larvicidal activities of indigenous *Bacillus thuringiensis* isolates and nematode symbiotic bacterial toxins against the mosquito vector *Culex pipiens* (Diptera: Culicidae). **Ashraf Ahmed** (aalii@ksu. edu.sa), Talat El-Kersh, and Tahany Ayaad, King Saud Univ., Riyadh, Saudi Arabia

**10:15 BREAK**

10:30 **1567** Morphological and molecular characterization of a novel microsporidian parasite from the invasive Asian rock pool mosquito, *Aedes japonicus*. **Theodore Andreadis** (theodore.andreadis@ct.gov)1, Hiroyuki Takaoka2, Yasushi Otsuka3, and

Charles Vossbrinck1, 1Connecticut Agricultural Experiment Station, New Haven, CT, 2Univ. of Malaya, Kuala Lumpur, Malaysia, 3Oita Univ., Oita, Japan

10:45 **1568** Differential transcription profiles in *Aedes aegypti* in response to larvicide. **Liming Zhao** (lmzhao@ufl.edu), Univ. of Florida, Vero Beach, FL

11:00 **1569** Foraging strategies for the mosquito-  
parasitic nematodes *Romanomermis iyengari* and *Strelkovimermis spiculatus*. **Yanli Xu** (xyll@neigaehrb. ac.cn)1, Limin Dong2, Yi Wang3, and Randy Gaugler3, 1Chinese Academy of Sciences, Harbin, China, 2Northeast Agricultural Univ., Harbin, China, 3Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

11:15 **1570** From phenotype to genotype: Creating resistant *Aedes aegypti* to prevent dengue transmission. **Heather Coatsworth** (hcoatswo@sfu.ca)1, Paola Caicedo2, Geoff Winsor1, Clara Ocampo2, and Carl Lowenberger1, 1Simon Fraser Univ., Burnaby, BC, Canada, 2CIDEIM, Cali, Colombia

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11:30 **1571** Differential expression in dengue-infected *Aedes albopictus* reveals important genes for anti-dengue response. **Hitoshi Tsujimoto** (htsujimo@ nmsu.edu)1, Nicolas Devitt2, Anitha Sundararajan2, Faye Schikey2, Kathryn Hanley1, and Immo Hansen1, 1New Mexico State Univ., Las Cruces, NM, 2National Center for Genome Resources, Santa Fe, NM

11:45 **1572** Proteomics informed by transcriptomics for characterising active transposable elements and genome annotation in *Aedes aegypti*. **Kevin Maringer** (kevin.maringer@mssm.edu)1, Ana Fernandez-Sesma1, David Matthews2, and Andrew Davidson2, 1Icahn School of Medicine at Mount Sinai, New York, NY, 2Univ. of Bristol, Bristol, United Kingdom

12:00 **1573** Studies on host behavior manipulation by the mosquito-parasitic nematode *Strelkovimermis spiculatus*. **Hana Haji AllahverdiPour** (hh375@rci.rutgers.edu)1,2, Yi Wang1, Reza Talaei-Hassanloui2, Javad Karimi3,

and Randy Gaugler1, 1Rutgers, The State Univ. of  
New Jersey, New Brunswick, NJ, 2Univ. of Tehran, Karaj, Iran, 3Ferdowsi Univ., Mashhad, Iran

**Contributed Papers: Morphology, Systematics, and Phylogeny: Myriapoda and Insecta**

***Room W225 B (Convention Center)***

**Moderators:** Gavin J. Svenson1 and Megan M. Wilson2, 1Cleveland Museum of Natural History, Cleveland, OH, 2Rutgers, The State Univ. of New Jersey, Newark, NJ

9:15 **1574** A new dimension in documenting new species: High-detail imaging for myriapod taxonomy and first 3D cybertype of a new millipede species (Diplopoda, Myriapoda). **Nesrine Akkari** (nesrine.akkari@nhm-wien. ac.at)1, Henrik Enghoff2, and Brian Metscher3, 1Natural History Museum, Vienna, Austria, 2Natural History Museum, Copenhagen, Denmark, 3Univ. of Vienna, Vienna, Austria

9:30 **1575** An illustrative approach to sexual isolation within giant helicopter damselflies (*Megaloprepus caerulatus*). **Megan M. Wilson** (meywilson@yahoo.com), Rutgers, The State Univ. of New Jersey, Newark, NJ

9:45 **1576** Holding on for dear life — the functional morphology of waterfall-dwelling damselflies in the Neotropics. **Christopher Beatty** (beattych@yahoo.com)1, Sebastian Büsse2, Melissa Sánchez Herrera1, and Stanislav Gorb2, 1Rutgers, The State Univ. of New Jersey, Newark, NJ, 2Christian Albrechts Univ. of Kiel, Kiel, Germany

10:00 **1577** Taxonomic significance of the epiphallus in the classification of Acridoidea and Pyrgomorphoidea (Orthoptera). **Mohd Usmani** (usmanikamil94@gmail. com) and Shahnila Usmani, Aligarh Muslim Univ., Aligarh, India

**10:15 BREAK**

10:30 **1578** Phylogeny of *Stagmatoptera* Burmeister, 1838 (Insecta: Mantodea) based on morphological and molecular evidence. **Henrique Rodrigues** (hmrbio@ gmail.com)1 and Gavin J. Svenson2, 1Case Western Reserve Univ., Cleveland, OH, 2Cleveland Museum of Natural History, Cleveland, OH

10:45 **1579** Extreme sexual size dimorphism led to sex- dependent life modalities during the evolution of flower simulating mantises. **Gavin J. Svenson** (gsvenson@ cmnh.org)1, Sydney Brannoch1,2, Henrique Rodrigues1,2, and Frank Wieland3, 1Cleveland Museum of Natural History, Cleveland, OH, 2Case Western Reserve Univ., Cleveland, OH, 3Palatinate Museum of Natural History, Bad Dürkheim, Germany

11:00 **1580** Uncovering the evolutionary and morphological links between male and female praying mantis (Insecta: Mantodea) genitalia and mating behaviors.  
**Sydney Brannoch** (sbrannoch@case.edu) and

Gavin J. Svenson, Cleveland Museum of Natural History, Cleveland, OH

11:15 **1581** Species diversity and phylogenetic analysis  
of termites (Isoptera) of the Western Ghats, India. **Kalleshwaraswamy Marulasiddappa** (kalleshwara@ gmail.com)1, A. S. Vidyashree1, H. M. Mahadevaswamy2, R. Asokan2, Pavithra Basavanagoudappa1, and

S. K. Adarsha1, 1Univ. of Agricultural and Horticultural Sciences, Shivamogga, India, 2Indian Institute of Horticultural Research, Bangalore, India

11:30 **1582** Phylogenetic analysis of the *Degeeriella* complex (Insecta: Phthiraptera): Paraphyletic genera suggest a history of intraordinal switching.  
**Therese A. Catanach** (tacatanach@tamu.edu)1, Veronica Pereyra2, M. P. Valim3, Kevin P. Johnson4, and Jason Weckstein1, 1Drexel Univ., Philadelphia, PA, 2National Univ. of Tucuman, Tucuman, Argentina, 3Museum of Zoology of the University of São Paulo, São Paulo, Brazil, 4Univ. of Illinois, Champaign, IL

11:45 **1583** The phylogeny of green lacewings (Neuroptera: Chrysopidae): Phylogenetic signal versus rapid radiation. **Ivonne Garzón** (ivonne.garzon@gmail.com)1, Laura Breitkreuz2, Michael S. Engel2, and Shaun Winterton3, 1Univ. of California, Sacramento, CA, 2Univ. of Kansas, Lawrence, KS, 3California Dept. of Food and Agriculture, Sacramento, CA

12:00 **1584** Morphological phylogeny of green lacewings (Neuroptera: Chrysopidae) with emphasis on a revised wing venation homology. **Laura Breitkreuz** (l-breitkreuz@ ku.edu)1, Ivonne Garzón2, Shaun Winterton3, and Michael S. Engel1, 1Univ. of Kansas, Lawrence, KS,  
2Univ. of California, Sacramento, CA, 3California Dept. of Food and Agriculture, Sacramento, CA

12:15 **1585** Small survivors: Unexpected diversity of *Hyposmocoma* (Lepidoptera: Cosmopterigidae) moths on a pummeled Hawaiian island. **Matthew J. Medeiros** (matt.j.medeiros@gmail.com)1, William Haines2,  
Mia Carleton3, and Daniel Rubinoff2, 1Univ. of California, Berkeley, CA, 2Univ. of Hawai’i, Honolulu, HI, 3Urban School of San Francisco, San Francisco, CA

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**TUESDAY**

**Tuesday, September 27 • MORNING/AFTERNOON •**

**Contributed Papers: RNAi and Gene Expression Control in Insects: Pest Management**

***West Hall F4 (WF4) (Convention Center)***

**Moderators:** Kun Yan Zhu1 and Xu Hu2, 1Kansas State Univ., Manhattan, KS, 2DuPont Pioneer, Johnston, IA

9:15 **1586** The multicopper oxidase gene family in the brown planthopper, *Nilaparvata lugens*. **Yuxuan Ye** (nhyyx37@yeah.net) and Chuan-Xi Zhang, Zhejiang Univ., Hangzhou, China

9:30 **1587** Transcriptome-wide screening and functional analysis of cuticular protein family with the R&R Consensus in the brown planthopper, *Nilaparvata lugens*. **Penglu Pan** (plpan@zju.edu.cn) and Chuan-Xi Zhang, Zhejiang Univ., Hangzhou, China

9:45 **1588** A salivary sheath protein essential for the interaction of the brown planthopper with rice plants. **Huang Haijian** (huanghaijian@zju.edu.cn),  
Yanyuan Bao, and Chuan-Xi Zhang, Zhejiang Univ., Hangzhou, China

10:00 **1589** Suppression of DHFR expression reduces growth and fecundity in the Asian corn borer, *Ostrinia furnacalis*. **Jun Yang** (junyang@dlut.edu.cn), Yuexin Xia, Mingbo Qu, and Qing Yang, Dalian Univ. of Technology, Dalian, China

**10:15 BREAK**

10:30 **1590** Discovery of midgut genes for the RNA interference control of corn rootworm. **Xu Hu** (xu.hu@ pioneer.com)1, Nina Richtman1, Jian-Zhou Zhao1,  
Xiping Niu1, Lisa Procyk1, Meghan Oneal1, Bliss Kernodle1, Joe Steimel1, Virginia Crane1, Gary Sandahl1, Julie Ritland1, Albert Lu1, James Presnail2, and Gusui Wu1, 1DuPont Pioneer, Johnston, IA, 2Evogene, Inc., Saint Louis, MO

10:45 **1591** Identification and characterization of double stranded ribonucleases in *Diabrotica virgifera virgifera* (Coleoptera: Chrysomelidae) and *Ostrinia nubilalis* (Lepidoptera: Crambidae). **Anastasia Cooper** (anacooper@ksu.edu), Young Ho Kim, and

Kun Yan Zhu, Kansas State Univ., Manhattan, KS

11:00 **1592** Transcriptomics-guided development of RNA interference strategies to manage whiteflies: A globally distributed vector of crop viruses. **Daniel Hasegawa** (daniel.k.hasegawa@gmail.com)1, Wenbo Chen2,

Yi Zheng2, Navneet Kaur3, William Wintermantel3, Alvin M. Simmons4, Zhangjun Fei2, and Kai-Shu Ling4, 1Cornell Univ., Charleston, SC, 2Cornell Univ., Ithaca, NY, 3USDA - ARS, Salinas, CA, 4USDA - ARS, Charleston, SC

11:15 **1593** RNA interference mediated knockdown of *Serpin 2* reveals its function in antiviral activity and gut homeostasis in *Bombyx mori*. **Satyavathi Valluri** (vsatya@cdfd.org.in), R. M. Pavani, S. Srividya, K. Swethakumari, and S. Annapurna, Centre for DNA Fingerprinting and Diagnostics, Hyderabad, India

**Tuesday, September 27, 2016 • Afternoon**

**Symposium: Bark and Ambrosia Beetles: Biology, Ecology, and Management**

***Room W414 C (Convention Center)***

**Moderators and Organizers:** Fernando E. Vega1,  
Richard W. Hofstetter2, and Peter Biedermann3, 1USDA - ARS, Beltsville, MD, 2Northern Arizona Univ., Flagstaff, AZ, 3Max Planck Institute for Chemical Ecology, Jena, Germany

1:30 **1594** Bark beetles and conifers: A system characterized by cross-scale interactions and thresholds. **Kenneth Raffa** (raffa@entomology.wisc.edu), Univ. of Wisconsin, Madison, WI

1:45 **1595** Conifer defense and resistance to bark beetles. **Paal Krokene** (krp@skogoglandskap.no), Norwegian Forest and Landscape Institute, Ås, Norway

2:00 **1596** Biology and ecology of the coffee berry borer, *Hypothenemus hampei*. **Fernando E. Vega** (fernando. vega@ars.usda.gov)1 and Francisco Infante2, 1USDA - ARS, Beltsville, MD, 2College of the Southern Border, Tapachula, Mexico

2:15 **1597** What drives evolution of social behavior in bark and ambrosia beetles? **Peter Biedermann** (pbiedermann@ice.mpg.de), Max Planck Institute for Chemical Ecology, Jena, Germany

2:30 **1598** Monogamous single-parenting matriarchs and sterile daughter helpers in a eusocial ambrosia beetle inhabiting living *Eucalyptus* trees. Shannon Smith1, Deborah Kent1, Jacobus Boomsma2, Adam Stow3, Markus Riegler1, and **Robert Mueller** (r.mueller@ westernsydney.edu.au)1, 1Western Sydney Univ., Richmond, Australia, 2Univ. of Copenhagen, Copenhagen, Denmark, 3Macquarie Univ., Sydney, Australia

2:45 **1599** *Tomicus*, a particular genus of bark beetles. **François Lieutier** (francois.lieutier@univ-orleans.fr)1, Massimo Faccoli2, and Bo Långström3, 1Univ. of Orléans, Orléans, France, 2Dept. of Agronomy, Food, Natural Resources, Animals and Environment, Legnaro, Italy, 3Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

**3:00 BREAK**

3:15 **1600** Beetle acoustic communication affects microbial symbiotic associations. **Richard W. Hofstetter** (rich.hofstetter@nau.edu)1, David Dunn2, Brennan Copp1, Peter Herron1, and Nicholas C. Aflitto3, 1Northern Arizona Univ., Flagstaff, AZ, 2Univ. of California, Santa Cruz, CA, 3Cornell Univ., Ithaca, NY

3:30 **1601** Economics and politics. **Jean-Claude Grégoire** (jcgregoi@ulb.ac.be), Free Univ. of Brussels, Brussels, Belgium

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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

**Symposium: Status of Worldwide Honey Bee Health and Its Impacts on Agriculture**

***Chapin Theater (Convention Center)***

**Moderators and Organizers:** Jeffrey Pettis1, Robyn Rose2, and Peter Neumann3, 1USDA - ARS, Beltsville, MD, 2USDA - APHIS, Riverdale, MD, 3Univ. of Bern, Bern, Switzerland

1:30 **1602** Pandemic DWV and global decline in honey bee health. **Robert Paxton** (robert.paxton@zoologie. uni-halle.de), Martin Luther Univ., Halle, Germany

1:45 **1603** The role of honey bees in worldwide food security. **Jeffrey Pettis** (jeff.pettis@ars.usda.gov), USDA - ARS, Beltsville, MD

2:00 **1604** Beekeeping practices in Southeast Asia: Which bee to choose, *Apis mellifera* or *Apis cerana*? **Panuwan Chantawannakul** (panuwan@gmail.com), Chiang Mai Univ., Chiang Mai, Thailand

2:15 **1605** Honey bee health in Brazil: Impacts of pathogens on Africanized vs. European bees.  
**Erica Teixeira** (erica@apta.sp.gov.br), APTA Regional, Santa Cecilia, Brazil

2:30 **1606** Honey bee health and potential impacts on agriculture in Canada. **Marta Guarna** (marta.guarna@ agr.gc.ca), Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada

2:45 **1607** APHIS national bee survey and world trade in bees. **Robyn Rose** (robyn.i.rose@aphis.usda.gov), USDA - APHIS, Riverdale, MD

**3:00 BREAK**

3:15 **1608** Next steps: Outreach and problem solving  
with beekeepers. **Dennis vanEngelsdorp** (dennis. vanengelsdorp@gmail.com), Univ. of Maryland, College Park, MD

**Symposium: Insect-transmitted Phytoviruses and Agricultural Pandemics: Current Scenarios and Sustainable Management**

***Room W231 B (Convention Center)***

**Moderators and Organizers:** Rajagopalbabu Srinivasan1 and Juan Alvarez2, 1Univ. of Georgia, Tifton, GA, 2DuPont, Newark, DE

1:30 **1609** An introduction to globally important arthropod-transmitted plant viruses: A case study with thrips-transmitted tomato spotted wilt virus management in peanut in the southeastern United States. **Rajagopalbabu Srinivasan** (babusri@uga.edu),

Anita Shrestha, Pin-Chu Lai, Kathleen Marasigan, Mark R. Abney, and Albert K. Culbreath, Univ. of Georgia, Tifton, GA

2:00 **1610** Management options for arthropod-transmitted plant viruses and limitations. **Juan Alvarez**

(juan.m.alvarez@dupont.com)1 and Rajagopalbabu Srinivasan2, 1DuPont, Newark, DE, 2Univ. of Georgia, Tifton, GA

2:15 **1611** Managing thrips-transmitted Iris yellow spot tospovirus outbreaks in onion: Lots of progress but challenges remain. **Hanu Pappu** (hrp@cahnrs.wsu.edu), Washington State Univ., Pullman, WA

2:30 **1612** Grower-driven data reveals first principles in the management of potato virus Y incidence in seed potato production. **Russell L. Groves** (groves@ entomology.wisc.edu)1, Kenneth E. Frost2, and

Amy Charkowski1, 1Univ. of Wisconsin, Madison, WI, 2Oregon State Univ., Hermiston, OR

2:45 **1613** Vector-virus interactions in maize agroecosystems in East Africa. **Margaret (Peg) Redinbaugh** (peg. redinbaugh@ars.usda.gov)1 and Subramanian Sevgan2, 1USDA - ARS, Wooster, OH, 2International Centre of Insect Physiology and Ecology, Nairobi, Kenya

**3:00 BREAK**

3:15 **1614** Emergence of whitefly complexes and associated plant viruses in China. Wang Xin-Ru, Wang Lan-Lan, Jun-Bo Luan, Shu-Sheng Liu and **Xiao-Wei Wang** (xiaowei\_wang@zju.edu.cn), Zhejiang Univ., Hangzhou, China

3:30 **1615** Pea aphid host races in the Pacific Northwest: Interactions with legume viruses and implications for virus incidence in pulse crops. **Sanford D. Eigenbrode** (sanforde@uidaho.edu)1 and Thomas Davis2, 1Univ. of Idaho, Moscow, ID, 2California Polytechnic State Univ., San Luis Obispo, CA

3:45 **1616** Aphid and whitefly-transmitted viruses impacting cucurbits production in southwestern United States. **Steven J. Castle** (steven.castle@ars.usda.gov)1 and John Palumbo2, 1USDA - ARS, Maricopa, AZ, 2Univ. of Arizona, Yuma, AZ

4:00 **1617** Development and dissemination of thrips and tospovirus management strategies for vegetable production systems of East Africa. **Subramanian Sevgan** (ssubramania@icipe.org)1, Jean Nguya Kalemba Maniania1, Johnson Nyasani1, S. Niassy1, AM. Muvea2, Rael Birithia1, Hanu Pappu3, Rainer Meyhoefer4, Gerald Moritz5,

Henry Wainright6, and Sunday Ekesi1, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Jomo Kenyatta Univ. of Agriculture and Technology, Nairobi, Kenya, 3Washington State Univ., Pullman, WA, 4Leibniz Univ., Hannover, Germany, 5Martin Luther Univ. Halle, Germany, 6Real IPM Kenya, Nairobi, Kenya

4:15 **1618** Factors affecting aphid-luteovirus interactions in agricultural and non-managed ecosystems.  
**Laura Ingwell** (laura.ingwell@gmail.com)1 and  
Nilsa A. Bosque-Pérez2, 1Purdue Univ., West Lafayette, IN, 2Univ. of Idaho, Moscow, ID

**Symposium: Advances in the Behavioral Ecology of Entomopathogenic Nematodes**

***Room W315 B (Convention Center)***

**Moderators and Organizers:** David Shapiro-Ilan1 and Ed Lewis2, 1USDA - ARS, Byron, GA, 2Univ. of California, Davis, CA

1:30 **1619** Infection dynamics of entomopathogenic nematodes. **Ed Lewis** (eelewis@ucdavis.edu)1 and David Shapiro-Ilan2, 1Univ. of California, Davis, CA, 2USDA - ARS, Byron, GA

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**TUESDAY**

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1:45 **1620** Group behavior in insect parasitic nematode dispersal. **Paul Schliekelman** (pdschlie@uga.edu)1, Ed Lewis2, and David Shapiro-Ilan3, 1Univ. of Georgia, Athens, GA, 2Univ. of California, Davis, CA, 3USDA - ARS, Byron, GA

2:00 **1621** Chemical signaling. **Fatma Kaplan** (fkaplan@ufl.edu)1, David Shapiro-Ilan2, and Ed Lewis3, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Byron, GA, 3Univ. of California, Davis, CA

2:15 **1622** Survival mechanism of entomopathogenic nematodes. **Itamar Glazer** (glazerit@volcani.agri.gov.il), Agricultural Research Organisation, Bet-Dagan, Israel

2:30 **1623** Exploiting the chemical ecology of the rhizosphere for crop protection. Ted Turlings1 and **Denis Willett** (dwillett@ufl.edu)2, 1Univ. of Neuchâtel, Neuchâtel, Switzerland, 2Univ. of Florida, Lake Alfred, FL

2:45 **1624** Biogeography and diversity of traits of entomopathogenic nematodes. Xun Yan and  
**Richou Han** (hanrc@gdei.gd.cn), Guangdong Academy of Agricultural Sciences, Guangzhou, China

**3:00 BREAK**

3:15 **1625** Once upon a time in America: Soil food webs and biological control in citrus orchards. **Raquel Campos-Herrera** (rcherrera@ualg.pt)1, Fahiem El-Borai2, and Larry Duncan3, 1Center for Biological Resources and Food Mediterranean, Faro, Portugal, 2Zagazig Univ., Zagazig, Egypt, 3Univ. of Florida, Lake Alfred, FL

3:30 **1626** Case study on host-pathogen relationships:  
*S. scarabaei* – turf system. **Albrecht Koppenhöfer** (koppenhofer@aesop.rutgers.edu), Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

3:45 **1627** Fatal fighting among adult entomopathogenic nematodes. Annemie Zenner1, Kathryn O’Callaghan1, Apostolos Kapranas2, and **Christine Griffin** (christine. griffin@nuim.ie)1, 1Maynooth Univ., Maynooth, Ireland, 2Univ. of Maynooth, Kildare, Ireland

4:00 **1628** Case study: Ecology of entomopathogenic nematodes in tropical fruit systems. **Claudia Dolinski** (claudia.dolinski@censanet.com.br)1 and  
Liliana Parente Ribeiro2, 1State Univ. of Northern

Rio de Janeiro, Rio de Janeiro, Brazil, 2State University of Northern Rio de Janeiro, Campos dos Goytacazes, Brazil

4:15 **1629** Ecological influence of *Steinernema carpocapsae* on native soil arthropods and nematode communities in pistachio orchards. **Amanda Hodson** (akhodson@ ucdavis.edu) and Ed Lewis, Univ. of California, Davis, CA

4:30 **1630** Entomopathogenic nematode dispersal, foraging, and infection strategies: Cruisers, ambushers, sprinters, and scouts. **Parwinder Grewal** (parwinder. grewal@utrgv.edu)1 and Harit Bal2, 1The Univ. of Texas, Edinberg, TX, 2The Ohio State Univ., Wooster, OH

4:45 **1631** Nematodes as model systems in behavioral ecology. **Adler Dillman** (adler.dillman@ucr.edu) and Tiffany Baiocchi, Univ. of California, Riverside, CA

**Symposium: Rise or Demise? A Global Outlook on the Future of Classical Biological Weed Control**

***West Hall F1 (WF1) (Convention Center)***

**Moderators and Organizers:** Mark Schwarzlaender1, Hariet Hinz2, Cliff Moran3, and Ikju Park1, 1Univ. of Idaho, Moscow, ID, 2CABI, Delémont, Switzerland, 3Univ. of Cape Town, Rondebosch, South Africa

1:30 **1632** How safe is weed biological control? A global review of direct non-target attack. **Hariet Hinz** (h.hinz@ cabi.org)1, Mark Schwarzländer2, and Rachel Winston3, 1CABI, Delémont, Switzerland, 2Univ. of Idaho, Moscow, ID, 3MIA Consulting, Shelley, ID

1:45 **1633** How specific can you get? Is the common reed, *Phragmites australis*, an anomaly? **Richard Casagrande** (casa@uri.edu)1, Bernd Blossey2, and Patrick Häfliger3, 1Univ. of Rhode Island, Kingston, RI, 2Cornell Univ., Ithaca, NY, 3CABI, Delémont, Switzerland

2:00 **1634** 110 years of continually successful weed biological control in Australia. **Andy Sheppard** (andy.sheppard@csiro.au)1, Jim Cullen1, and  
Bill Palmer2, 1CSIRO, Canberra, Australia, 2Queensland Dept. of Agriculture and Fisheries, Brisbane, Australia

2:15 **1635** Minimizing non-target effects: Making biocontrol safer and more effective. **Quentin Paynter** (paynterq@landcareresearch.co.nz)1, Simon V. Fowler2, and Ronny Groenteman2, 1Landcare Research, Auckland, New Zealand, 2Landcare Research,

Lincoln, New Zealand

2:30 **1636** Finding intraspecific information and precise origins of plant invasions: Current and upcoming molecular methods. **John Gaskin** (john.gaskin@ars. usda.gov), USDA - ARS, Sidney, MT

2:45 **1637** Cryptic species and biological control: A brave new world? **Massimo Cristofaro** (massimo.cristofaro. cas@enea.it)1, Marie-Claude Bon2, Lincoln Smith2, Alessio De Biase3, Radmila Petanović4, and

Biljana Vidović4, 1ENEA, Rome, Italy, 2USDA - ARS, Montferrier-sur-Lez, France, 3Univ. of Rome  
“La Sapienza”, Rome, Italy, 4Univ. of Belgrade, Belgrade, Serbia

**SD1638** Genomic approaches in weed biological control. Amanda Stahlke, **Mark Schwarzländer** (markschw@ uidaho.edu), and Paul Hohenlohe, Univ. of Idaho, Moscow, ID

**SD1639** Biological control of silverleaf nightshade (*Solanum elaeagnifolium*), one of the worst alien invasive weeds of the Mediterranean basin. **Javid Kashefi** (jkashef@ ars-ebcl.org)1, Marie-Claude Bon2, Gualbert Gbèhounou3, Ahmet Uludag4, Anastasia Lagopodi5, Mohamed Bouhache6, and Carl Bell7, 1USDA - ARS, Thessaloniki, Greece, 2USDA - ARS, Montferrier-sur-Lez, France, 3Food and Agriculture Organization of the United Nations, Rome, Italy, 4Çanakkale Onsekiz Mart Univ., Çanakkale, Turkey, 5Aristotle Univ. of Thessaloniki, Thessaloniki, Greece, 6Agricultural and Veterinary Institute Hassan II, Rabat, Morocco, 7Univ. of California Cooperative Extension, Ventura, CA

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**TUESDAY**

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* **SD1640**Proposed adoption of classical biological control  
  by the Convention of Biological Diversity for the management of invasive alien species in natural ecosystems. Andy Sheppard1 and **Piero Genovesi** (piero.genovesi@isprambiente.it)2, 1CSIRO, Canberra, Australia, 2ISPRA, Rome, Italy
* **SD1641**Incorporating olfactory cues into risk assessment of the root weevil, *Mogulones crucifer,* as a biocontrol agent of *Cynoglossum officinale*. **Basu Kafle** (kafl6134@ vandals.uidaho.edu), Sanford D. Eigenbrode, and   
  Mark Schwarzländer, Univ. of Idaho, Moscow, ID
* **SD1642**Role of chemical, visual, and tactile cues in the host selection behavior of the weevil *Ceutorhynchus cardariae*, a potential biological control agent for *Lepidium draba*. **Jessica Rendon** (rend7937@vandals. uidaho.edu)1, Sanford D. Eigenbrode1, Hariet Hinz2,   
  Urs Schaffner2, and Mark Schwarzländer1, 1Univ. of Idaho, Moscow, ID, 2CABI, Delémont, Switzerland

**3:00 BREAK AND POSTER SESSION**

3:15 **1643** Community-based implementation is vital to the wide-scale success of weed biological control in South Africa. **Martin Hill** (m.hill@ru.ac.za),  
Julie Coetzee, Iain Patterson, Philip Weyl, Grant Martin, and Jackie Hill, Rhodes Univ., Grahamstown, South Africa

3:30 **1644** Simple citizen science monitoring programs generate a wealth of data to assess weed biocon-  
trol effects. Aaron Weed1 and **Mark Schwarzländer** (markschw@uidaho.edu)2, 1U.S. National Park Service, Fredericksburg, VA, 2Univ. of Idaho, Moscow, ID

3:45 **1645** Growing prospects for classical biological control of weeds in Europe. **Richard Shaw** (r.shaw@ cabi.org), CABI, Egham, United Kingdom

4:00 **1646** *Tamarix* biocontrol in North America: Tracking success in the midst of controversy. **Dan Bean** (dan.bean@state.co.us)1 and Tom Dudley2, 1Colorado Dept. of Agriculture, Palisade, CO, 2Univ. of California, Santa Barbara, CA

4:15 **1647** Weed biological control in California: Review of the past and prospects for the future. **Michael Pitcairn** (mike.pitcairn@cdfa.ca.gov), California Dept. of Food and Agriculture, Sacramento, CA

4:30 **1648** Classical biological control programs for exotic weeds in the western USA: Long-term assessment of weed management, nontarget effects, and economic and ecological impacts. **Rich Hansen** (richard.w.hansen@ aphis.usda.gov), USDA - APHIS, Fort Collins, CO

4:45 **1649** Sleeping next to an elephant: Still keeping biological control in the management toolbox in Canada. **Rob Bourchier** (robert.bourchier@agr.gc.ca)1, Aaron Weed2, Lisa Tewksbury3, Naomi Cappuccino4, Sandy Smith5, Andre Gassmann6, and

Richard Casagrande3, 1Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, 2U.S. National Park Service, Fredericksburg, VA, 3Univ. of Rhode Island, Kingston, RI, 4Carleton Univ., Ottawa, ON, Canada, 5Univ. of Toronto, Toronto, ON, Canada, 6CABI, Delémont, Switzerland

5:00 **1650** Pathogens continue to impress as weed biological control agents in Australia. **Louise Morin** (louise.morin@csiro.au), CSIRO, Canberra, Australia

5:15 **1651** Bimodal host-finding studies improve environmental safety assessments of a weed biocontrol candidate, the weevil *Mogulones borraginis* on *Cynoglossum officinale*. **Ikju Park** (park0563@vandals. uidaho.edu)1, Sanford D. Eigenbrode1, Hariet Hinz2,

Urs Schaffner2, and Mark Schwarzländer1, 1Univ. of Idaho, Moscow, ID, 2CABI, Delémont, Switzerland

**Symposium: Arthropod Movement in Agro- Ecosystems: Linking Individual Behaviours and Population Patterns Across Spatio-Temporal Scales. Just What Does Emerge?**

***Room W330 B (Convention Center)***

**Moderators and Organizers:** Hazel R. Parry, Cate Paull, and Nancy Schellhorn, CSIRO, Brisbane, Australia

1:30 **1652** Resource exploitation: The role of movement, oviposition, and the landscape context. **Nancy A. Schellhorn** (nancy.schellhorn@csiro.au), CSIRO, Dutton Park, Australia

1:45 **1653** Linking herbivore dispersal and population dynamics in complex landscapes. **Megan E. O’Rourke** (megorust@vt.edu)1 and Katja Poveda2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Cornell Univ., Ithaca, NY

2:00 **1654** Factors affecting movement of arthropods that transmit plant pathogens and implications for pathogen spread. **David Crowder** (dcrowder@wsu. edu), Washington State Univ., Pullman, WA

2:15 **1655** Predicting biological control of cereal aphids across agricultural landscapes. **Mattias Jonsson** (mattias.jonsson@slu.se)1, Riccardo Bommarco1, Barbara Ekbom1, Henrik Smith2, Camilla Winqvist1, Berta Caballero-Lopez3, Jan Bengtsson1, and

Ola Olsson2, 1Swedish Univ. of Agricultural Sciences, Uppsala, Sweden, 2Lund Univ., Lund, Sweden, 3Natural History Museum, Barcelona, Spain

2:30 **1656** Piecing together patterns of western corn rootworm (*Diabrotica virgifera virgifera* LeConte) movement. **Joseph Spencer** (spencer1@illinois.edu) and Sarah Hughson, Univ. of Illinois, Champaign, IL

2:45 **1657** The interaction between migratory capacity and pathogen load in the fall armyworm, *Spodoptera frugiperda*. **Aislinn Pearson** (aislinn.pearson@rothamsted. ac.uk)1,2, Robert Graham3, Jason Lim2, Jason Chapman4, and Kenneth Wilson1, 1Lancaster Univ., Lancaster, United Kingdom, 2Rothamsted Research, Harpenden, United Kingdom, 3Harper Adams Univ., Newport, United Kingdom, 4Univ. of Exeter, Penryn, United Kingdom

**3:00 BREAK**

3:15 **1658** Genetic signatures underpinning long-distance movement in a global insect pest, *Helicoverpa armigera*. **Christopher Jones** (christopher.jones@ rothamsted.ac.uk)1, Jason Lim1, Chris Bass2, and

Jason Chapman1,2, 1Rothamsted Research, Harpenden, United Kingdom, 2Univ. of Exeter, Penryn, United Kingdom

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**TUESDAY**

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3:30 **1659** Linking *Helicoverpa* spp. moth behavior to landscape drivers: Implications for management. **Cate Paull** (cate.paull@csiro.au)1, Andrew Hulthen1, and Nancy A. Schellhorn2, 1CSIRO, Brisbane, Australia, 2CSIRO, Dutton Park, Australia

3:45 **1660** From models to management: Simulating *Helicoverpa* movement behaviour in complex landscapes and the implications for Bt resistance. **Hazel R. Parry** (hazel.parry@csiro.au)1, Cate Paull1, Myron Zalucki2, Anthony R. Ives3, and Nancy Schellhorn1, 1CSIRO, Brisbane, Australia, 2Univ. of Queensland, Brisbane, Australia, 3Univ. of Wisconsin, Madison, WI

4:00 **1661** Intrinsic influences on establishment and dispersal success in fragmented landscapes: A spatially-explicit individual-based approach.  
**Audrey Lustig** (audrey.lustig@lincolnuni.ac.nz) and Susan Worner, Lincoln Univ., Canterbury, New Zealand

4:15 **1662** BEESCOUT: A BEEHAVE landscape module  
to determine the scouting success in bees.  
**Matthias Becher** (m.a.becher@exeter.ac.uk) and  
Juliet Osborne, Univ. of Exeter, Penryn, United Kingdom

4:45 **1663** Modelling monarch butterfly movement and egg-laying in a spatially-explicit Iowa, USA, landscape. **Tyler Grant** (tgrant@iastate.edu)1, Steven Bradbury1, Hazel R. Parry2, and Myron Zalucki3, 1Iowa State

Univ., Ames, IA, 2CSIRO, Brisbane, Australia, 3Univ. of Queensland, Brisbane, Australia

**Symposium: Arthropods and Decomposition**

***Room W224 E (Convention Center)***

**Moderators and Organizers:** Michael D. Ulyshen1 and Jennifer L. Pechal2, 1USDA - Forest Service, Athens, GA, 2Michigan State Univ., East Lansing, MI

1:30 **1664** Mapping brown food webs on biogeochemical gradients. **Michael Kaspari** (mkaspari@ou.edu), Univ. of Oklahoma, Norman, OK

1:45 **1665** Decomposition, thermal microclimates, and the consequences for ant biodiversity. **Terrence P. McGlynn** (terry.mcglynn@gmail.com) and Erica Parra, California State Univ., Carson, CA

2:00 **1666** Spatial and temporal variation in insect functional diversity effects on litter decomposition. **André Frainer** (andre.frainer@uit.no)1 and Brendan McKie2, 1Univ. of Tromsø The Arctic Univ. of Norway, Tromsø, Norway, 2Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

2:15 **1667** The role of insects in fine woody debris decomposition. **Allison Stoklosa** (amstok7@gmail.com)1 and Michael D. Ulyshen2, 1Drexel Univ., Philadelphia, PA, 2USDA - Forest Service, Athens, GA

2:30 **1668** The role of insects and microbes for dead-wood decomposition relative to global climate gradients. **Sebastian Seibold** (sebastian-seibold@gmx.de), Technical Univ., Freising, Germany

2:45 **1669** The potential of insects to act as spore vectors. **Rannveig Jacobsen** (rannveig.jacobsen@nmbu.no)1, Tone Birkemoe1, Anne Sverdrup-Thygeson1, Håvard Kauserud2, and Synnøve Botnen2, 1Norwegian Univ. of Life Sciences, Ås, Norway, 2Univ. of Oslo, Oslo, Norway

**3:00 BREAK**

3:15 **1670** Patterns and implications of insect-accelerated wood loss in southeastern U.S. forests. **Michael Ulyshen** (mulyshen@hotmail.com)1, Sebastian Seibold2, Michael Strickland3, Allison Stoklosa4, and Scott Horn1, 1USDA - Forest Service, Athens, GA, 2Technical Univ., Freising, Germany, 3Virginia Polytechnic Institute

and State Univ., Blacksburg, VA, 4Drexel Univ., Philadelphia, PA

3:30 **1671** Resource subsidy influence on necrobiome networks. **Jennifer L. Pechal** (pechalje@msu.edu) and M. Eric Benbow, Michigan State Univ., East Lansing, MI

3:45 **1672** The dynamic necrobiome: The interacting web of organisms associated with animal death and decomposition. **M. Eric Benbow** (benbow@msu.edu)1, Jennifer L. Pechal1, Philip Barton2, and

Courtney R. Weatherbee1, 1Michigan State Univ., East Lansing, MI, 2The Australian National Univ., Canberra, Australia

4:00 **1673** Tri-trophic interactions mediating arthropod behavior on decomposing vertebrate carrion. **Jeffery K. Tomberlin** (jktomberlin@tamu.edu)1, Tawni L. Crippen2, and Jonathan A. Cammack1, 1Texas A&M Univ., College Station, TX, 2USDA - ARS, College Station, TX

4:15 **1674** Rhizospheric C-cycling: Implications of soil microarthropods. **Michael Strickland** (strick77@ vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

4:30 **1675** Impact of dissolved oxygen levels on marine taphonomy and faunal scavenging of pig carcasses submerged at a variety of depths and habitats in the Salish Sea. **Gail Anderson** (ganderso@sfu.ca) and Lynne Bell, Simon Fraser Univ., Burnaby, BC, Canada

4:45 **1676** Experimental citizen science: Measuring dung decomposition by arthropods. **Riikka Kaartinen** (riikka.kaartinen@slu.se)1, Bess Hardwick2, and  
Tomas Roslin2, 1Swedish Univ. of Agricultural Sciences, Uppsala, Sweden, 2Univ. of Helsinki, Helsinki, Finland

5:00 **1677** Species traits predict biodiversity dynamics at carrion resource patches. **Philip Barton** (philip.barton@ anu.edu.au), The Australian National Univ., Canberra, Australia

5:15 **1678** Seek and hide: Burying beetles exploit and then suppress microbial semiochemicals. **Stephen Trumbo** (stephen.trumbo@uconn.edu)1, Charmaine Woodard Melvin2, and Paula K. B. Philbrick2, 1Univ. of Connecticut, Waterbury, CT, 2Texas Tech Univ., Lubbock, TX

**Symposium: Entomological Research in China: Major Progresses and Perspectives**

***Room W414 B (Convention Center)***

**Moderators and Organizers:** Tong-Xian Liu1 and Le Kang2, 1Northwest A&F Univ., Yangling, China, 2Chinese Academy of Sciences, Beijing, China

1:30 **1679** Current progress and perspectives of entomology in China. **Le Kang** (lkang@ioz.ac.cn), Chinese Academy of Sciences, Beijing, China

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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

2:00 **1680** The functional genomics of the brown planthopper. **Chuan-Xi Zhang** (chxzhang@zju.edu.cn), Hai-Jun Xu, and Yanyuan Bao, Zhejiang Univ., Hangzhou, China

2:30 **1681** Further insight into reproductive incompatibility between putative cryptic species of the *Bemisia tabaci* whitefly complex. **Shu-Sheng Liu** (shshliu@zju.edu.cn), Zhejiang Univ., Hangzhou, China

2:45 **1682** Genomic and molecular features in fungi to interact with insects. **Chengshu Wang** (cswang@sibs. ac.cn), Chinese Academy of Sciences, Shanghai, China

**3:00 BREAK**

3:15 **1683** What controls the pupal-specific expression of cuticle protein genes in the silkworm, *Bombyx mori*? **Qili Feng** (qlfeng@scnu.edu.cn), South China Normal Univ., Guangzhou, China

3:30 **1684** Juvenile hormone signaling in *Drosophila*. **Sheng Li** (lisheng01@sibs.ac.cn), Chinese Academy of Sciences, Shanghai, China

3:45 **1685** The peripheral pheromone olfactory systems in two moth species, *Helicoverpa armigera* and *Helicoverpa assulta*. **Chen-Zhu Wang** (czwang@ioz.ac.cn), Chinese Academy of Sciences, Beijing, China

4:00 **1686** Status evolution of insect pests in Bt cotton ecosystem of China. **Kongming Wu** (kmwu@ippcaas. cn), Chinese Academy of Agricultural Sciences, Beijing, China

4:15 **1687** Biology, ecology, and management of the diamondback moth in China. **Zhenyu Li** (zhenyu\_ li@163.com)1, Xia Feng1, Shu-Sheng Liu2, Minsheng You3, and Michael J. Furlong4, 1Guangdong Academy of Agricultural Sciences, Guangzhou, China, 2Zhejiang Univ., Hangzhou, China, 3Fujian Agriculture and Forestry Univ., Fuzhou, China, 4Univ. of Queensland, Brisbane, Australia

4:30 **1688** Biological control of pest insects in protected environments in China: How far are we? **Tong-Xian Liu** (txliu@nwsuaf.edu.cn), Northwest A&F Univ., Yangling, China

**Symposium: Industrialization of Insects as a Food Ingredient**

***Room W222 A (Convention Center)***

**Moderator and Organizer:** Florence Dunkel, Montana State Univ., Bozeman, MT

1:30 **1689** Perfect storm to nutritional security: Insects on the menu? **Sonny Ramaswamy** (sonny@nifa.usda.gov), USDA - NIFA, Washington, DC

2:00 **1690** Nutritional aspects of insects and the funding environment: SBIR grants and USDA - NIFA. **Jodi Williams** (jwilliams@nifa.usda.gov), USDA - ARS, Washington, DC

2:15 **1691** Current state of the art in insect mass rearing technologies and their potential application in insect farming. **Juan Morales-Ramos** (juan.moralesramos@ ars.usda.gov) and M. Guadalupe Rojas, USDA - ARS, Stoneville, MS

2:30 **1692** Lessons from Thailand on industrializing insect ingredients. **Patrick Durst** (patrick.durst@fao.org), Food and Agriculture Organization of the United Nations, Bangkok, Thailand

2:45 **1693** Recognizing and alleviating the disgust factor. **Paul Rozin** (rozin@psych.upenn.edu), Univ. of Pennsylvania, Philadelphia, PA

**3:00 BREAK**

3:15 **1694** Regulatory aspects of insects in food in the United States and Europe. **Palma Marone** (pamarone@ verizon.net), Virginia Commonwealth Univ., Richmond, VA

3:30 **1695** Insects as food: History, culture, and modern use around the world. **Eraldo Costa-Neto** (eraldont@ hotmail.com)1 and Florence Dunkel2, 1Feira de Santana State Univ., Feira de Santana, Brazil, 2Montana State Univ., Bozeman, MT

3:45 **1696** Presentation withdrawn

4:00 **1697** The state of research on insects as food: A systematic review of the literature. **Charlotte Payne** (charlotte.payne@gmail.com)1, Joshua Evans2, Andrew Muller2, and Rebecca Roberts3, 1Univ. of Cambridge, Cambridge, United Kingdom, 2Nordic Food Lab, Frederiksberg, Denmark, 3Humboldt Univ., Berlin, Germany

4:15 **1698** Food microbiological considerations for the insect-based food industry. **Douglas Marshall** (douglasmarshall@eurofinsus.com), Eurofins Microbiology Laboratories, Inc., Fort Collins, CO

4:30 **1699** Edible grasshoppers promoting collaboration in the Middle East. **Dror Tamir** (drorta@tzatzar.biz), Steak TzarTzar, Tnuvot, Israel

4:45 **1700** Considerations for development and commercialization of insect based foods. **George Cavender** (gcavender2@unl.edu), Univ. of Nebraska, Lincoln, NE

**Symposium: Insects and the Global Human Experience**

***Room W314 A (Convention Center)***

**Moderator and Organizer:** Gene Kritsky, Mount St. Joseph Univ., Cincinnati, OH

1:30 **1701** Insects Incorporated: Cultural entomology connects all disciplines as an online resource. **Barrett Klein** (barrett@pupating.org), Univ. of Wisconsin, La Crosse, WI

1:45 **1702** Insects as examples of parallel mythology. **Ronald Cherry** (Pinesnpets@aol.com), Univ. of Florida, Belle Glade, FL

2:00 **1703** Beekeeping from antiquity through the Middle Ages. **Gene Kritsky** (cdarwin@aol.com), Mount St. Joseph Univ., Cincinnati, OH

2:15 **1704** What makes a don of Cambridge University and pioneer of the American prairie become a champion of Darwinism? **Carol Anelli** (anelli.7@osu.edu), The Ohio State Univ., Columbus, OH

2:30 **1705** Insects in Japanese tradition and culture. **Nan-Yao Su** (nysu@ufl.edu), Univ. of Florida, Davie, FL

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**TUESDAY**

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2:45 **1706** Insects in Japanese and French art, ca. 1900. **Sandra Schachat** (schachatsr@si.edu), Mississippi State Univ., Mississippi State, MS

**3:00 BREAK**

3:15 **1707** Insectography: Insects in the world of fiction. **Erin Bauer** (ebauer2@unl.edu), Univ. of Nebraska, Lincoln, NE

3:30 **1708** The mother of entomology: 17th century artist and revolutionary, Maria Sybilla Merian. **Michelle A. Duennes** (mduennes@life.illinois.edu), Univ. of Illinois, Champaign, IL

3:45 **1709** Bugs and the blues: Insects as tricksters in early blues music. **Robert K. D. Peterson** (bpeterson@ montana.edu), Montana State Univ., Bozeman, MT

4:00 **1710** For the record: The contribution of insects in popular music. **Stephen R. Clarke** (sclarke@fs.fed.us), USDA - Forest Service, Lufkin, TX

4:15 **1711** Entomoludology: Usage of insects in video games. **Matan Shelomi** (mshelomi@ice.mpg.de), Max Planck Institute for Chemical Ecology, Jena, Germany

4:30 **1712** Insects in fireworks. **Joseph R. Coelho** (coelh- jo@quincy.edu), Quincy Univ., Quincy, IL

4:45 **1713** Public perceptions of insect diversity: How many “bugs” might there be? **John Acorn** (jacorn@ ualberta.ca), Univ. of Alberta, Edmonton, AB, Canada

**Symposium: Biology and Evolution of Social Insect Symbionts**

***Room W240 D (Convention Center)***

**Moderators and Organizers:** Joseph Parker1 and Christoph von Beeren2, 1Columbia Univ., New York, NY, 2The Rockefeller Univ., New York, NY

3:30 **1721** Myrmecophily in xanthopygine rove beetles (Coleoptera: Staphylinidae). **Stylianos Chatzimanolis** (stylianos-chatzimanolis@utc.edu), Univ. of Tennessee, Chattanooga, TN

3:45 **1722** Myrmecophile chemo-evo-devo: Genetic architecture of the tergal gland, a preadaptation for social parasitism in aleocharine rove beetles.  
**Joseph Parker** (dibasic@gmail.com), Columbia Univ., New York, NY

4:00 **1723** Poorly known and possible myrmecophiles in the spider beetles and dung beetles: How rare can they be? **T. Keith Philips** (keith.philips@wku.edu), Western Kentucky Univ., Bowling Green, KY

**Symposium: Emerging Technologies for Tomorrow’s Collaborative Discoveries**

***West Hall F2 (WF2) (Convention Center)***

**Moderator and Organizer:** Tamra Lincoln, USDA - ARS, Columbia, MO

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1:30 **1714**  
a community of ants, aphids, mealybugs, and bacteria. **Aniek Ivens** (aivens@rockefeller.edu), The Rockefeller Univ., New York, NY

1:45 **1715** Artificial selection on beneficial gut microbiomes of bees. **Ulrich G. Mueller** (umueller@mail.utexas.edu) and Rong Ma, The Univ. of Texas, Austin, TX

2:00 **1716** Host specificity in phorid parasitoids of ants. **Don Feener** (donald.feener@utah.edu), Univ. of Utah, Salt Lake City, UT

2:15 **1717** Biodiversity, life-history adaptations, and network structure of army ant-symbiont communities. **Christoph von Beeren** (cvonbeeren@mail.rockefeller. edu), The Rockefeller Univ., New York, NY

2:30 **1718** Systematics and diversification of the eucharitid ant parasitoids (Hymenoptera: Chalcidoidea). **Elizabeth Murray** (em573@cornell.edu), Cornell Univ., Ithaca, NY

2:45 **1719** Beetles breaking the ant acoustical code: New insights into a host-parasite relationship. **Andrea Di Giulio** (andrea.digiulio@uniroma3.it), Univ. of Roma Tre, Rome, Italy

**3:00 BREAK**

3:15 **1720** Molecular phylogeny of the flanged bombardier beetles (Carabidae: Paussinae). **Wendy Moore** (wmoore@ arizona.edu), Univ. of Arizona, Tucson, AZ

1:30

1:45

2:00

2:15

**1724** It’s a bird. It’s a plane. No, it’s weed biocontrol by drone. **Carey Minteer** (carey.minteer@ars.usda.gov)1, Thomas Spencer2, Victor Wilhelm2, Travis Barnett2, Michael Hensch2, and Philip Tipping1, 1USDA - ARS,

Ft. Lauderdale, FL, 2U.S. Army Corps of Engineers, Jacksonville, FL

**1725** Natural history matters: Using 19th century techniques to solve 21st century pest problems. **Lauren M. Diepenbrock** (laurendiepenbrock@gmail. com), Katharine Swoboda-Bhattarai, and

Hannah Burrack, North Carolina State Univ., Raleigh, NC

**1726** The genome-wide analysis of innate immunity in a pupal endoparasitoid wasp, *Pteromalus puparum*. **Lei Yang** (11316090@zju.edu.cn)1, Qi Fang1, Zhichao Yan1, Zhe Lin2, and Gongyin Ye1, 1Zhejiang Univ., Hangzhou, China, 2State Key Laboratory of Integrated Management of Pest Insects and Rodents, Beijing, China

**1727** Using the latest generation of harmonic radar and microtags to track the retention capacity of the invasive brown marmorated stink bug in vegetables and tree fruit augmented with semiochemicals. **William R. Morrison** (william.morrison@ars.usda.gov)1, Doo-Hyung Lee2, Bruce Colpitts3, Charles Vincent4, Gilles Boiteau5, and Tracy C. Leskey1, 1USDA - ARS, Kearneysville, WV, 2Gachon Univ., Seongnam, South Korea, 3Univ. of New Brunswick, Fredericton, NB, Canada, 4Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada, 5Agriculture and Agri-Food Canada, Fredericton, NB, Canada

**1728** Insect research without the bug: Eicosanoid inhibition in cell culture. **Tamra Lincoln** (treallf@gmail. com)1, Cynthia Goodman1, Yaofa Li2, Kaile Zhou3, Joseph Ringbauer1, and David Stanley1, 1USDA - ARS, Columbia, MO, 2Hebei Academy of Agricultural and Forestry Sciences, Baoding, China, 3Univ. of Missouri, Columbia, MO

**1729** Laser ablation tomography: High resolution imaging, 3D modeling, and quantitative analysis. **Benjamin Hall** (hall.benjamin@gmail.com),  
Brian Reinhardt, Andrew Yanders, Asheesh Lanba, and Josh Blosenski, L4iS, State College, PA

Multi-level mutualism: Interaction specificity in

2:30

2:45



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* **SD1730**Cuticle comparative analyses between endo- and ecto-parasitoids using electron microscopy and genomic approaches. **Jiale Wang** (jialewang@zju.edu.cn), Qi Fang, Zhichao Yan, and Gongyin Ye, Zhejiang Univ., Hangzhou, China
* **SD1731**Sex-biased expression of microRNAs in an en- doparasitoid wasp, *Pteromalus puparum*. **Shan Xiao** (xiaoshan9401@126.com), Qi Fang, and Gongyin Ye, Zhejiang Univ., Hangzhou, China
* **SD1732**Prostaglandin activity in established cell lines.  
  **Kaile Zhou** (kailezhou1991@gmail.com)1,  
  Cynthia Goodman2, Tamra Lincoln2, Yaofa Li3,  
  Joseph Ringbauer2, and David Stanley2, 1Univ. of Missouri, Columbia, MO, 2USDA - ARS, Columbia, MO, 3Hebei Academy of Agricultural and Forestry Sciences, Baoding, China
* **SD1733**New kids on the block: Regulatory issues around emerging pests and emerging technologies.  
  **Johanna Elsensohn** (jeelsens@ncsu.edu), Zachary Brown, and Hannah Burrack, North Carolina State Univ., Raleigh, NC

**3:00 BREAK AND POSTER SESSION**

3:15 **1734** Stable isotope labeling gives insight into strategies for managing resistance in western corn rootworm, *Diabrotica virgifera virgifera* LeConte. Sally Taylor and **Christian Krupke** (ckrupke@purdue. edu), Purdue Univ., West Lafayette, IN

3:30 **1735** Effectiveness of various entomopathogenic nematode species on the control of larval *Diabrotica virgifera virgifera* (Coleoptera: Chrysomelidae).  
**Ryan Winslow Geisert** (rwg5h8@mail.missouri.edu) and Thomas A. Coudron, USDA - ARS, Columbia, MO

3:45 **1736** Video evaluation, timelapse, and photo geolocation: Tools for integrating research and extension. **Anthony J. McMechan** (justin.mcmechan@ gmail.com), Univ. of Nebraska, Lincoln, NE

**Symposium: Insect Effects on Ecosystem Services**

***Room W414 D (Convention Center)***

**Moderators and Organizers:** Timothy D. Schowalter1 and Teja Tscharntke2, 1Louisiana State Univ., Baton Rouge, LA, 2Georg August Univ., Göttingen, Germany

*We greatly appreciate funding from the National Science Foundation Grant DEB-1565406 for travel support for international speakers, travel awards for graduate students and early career professionals and funding for the reception following this symposium.*

2:30 **1740** Biodiversity services in agroecosystems. **Teja Tscharntke** (ttschar@gwdg.de), Georg August Univ., Göttingen, Germany

2:45 **1741** Designing landscapes for multiple services. **Douglas A. Landis** (landisd@msu.edu), Michigan State Univ., East Lansing, MI

**3:00 BREAK**

3:15 **1742** Fruits of the insects — managing pollinator  
and predator communities for sustainable agriculture. **Riccardo Bommarco** (riccardo.bommarco@slu.se), Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

3:30 **1743** Effects of land use and plant diversity on insect diversity and consequences for ecosystem functioning. **Wolfgang Weisser** (wolfgang.weisser@tum.de)1, Martin Grossner2, Nadja Simons2, Anne Ebeling3, Sebastian Meyer2, and Lionel Hertzog2, 1Technical Univ., Freising, Germany, 2Technical Univ., München, Germany, 3Univ. of Jena, Jena, Germany

3:45 **1744** Landscape effects on pollination services. **Hisatomo Taki** (htaki@affrc.go.jp), Forestry and Forest Products Research Institute, Tsukuba, Japan

4:00 **1745** Deforestation and human disease. Amy Vittor1 and **Nathan Burkett-Cadena** (nburkettcadena@ufl. edu)2, 1Univ. of Florida, Gainesville, FL, 2Univ. of Florida, Vero Beach, FL

4:15 **1746** Climate change effects on insects and ecosystem services. **Chelse Prather** (cprather@radford. edu)1 and Angela Laws2, 1Radford Univ., Radford, VA, 2Univ. of Houston, Houston, TX

4:30 **1747** Economic values of harvesting grasshoppers for food versus control. **Rene Cerritos** (renecerritos@ gmail.com), National Autonomous Univ. of México, Mexico City, Mexico

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4:45 **Reception**  
**Symposium: Novel Insecticidal Agents and**

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**Next-Gen Approaches for Insect Control**

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1:30 **1737**  
services. **Timothy D. Schowalter** (tschowalter@agcenter. lsu.edu), Louisiana State Univ., Baton Rouge, LA

2:00 **1738** Grasshopper stimulation of grassland productivity. **Gary Belovsky** (belovsky.1@nd.edu) and Jennifer Slade, Univ. of Notre Dame, South Bend, IN

2:15 **1739** Ecosystem services of dung beetles in Australia. **Bernard Doube** (bernardo@internode. on.net), Dung Beetle Solutions, Bridgewater, Australia

***Room W225 A (Convention Center)***

**Moderators and Organizers:** William Moar1 and Kenneth Narva2, 1Monsanto Company, St. Louis, MO, 2Dow AgroSciences, Indianapolis, IN

1:30 **1748** Novel pesticidal protein discovery: What’s next in a post-next-gen sequencing world? **Kimberly Sampson** (kimberly.sampson@bayer.com), James Doroghazi, Elyse Rodgers-Vieira, Jessica Monserrate, and Jelena Zaitseva, Bayer CropScience, Morrisville, NC

1:45 **1749** Novel protein for corn rootworm control. **Yong Yin** (yong.yin@monsanto.com)1, David Bowen2, Catherine Chay1, Jason Milligan1, Gregory Bean1, Arlene Howe1, Stanislaw Flasinski1, Renata Bolognesi2, and James Roberts2, 1Monsanto Company, St. Louis, MO, 2Monsanto Company, Chesterfield, MO

2:00 **1750** *Bacillus thuringiensis* insecticidal proteins  
for control of *Diabrotica virgifera virgifera*.  
**Kenneth Narva** (knarva@dow.com)1, Colin Berry2, Jean-Louis Schwartz3, Raffi Aroian4, and Vimbai Chikwana1,

Overview of insect effects on ecosystem

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**TUESDAY**

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1Dow AgroSciences, Indianapolis, IN, 2Cardiff Univ., Cardiff, United Kingdom, 3Univ. of Montréal, Montréal, QC, Canada, 4Univ. of Massachusetts, Worcester, MA

2:15 **1751** Modification of *a Bacillus thuringiensis* toxin to target soybean aphid (*Aphis glycines*). **Biviana Flores-Escobar** (biviana@iastate.edu), Benjamin Diest, Maria Fernandez Luna, and Bryony Bonning, Iowa State Univ., Ames, IA

2:30 **1752** Continuous evolution of the *B. thuringiensis* toxin Cry1Ac can overcome Bt resistance in insects. Thomas Malvar1, Ahmed Badran2, **Victor Guzov** (victor.m.guzov@monsanto.com)3, Qing Huai4,  
Melissa Kemp4, Prashanth Vishwanath4, Wendy Kain5, Ping Wang5, Artem Evdokimov6, Farhad Moshiri4, Keith Turner4, and David Liu2, 1Monsanto Company, North Stonington, CT, 2Harvard Univ., Cambridge, MA, 3Monsanto Company, Cambridge, MA, 4Monsanto Company, Chesterfield, MO, 5Cornell Univ., Geneva, NY, 6HarkerBIO, LLC, Buffalo, NY

2:45 **1753** *Bacillus thuringiensis* toxin classification — the need for change? **Neil Crickmore** (n.crickmore@sussex. ac.uk), Univ. of Sussex, Brighton, United Kingdom

**3:00 BREAK**

3:15 **1754** Highly efficacious recombinant bacterial larvicides for mosquito vector control based on endotoxins of *Bacillus thuringiensis* and *Lysinibacillus sphaericus*. **Brian Federici** (brian.federici@ucr.edu)1, Dennis Bedishi1, Hyun-Woo Park2, Robert Hice1, and Margaret Wirth1, 1Univ. of California, Riverside, CA, 2California Baptist Univ., Riverside, CA

3:30 **1755** Structural and functional characterization of a new corn rootworm active protein from a *Pseudomonas* strain. **Lu Liu** (lu.liu@pioneer.com)1, Jarred Oral1,  
James English1, Azalea Ong1, Ingrid Udranszky1,

Brad Poland2, David Cerf1, Mark McDonald1, and Genhai Zhu1, 1DuPont Pioneer, Hayward, CA, 2DuPont Pioneer, Johnston, IA

3:45 **1756** Structural basis for a shared mode of action between a pair of corn rootworm actives from a *Bacillus thuringienses* and a non-*Bacillus* bacterial source. **Nasser Yalpani** (nasser.yalpani@pioneer.com)1, Timothy M. Nowatzki1, Amit Sethi1, Brad Poland1, Jian-Zhou Zhao1, and Lu Liu2, 1DuPont Pioneer, Johnston, IA, 2DuPont Pioneer, Hayward, CA

4:00 **1757** The future of cystine-knot peptides in insecticide development. **Robert Kennedy** (rmkennedy@ vestaron.com), Vestaron Corporation, Kalamazoo, MI

4:15 **1758** Preliminary ecological risk assessment of a new Bt protein (Cry51Aa2.834\_16) effective for controlling targeted sucking insect pests in cotton using laboratory and field data. Aqeel Ahmad, Peter Asiimwe,

Pamela Bachman, Jennifer Fridley, **Peter Jensen** (peter.d.jensen@monsanto.com), Steven Levine, Jianguo Tan, and Joshua Uffman, Monsanto Company, St. Louis, MO

4:30 **1759** Use of species sensitivity distributions in the characterization of risk of novel insecticidal proteins to non-target organisms. **Chad Boeckman** (chad.boeckman@ pioneer.com), DuPont Pioneer, Johnston, IA

4:45 **1760** Insect resistance management for next-generation insecticidal traits. **Miles Lepping** (mdlepping@dow.com) and Nicholas Storer, Dow AgroSciences, Indianapolis, IN

**Symposium: Evolution of Biological Clocks**

***Room W224 C (Convention Center)***

**Moderators and Organizers:** Astrid Groot1 and Charalambos Kyriacou2, 1Univ. of Amsterdam, Amsterdam, Netherlands, 2Univ. of Leicester, Leicester, United Kingdom

1:30 **1761** Circadian clock control of the monarch butterfly seasonal migration. **Christine Merlin** (cmerlin@bio. tamu.edu), Texas A&M Univ., College Station, TX

2:00 **1762** Circatidal clock in the mangrove cricket. **Hideharu Numata** (numata@ethol.zool.kyoto-u.ac.jp), Kyoto Univ., Kyoto, Japan

2:30 **1763** From genome to function: Circadian and circalunar timing adaptations in the intertidal insect *Clunio marinus*. Tobias Kaiser and **Birgit Poehn** (birgit. poehn@univie.ac.at), Max F. Perutz Laboratories, Vienna, Austria

**3:00 BREAK**

3:15 **1764** Evolution of timing in insects and crustacea. **Charalambos Kyriacou** (cpk@leicester.ac.uk), Univ. of Leicester, Leicester, United Kingdom

3:30 **1765** The linden bug, *Pyrrhocoris apterus*, a model for insect seasonality. **Marketa Hejnikova** (hejnikova@ entu.cas.cz), Lenka Pivarciova, and David Dolezel, Czech Academy of Sciences, České Budějovice,

Czech Republic

3:45 **1766** Observation of circadian behavior in the large black chafer, *Holotrichia parallela*. **Yuta Kawasaki** (utakwsk@sci.osaka-cu.ac.jp), Osaka City Univ., Osaka, Japan

4:00 **1767** Evolution of timing sexual behaviors in moths. **Astrid Groot** (a.t.groot@uva.nl), Univ. of Amsterdam, Amsterdam, Netherlands

4:15 **Panel Discussion**  
**Symposium: Interactions Between the Insect**



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**Immune System and Parasites**

***Room W331 D (Convention Center)***

**Moderators and Organizers:** Michael R. Strand1 and Francesco Pennacchio2, 1Univ. of Georgia, Athens, GA, 2Univ. of Napoli Federico II, Napoli, Italy

1:30 **1768** Genes and symbionts: The evolution of virus resistance in *Drosophila*. **Francis Jiggins** (fmj1001@ cam.ac.uk), Chuan Cao, and Julien Martinez, Univ. of Cambridge, Cambridge, United Kingdom

1:45 **1769** *Wolbachia*-insect associations and antiviral immunity. **Karyn Johnson** (karynj@uq.edu.au), Aleksej Stevanovic, and Zhee Sheen Wong, Univ. of Queensland, St. Lucia, Australia

2:00 **1770** Innate immune response and parasite evasion in malaria vector mosquitoes. **George Christophides** (g.christophides@imperial.ac.uk), Imperial College London, London, United Kingdom



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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**



2:15 **1771** Host-virus interactions: Lessons from  
the model organism *Drosophila melanogaster*. **Jean-Luc Imler** (jl.imler@unistra.fr), National Centre for Scientific Research, Strasbourg, France

2:30 **1772** The regulation of humoral control immunity in mosquitoes. **Kristin Michel** (kmichel@ksu.edu), Victoria Davidson, Melissa Gulley, David Meekins, and Xin Zhang, Kansas State Univ., Manhattan, KS

2:45 **1773** Microbial community and redox homeostasis in the mosquito gut ecosystem. **Jiannong Xu** (jxu@nmsu. edu), New Mexico State Univ., Las Cruces, NM

**3:00 BREAK**

3:15 **1774** Honey bee-parasite immune suppression by parasites and pathogens. **Francesco Pennacchio** (ibrahim@igb.cnr.it)1 and Francesco Nazzi2, 1Univ. of Napoli Federico II, Napoli, Italy, 2Univ. of Udine, Udine, Italy

3:30 **1775** Nematodes and bacteria: Allies in the suppres- sion of insect immune defenses. **Heidi Goodrich-Blair** (hgblair@bact.wisc.edu)1, Ángel Casanova-Torres1, Elisabeth Hussa2, Helge Bode3, Adler Dillman4,

Ionnnis Eleftherianos5, Steve Forst6, and  
Jean-Marc Reichhart7, 1Univ. of Wisconsin, Madison, WI, 2Millsaps College, Jackson, MS, 3Goethe-Univ., Frankfurt, Germany, 4Univ. of California, Riverside, CA, 5The George Washington Univ., Washington, DC, 6Univ. of Wisconsin, Milwaukee, WI, 7Univ. of Strasbourg, Strasbourg, France

3:45 **1776** The role of novel viruses as parasite mutualists. **Gaelen Burke** (grburke@uga.edu) and Kelsey Coffman, Univ. of Georgia, Athens, GA

4:00 **1777** Molecular analysis of immune-suppressive virus-like particles from cynipid wasp *Leptopilina heterotoma,* a generalist parasite of *Drosophila* spp*.* **Shubha Govind** (sgovind@ccny.cuny.edu)1,

Mary Ellen Heavner1, Johnny Ramroop1, Brian Wey1 and Shaneen Singh2, 1City Univ. of New York, New York, NY, 2City Univ. of New York, Brooklyn, NY

4:15 **1778** Molecular response of *Manduca sexta* immune tissues to parasitization by the bracovirus-associated wasp *Cotesia congregata*. **Elisabeth Huguet** (elisabeth. huguet@univ-tours.fr), National Center for Scientific Research, Tours, France

4:30 **1779** *Drosophila-Leptopilina* wasps interactions: Inter-species variation, mechanisms, and evolution. **Marylène Poirié** (poirie@sophia.inra.fr), Nice Sophia Antipolis Univ., Sophia Antipolis, France

4:45 **1780** How different parasitoids respond to immunity of the same host. **Xue-xin Chen** (xxchen@zju.edu.cn), Zhi-zhi Wang, Xi-qian Ye, Min Shi, Qijuan Gu, Ze-huan Wang, Jia-ni Zou and Le-qing Zhan, Zhejiang Univ., Hangzhou, China

5:00 **1781** Epigenetic interactions between insects and parasitic fungi. **Krishnendu Mukherjee** (krishnendu. mukherjee@agrar.uni-giessen.de)1 and  
Andreas Vilcinskas2, 1Univ. of Giessen, Giessen, Germany, 2Justus Liebig Univ., Gießen, Germany

**Symposium: Parasitoids, Polydnaviruses, and Pathogens: Genomes to Immune Physiology**

***Room W330 C (Convention Center)***

**Moderators and Organizers:** Bruce Webb1 and Nathalie Volkoff2, 1Univ. of Kentucky, Lexington, KY, 2INRA, Montpellier, France

1:30 **1782** Mechanisms of transfer of virulence molecules in ichneumonid wasps. **Anne-Nathalie Volkoff** (volkoff@ supagro.inra.fr)1, Apolline Pichon1, Magali Eychenne1, Marc Ravallec1, Annie Bézier2, Matthieu Leobold2, Véronique Jouan1, Serge Urbach3, Valérie Barbe4, Jean-Michel Drezen5, Fabrice Legeai6, and Don Stoltz7, 1INRA, Montpellier, France, 2François Rabelais Univ., Tours, France, 3National Center for Scientific Research, Montpellier, France, 4National Sequencing Centre, Evry, France, 5National Center for Scientific Research, Tours, France, 6INRA, Le Rheu, France, 7Dalhousie Univ., Halifax, NS, Canada

1:45 **1783** Advancing on the understanding of the genome, gene expression, and potential for biotechnological exploitation of the polydnavirus associated with *Cotesia flavipes*. **Fernando L. Cônsoli** (fconsoli@usp. br)1, Guilherme Rossi1, Bruna Merlin1, Simone Prado2, and Fabio Dossi1, 1Univ. of São Paulo, Piracicaba, Brazil, 2Embrapa Environment, Jaguariuna, Brazil

2:00 **1784** Comparative genomics of parasitoid wasps  
and what it says on the evolution of their endogenous bracovirus. **Jean-Michel Drezen** (drezen@univ-tours. fr)1, Jeremy Gauthier2, Annie Bézier2, Jean-Marc Aury3, Valérie Barbe3, Anthony Bretaudeau4, Fabrice Legeai5, Karine Musset2, Philippe Gayral2, Elisabeth Huguet1, and Elisabeth Herniou2, 1National Center for Scientific Research, Tours, France, 2François Rabelais Univ., Tours, France, 3National Sequencing Center, Evry, France, 4INRA, Rennes, France, 5INRA, Le Rheu, France

2:15 **1785** On the evolutionary origins of banchine polydnaviruses. **Michel Cusson** (mcusson@rncan.gc.ca)1, Catherine Béliveau1, Alejandro Cohen2, Don Stewart3,  
G. Periquet4, Abdelmadjid Djoumad3, Lisa Kuhn2,

Don Stoltz2, Brian Boyle5, Anne-Nathalie Volkoff6, Elisabeth Herniou4, and Jean-Michel Drezen7,  
1Natural Resources Canada, Québec City, QC, Canada, 2Dalhousie Univ., Halifax, NS, Canada, 3Natural Resources Canada, Halifax, NS, Canada, 4François Rabelais Univ., Tours, France, 5Univ. Laval, Québec City, QC, Canada, 6INRA, Montpellier, France, 7National Center for Scientific Research, Tours, France

2:30 **1786** Molecular pathways shared between host- parasitoid interaction in insect and other animals: The case of teratocyte extracellular enolase. Gerarda Grossi1, Annalisa Grimaldi2, Rosa Cardone3, Simona Laurino1, and **Patrizia Falabella** (patrizia.falabella@unibas.it)1, 1Univ. of Basilicata, Potenza, Italy, 2Univ. of Insubria, Varese, Italy, 3Univ. of Bari, Bari, Italy

2:45 **1787** A trigger factor for the emergence of parasitoid wasp larvae from the host. **Yoichi Hayakawa** (hayakayo@cc.saga-u.ac.jp), Saga Univ., Saga, Japan

**3:00 BREAK**

**1788** When two types of polydnaviruses work on the same host: What we can draw from their genomes and gene expressions. **Min Shi** (shimin0623@zju.edu.cn), Xi-qian Ye, Ze-huan Wang, and Xue-xin Chen, Zhejiang Univ., Hangzhou, China

3:30 **Discussion**  
**Symposium: Plant Piercing-Sucking Insects and**

***Room W232 B (Convention Center)***

**Moderators and Organizers:** Chrystel Olivier1, Charles Vincent2, Julien Saguez3, and Philippe Giordanengo4, 1Agriculture and Agri-Food Canada, London, ON, Canada, 2Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada, 3Entomological Society of Québec, Saint-Jean-sur-Richelieu, QC, Canada, 4INRA, Sophia Antipolis, France

1:30 **1789** Potential vectors of maize bushy stunt disease in native corn grown at high elevations in southeast Mexico. **Edel Perez** (edellopez1987@gmail.com)1,  
Tyler Wist2, Dana Nordin2, Tim Dumonceaux2,  
Mauricio Luna-Rodriguez1, and Chrystel Olivier3, 1Univ. Veracruzana, Xalapa, Mexico, 2Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, 3Agriculture and Agri-Food Canada, London, ON, Canada

1:45 **1790** The acrostyle within aphid stylets: Role in plant virus transmission and plant-aphid interaction. **Marilyne Uzest** (uzest@supagro.inra.fr), INRA, Montpellier, France

2:00 **1791** When a Palearctic bacterium meets a Nearctic insect vector: Genetic and ecological insights into the emergence of the grapevine *Candidatus Phytoplasma vitis* and *Ca. P. vitialni* epidemics in Europe. Sylvie Malembic-Maher1, Delphine Desque1, Dima Khalil1, Pascal Salar1, Jean-Luc Danet1, Sibylle Duret1, Jelena Jović2, Slobodan Krnjajić2, Elisa Angelini3, Luisa Filippin3, Ibolya Ember4, Maria Kolber5, Michele Della Bartola6, Alberto Materazzi6, Michael Maixner7, Laure Beven1, Nathalie Bouvery1, and **Xavier Foissac** (foissac@bordeaux. inra.fr)1, 1INRA, Villenave d’Ornon, France, 2Institute

for Plant Protection and Environment, Zemun, Serbia, 3CREA, Conegliano, Italy, 4Univ. of Budapest, Budapest, Hungary, 5Genlogs Biodiagnostika Kft., Celldömölk, Hungary, 6Univ. of Pisa, Pisa, Italy, 7Julius Kühn Institute, Siebeldingen, Germany

2:15 **1792** Why host acquired insect-specific toxins and regulations when you are a plant pathogen? Facts and lessons from the aphid / Cyt / *Dickeya dadantii* model. **Yvan Rabhé** (Yvan.Rahbe@lyon.inra.fr)1,2 and

Guy Condemine2, 1INRA, Villeurbanne, France, 2Univ. of Lyon, Villeurbanne, France

2:30 **1793** Vector manipulation by viruses: The pathosystem Brassicaceae-aphids-phytoviruses, a study case. **Quentin Chesnais** (quentin.chesnais@u-picardie.  
fr)1, Aude Couty1, Marilyne Uzest2, Veronique Brault3, and Arnaud Ameline1, 1Univ. of Picardie Jules Verne, Amiens, France, 2INRA, Montpellier, France, 3INRA, Colmar, France

2:45 **1794** Effect of mineral oil on the aphid–potato–PVY system. **Sebastien Boquel** (boquel.s@gmail.com), Jianhua Zhang, Xianzhou Nie, and Yvan Pelletier,

Agriculture and Agri-Food Canada, Fredericton, NB, Canada

**3:00 BREAK**

3:15 **1795** Phytoplasma disease in canola. **Chrystel Olivier** (drchrystelolivier@gmail.com), Tyler Wist,  
Tim Dumonceaux and Christine Hammond, Agriculture and Agri-Food Canada, Saskatoon, SK, Canada

3:30 **1796** Tritrophic interactions between leafhoppers, grapevines, and phytoplasmas in Canadian vineyards: An overview. **Julien Saguez** (saguezj@yahoo.com)1, Charles Vincent2, Jacques Lasnier3, Tim Dumonceaux4, Christine Hammond4, Lorne Stobbs5, Philippe Giordanengo6, and Chrystel Olivier4, 1Entomological Soceity of Québec, Saint-Jean-sur-Richelieu, QC, Canada, 2Agriculture and Agri-Food Canada, Saint-Jean-sur- Richelieu, QC, Canada, 3Ag-Cord, Inc., Granby, QC, Canada, 4Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, 5Agriculture and Agri-Food Canada, Vineland, ON, Canada, 6INRA, Sophia Antipolis, France

3:45 **1797** Presentation withdrawn

**Symposium: Advances in Pest Management**

***Room W240 C (Convention Center)***

**Moderators and Organizers:** Olivia Reynolds1 and Eric B. Jang2, 1New South Wales Dept. of Primary Industries, Menangle, Australia, 2USDA - ARS, Hilo, HI

1:30 **1798** Ecological approaches to enhance biological control of insect pests. **Geoffrey Gurr** (geoff.gurr@ gmail.edu.au)1,2,3, 1Charles Sturt Univ., Orange, Australia, 2Fujian Agriculture and Forestry Univ., Fuzhou, China, 3Ministry of Agriculture, Fuzhou, China

2:00 **1799** Biosensors to support socially acceptable  
pest management technologies for surveillance, management, and eradication of invasive species.  
**D. Max Suckling** (max.suckling@plantandfood.co.nz)1, Flore Mas2, and Kye Chung Park2, 1The New Zealand Institute for Plant & Food Research Ltd, Auckland, New Zealand, 2The New Zealand Institute for Plant & Food Research Ltd, Christchurch, New Zealand

2:30 **1800** Toxic and beneficial effects of plant essential oils on arthropod pests lead to novel control methods. **Nikos Papadopoulos** (nikopap@uth.gr)1, Charalampos Ioannou2, Dimitrios Papachristos3, Stella Papanastasiou2, and Christos Gerofotis2, 1Univ. of Thessaly, Nea Ionia, Greece, 2Univ. of Thessaly, Volos, Greece, 3Benaki Phytopathological Institute, Kifissia, Greece

2:45 **1801** Two in one: Use of sterile insects to transmit entomopathogenic fungi and induce sterility.



**Vectors without Borders**

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**Pablo Liedo** (pliedo@ecosur.mx)1, Pablo Montoya2, and Jorge Toledo1, 1College of the Southern Border, Tapachula, Mexico, 2Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food, Tapachula, Mexico

**3:00 BREAK**

3:15 **1802** The development of monitoring systems for pests based on internet of things (IOTs) technology. **En-Cheng Yang** (ecyang@ntu.edu.tw), Jo-Air Jiang, Tzu-Shiang Lin, Chien-Hao Wang, and Min-Sheng Liao, National Taiwan Univ., Taipei, Taiwan

3:30 **1803** Computer simulation of pest detection applied to invasive tephritids. **Nicholas Manoukis** (nicholas. manoukis@ars.usda.gov), USDA - ARS, Hilo, HI

3:45 **1804** Stable isotope technology for the determination of pest natal origins. **Karen Armstrong** (karen.armstrong@ lincoln.ac.nz)1,2, Peter Holder1,2, D. Murphy2,3, C Allen2,3, Peter Crisp2,4, W. Woods2,5, and Bernie Dominiak2,6, 1Lincoln Univ., Christchurch, New Zealand, 2Plant Biosecurity Cooperative Research Centre, Canberra, Australia, 3Queensland Univ. of Technology, Brisbane, Australia, 4South Australian Research and Development Institute, Adelaide, Australia, 5Dept. of Agriculture

and Food, Perth, Australia, 6New South Wales Dept. of Primary Industries, Orange, Australia

4:00 **1805** New trap dispensers to improve detection programs for area-wide control of fruit flies (Diptera: Tephritidae): Implications of chemical degradation of trimedlure multi-lure dispensers weathered under California climatic conditions. **Roger Vargas** (roger.vargas@ ars.usda.gov)1, Steven Souder1, Joseph G. Morse2, Elizabeth Grafton-Cardwell3, David R. Haviland4,

John Kabashima5, Ben Faber6, Bruce Mackey7,  
Eddie Nkomo8, Peter Cook8, and John Stark9, 1USDA - ARS, Hilo, HI, 2Univ. of California, Riverside, CA,  
3Univ. of California, Exeter, CA, 4Univ. of California Cooperative Extension, Bakersfield, CA, 5Univ. of California Cooperative Extension, Costa Mesa, CA, 6Univ. of California Cooperative Extension, Ventura, CA, 7USDA - ARS, Albany, CA, 8Farma Tech International, North Bend, WA, 9Washington State Univ., Puyallup, WA

**Symposium: Insect-Resistant Genetically Engineered Crops: Current Status, Concerns, and Future Prospects**

***Room W414 A (Convention Center)***

**Moderators and Organizers:** Anthony M. Shelton1 and  
Jörg Romeis2, 1Cornell Univ., Geneva, NY, 2Agroscope, Zürich, Switzerland

1:30 **1806** Insect resistant genetically-engineered crops: Regulations, acceptance, and barriers. **Nicholas Storer** (nstorer@dow.com)1, Matthew Cahill2, Filip Cnudde3, Raju Kapoor4, and Angel Saavedra5, 1Dow AgroSciences, Indianapolis, IN, 2Dow AgroSciences, Sydney, Australia, 3Dow AgroSciences, Brussels, Belgium, 4Dow AgroSciences, New Delhi, India, 5Dow AgroSciences, Guadalajara, Mexico

2:00 **1807** Role of Bt maize in global IPM. **Richard Hellmich** (richard.hellmich@ars.usda.gov)1, Aaron Gassmann2, Celso Omoto3, and Johnnie van den Berg4,

1USDA - ARS, Ames, IA, 2Iowa State Univ., Ames, IA, 3Univ. of São Paulo, Piracicaba, Brazil, 4North-West Univ., Potchefstroom, South Africa

2:15 **1808** Role of Bt cotton in global IPM. **Lewis Wilson** (lewis.wilson@csiro.au)1, Steven Naranjo2, Hari Sharma3, Kongming Wu4, Jeff Gore5, and Silvana V. Paula-Moraes6, 1CSIRO, Narrabri, Australia, 2USDA - ARS, Maricopa, AZ, 3Dr. YS Parmar Univ. of Horticulture & Forestry, Nauni, Solan, India, 4Chinese Academy of Agricultural Sciences, Beijing, China, 5Mississippi State Univ., Stoneville, MS, 6Embrapa Cerrados, Planaltina, Brazil

2:30 **1809** Economics of Bt crops and virus-resistant crops: A global view. **David Zilberman** (zilber11@berkeley. edu) and Scott Kaplan, Univ. of California, Berkeley, CA

**3:00 BREAK**

3:15 **1810** Environmental effects of insect resistant genetically-engineered crops and implications for regulation. **Jörg Romeis** (joerg.romeis@agroscope. admin.ch)1, Michael Meissle1, and Yunhe Li2, 1Agroscope, Zürich, Switzerland, 2Chinese Academy of Agricultural Sciences, Beijing, China

3:30 **1811** Resistance management in insect resistant genetically-engineered crops. **Rick Roush** (rtr10@psu. edu)1 and Sharon Downes2, 1Pennsylvania State Univ., University Park, PA, 2CSIRO, Narrabri, Australia

3:45 **1812** Bt eggplant: A bold step for Bangladesh and hope for the Philippines. **Anthony M. Shelton** (ams5@ cornell.edu)1, Desiree Hautea2, Joseph E. Huesing3, and Gour Pada Das4, 1Cornell Univ., Geneva, NY, 2Univ. of the Philippines, Laguna, Philippines, 3USAID, Washington, DC, 4Sathguru, Dhaka, Bangladesh

4:00 **1813** Bt rice in China: From biosafety asssessment to public acceptance. **Junce Tian** (tianjunce@163.com), Gongyin Ye, Zeng-Bing Lu, Cong Dang, Duo Ning, and Nai-Shun Han, Zhejiang Univ., Hangzhou, China

4:15 **1814** Beyond Bt: Exploiting arachnid venom peptide toxins to control crop pests. **Elaine Fitches** (e.c.fitches@ durham.ac.uk)1, Jake De Their1, Erich Nakasu2, Prashant S. Pyati1, Michelle Powell3, Martin Edwards4, Angharad M. R. Gatehouse4, and John Gatehouse1, 1Durham Univ., Durham, United Kingdom, 2Embrapa Vegetables, Brasília, Brazil, 3Fera Science Ltd., York, United Kingdom, 4Newcastle Univ., Newcastle upon Tyne, United Kingdom

4:30 **1815** RNAi for insect control. **Murugesan Rangasamy** (mrangasamy@dow.com), Huarong Li, Elane Fishilevich, Meghan Frey, Sarah Worden, Miles Lepping, Premchand Gandra, Chaoxian Geng, and Kenneth Narva, Dow AgroSciences, Indianapolis, IN

4:45 **Discussion**

**Symposium: Research Frontiers into the Use of Preventive Medicine in Arthropod Pest Management**

***Room W240 B (Convention Center)***

**Moderators and Organizers:** Christian Nansen1 and Kevin Heinz2, 1Univ. of California, Davis, CA, 2Texas A&M Univ., College Station, TX

1:30 **Panel Discussion**  
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1:45 **1816** Herbivore defenses induced in *Arabidopsis* by beneficial soil bacteria. Mina Aziz, Ranjith Nadipalli, Jin-Lin Zhang, and **Paul Pare** (paul.pare@ttu.edu), Texas Tech Univ., Lubbock, TX

2:00 **1817** Mutualistic soil fungi and plant nutrition jointly influence plant-herbivore interactions. **Rachel Vannette** (raleva@stanford.edu), Stanford Univ., Stanford, CA

2:15 **1818** A lipid-mediated cross-talk between insect defense and drought stress responses. **Michael Kolomiets** (Mike.Kolomiets@agnet.tamu.edu)1,  
Eli Borrego1, Pei-Cheng Huang1, Christian Nansen2, and Shawn Christensen3, 1Texas A&M Univ., College Station, TX, 2Univ. of California, Davis, CA, 3USDA - ARS, Gainesville, FL

2:30 **1819** Beating the bugs in the cranberry bogs — nutrients influence plant resistance. **Elvira de Lange** (elvira.delange@rutgers.edu)1,2, Vera Kyryczenko-Roth2, Jennifer Johnson-Cicalese2, Joan Davenport3,

Nicholi Vorsa1,2, and Cesar Rodriguez-Saona1,2, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, 3Washington State Univ., Prosser, WA

2:45 **1820** Plant feeding pest and predatory mites, from lab to field, implications for IPM. **Eric Palevsky** (palevsky@volcani.agri.gov.il)1, Moshe Inbar2, and Sharon Warburg1,2, 1Agricultural Research Organisation, Ramat Yishay, Israel, 2Univ. of Haifa, Haifa, Israel

**3:00 BREAK**

3:15 **1821** Ecological modelling of the effects of water hyacinth nutrient composition on the performance of a biological control agent. **Emily Bick** (enbick@ucdavis. edu)1, Paul Pratt2, and Christian Nansen1, 1Univ. of California, Davis, CA, 2USDA - ARS, Albany, CA

3:30 **1822** *Parasaccharibacter apium*, gen. nov., sp. nov., improves honey bee (Hymenoptera: Apidae) resistance to *Nosema*. Lucy Snyder, Charlotte Meador,  
Rebecca Naldo, Brendon Mott, **Kirk E. Anderson** (kirk.anderson@ars.usda.gov) and Vanessa Corby-Harris, USDA - ARS, Tucson, AZ

3:45 **1823** Efficacy of probiotics for improved honey bee colony health. **Ryan Schwarz** (ryan.schwarz@ars.usda. gov)1, Jay Evans1, and Nancy Moran2, 1USDA - ARS, Beltsville, MD, 2The Univ. of Texas, Austin, TX

4:00 **1824** Remote sensing of nutrient-induced host plant susceptibility and biotic stress responses. **Christian Nansen** (chrnansen@ucdavis.edu), Univ. of California, Davis, CA

4:15 **1825** Crop rotation and plant nutrition modulate crop-pest interactions: Evidence from ecoinformatics datasets. **Jay Rosenheim** (jarosenheim@ucdavis.edu)1, Matthew Meisner1, and Andrew Forbes2, 1Univ. of California, Davis, CA, 2Univ. of Iowa, Iowa City, IA

4:30 **Discussion**

**Symposium: Forest Insect Invasions in a Changing Climate: Mechanisms and Risks**

***Room W224 D (Convention Center)***

**Moderators and Organizers:** Dylan Parry1, Christelle Robinet2, and Patrick Tobin3, 1State Univ. of New York, Syracuse, NY, 2INRA, Orléans, France, 3Univ. of Washington, Seattle, WA

1:30 **1826** Forest insect invasion in a changing climate: An overview. **Dylan Parry** (dparry@esf.edu)1, Christelle Robinet2, and Patrick Tobin3, 1State Univ. of New York, Syracuse, NY, 2INRA, Orléans, France, 3Univ. of Washington, Seattle, WA

1:45 **1827** Adoption of novel hosts following a climatically induced range expansion of mountain pine beetle. **Nadir Erbilgin** (erbilgin@ualberta.ca), Univ. of Alberta, Edmonton, AB, Canada

2:00 **1828** Potential responses of the invasive European woodwasp, *Sirex noctilio*, to a warming world.

**José Villacide** (jvillacide@bariloche.inta.gov.ar), Victoria Lantschner, and Juan C. Corley, National Agricultural Technology Institute, Bariloche, Argentina

2:15 **1829** The range expansion of the pine processionary moth in a changing world: How a well understood multifactorial process could tangle up. **Mathieu Laparie** (mathieu.laparie@orleans.inra.fr), Christelle Robinet, Jérôme Rousselet, and Alain Roques, INRA, Orléans, France

2:30 **1830** The opening and closing of climatic envelopes in the gypsy moth invasion of North America.  
**Kristine Grayson** (kgrayson@richmond.edu)1,  
Lily Thompson2, Trevor Faske2, Patrick Tobin3, Christopher Friedline2, Andrew Eckert2, Dylan Parry4, and Derek Johnson2, 1Univ. of Richmond, Richmond, VA, 2Virginia Commonwealth Univ., Richmond, VA, 3Univ.

of Washington, Seattle, WA, 4State Univ. of New York, Syracuse, NY

2:45 **1831** Spread and pathway modelling to support pest risk assessment under global change. **Wopke van der Werf** (wopke.vanderwerf@wur.nl)1, Bob Douma1,  
Christelle Robinet2, Lia Hemerik1, and Monique Mourits1, 1Wageningen Univ. and Research Centre, Wageningen, Netherlands, 2INRA, Orléans, France

**3:00 BREAK**

3:15 **1832** Brown marmorated stink bug: The invasion potential under current and future climates.  
**Darren Kriticos** (darren.kriticos@csiro.au)1,  
Hernando Acosta2, John M. Kean3, Senait Senay4, and Craig Phillips3, 1CSIRO, Canberra, Australia, 2Ministry of Primary Industries, Wellington, New Zealand, 3AgResearch Ltd, Christchurch, New Zealand, 4Lincoln Univ., Canterbury, New Zealand

3:30 **1833** The International Pest Risk Research Group: Developing and promoting improved methods for pest risk modelling and mapping. **Richard Baker** (richard. baker@fera.gsi.gov.uk)1, Frank Koch2, Darren Kriticos3, Amy C. Morey4, and Robert Venette5, 1The Food and Environmental Research Agency, York, United Kingdom, 2USDA - Forest Service, Research Triangle Park, NC, 3CSIRO, Canberra, Australia, 4Univ. of Minnesota,

St. Paul, MN, 5USDA - Forest Service, St. Paul, MN

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3:45 **1834** Impacts of climate change on habitat suitability for invasive alien species: Support for the Mix-Master hypothesis? **Robert Venette** (rvenette@fs.fed.us)1, Frank Koch2, Denys Yemshanov3, and Kevin M. Potter4, 1USDA - Forest Service, St. Paul, MN, 2USDA - Forest Service, Research Triangle Park, NC, 3Natural Re- sources Canada, Sault Ste. Marie, ON, Canada, 4North Carolina State Univ., Research Triangle Park, NC

**Symposium: Hitchhikers in Florida: History and Control**

***Room W224 H (Convention Center)***

**Moderators and Organizers:** Vivek Kumar1 and Garima Kakkar2, 1Univ. of Florida, Apopka, FL, 2Fort Lauderdale Research & Education Center, Davie, FL

1:30 **1835** History of alien invasive arthropod detections in Florida. **Norman Leppla** (ncleppla@ufl.edu)1,  
J. Howard Frank1, Micheal Thomas2, and Paul Skelley3, 1Univ. of Florida, Gainesville, FL, 2Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, 3Florida State Collection of Arthropods, Gainesville, FL

2:00 **1836** Introduced urban pests in Florida. Roberto Pereira and **Philip G. Koehler** (pgk@ufl.edu), Univ. of Florida, Gainesville, FL

2:15 **1837** Unseen hitchhikers to Florida: Entomophilic nematodes. **Robin Giblin-Davis** (giblin@ufl.edu)1, Natsumi Kanzaki2, and Kerrie Davies3, 1Univ. of Florida, Davie, FL, 2Forestry and Forest Products Research Institute, Tsukuba, Japan, 3Univ. of Adelaide, Adelaide, Australia

2:30 **1838** Florida’s exotic snails and slugs. **John L. Capinera** (capinera@ufl.edu), Univ. of Florida, Gainesville, FL

2:45 **1839** Florida exotic whitefly invaders from the last decade. **Cindy L. McKenzie** (cindy.mckenzie@ars.usda. gov)1, Aaron Dickey2, Ian Stocks3, Vivek Kumar4, and Lance Osborne4, 1USDA - ARS, Ft. Pierce, FL, 2USDA - ARS, Clay Center, NE, 3Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, 4Univ. of Florida, Apopka, FL

**3:00 BREAK**

3:15 **1840** Banker plants: Using a systems approach for dealing with exotic invasives in Florida. **Lance Osborne** (lsosborn@ufl.edu)1, Vivek Kumar1, Garima Kakkar2, and Cindy L. McKenzie3, 1Univ. of Florida, Apopka, FL, 2Fort Lauderdale Research & Education Center, Davie, FL, 3USDA - ARS, Ft. Pierce, FL

3:30 **1841** History, biology, ecology, behavior, and management of redbay beetle (*Xyloborus glabratus*) and other non-native ambrosia beetles in Florida. **Russell Mizell** (rfmizell@ufl.edu), Univ. of Florida, Quincy, FL

3:45 **1842** Biocontrol in Florida using herbivores, parasitoids, and predators. **Eric Rohrig** (eric.rohrig@ freshfromflorida.com)1 and J. Howard Frank2, 1Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, 2Univ. of Florida, Gainesville, FL

4:00 **1843** Biology, behavior, and management of chilli thrips, and other invasive thrips (Thysanoptera: Thripidae) in south Florida. **Vivek Kumar** (vivekiari@ ufl.edu)1, Garima Kakkar2, Cindy L. McKenzie3, Dakshina Seal4, and Lance Osborne1, 1Univ. of Florida, Apopka, FL, 2Fort Lauderdale Research & Education Center, Davie, FL, 3USDA - ARS, Ft. Pierce, FL, 4Univ. of Florida, Homestead, FL

4:15 **1844** Biology and control of Mexican bromeliad weevil in Florida. **Ronald D. Cave** (rdcave@ufl.edu)1 and Teresa M. Cooper2, 1Univ. of Florida, Ft. Pierce, FL, 2Univ. of Florida, Gainesville, FL

4:30 **1845** Application of RNA interference (RNAi) as  
an invasive pest control strategy in Florida. **Robert Shatters** (robert.shatters@ars.usda.gov)1, John Ramos1, Ritesh Jain2, Kasie Sturgeon2, Charles A. Powell2, William Dawson3, Siddarame Gowda3, Magali Grando4, Cássia Ceccon4, and Dov Borovsky1, 1USDA - ARS,

Ft. Pierce, FL, 2Univ. of Florida, Ft. Pierce, FL, 3Univ. of Florida, Lake Alfred, FL, 4Univ. of Passo Fundo, Passo Fundo, Brazil

**Symposium: No More Invasive Insect Species: Is Quarantine the Answer?**

***West Hall F4 (WF4) (Convention Center)***

**Moderators and Organizers:** Aziz Ajlan1, Khalid Alhudaib2, and  
J. R. Faleiro3, 1King Faisal Univ., Jeddah, Saudi Arabia, 2King Faisal Univ., Hofuf, Saudi Arabia, 3Ministry of Agriculture, Al-Hassa, Saudi Arabia

1:30 **1846** Application of qualitative and quantitative quarantine methods for the management of red  
palm weevil, *Rhynchophorus ferrugineus* Olivier (Curculionidae: Coleoptera), in date palm farms. **Polana S. P. V. Vidyasagar** (vidyasagar49@yahoo.com), King Saud Univ., Riyadh, Saudi Arabia

2:00 **1847** Challenges in prevention of borers’ invasion. **Victoria Soroker** (sorokerv@volcani.agri.gov.il)1,  
Yuval Cohen1, A. Hetzroni1, and Pompeo Suma2, 1Agricultural Research Organisation, Bet-Dagan, Israel, 2Univ. of Catania, Catania, Italy

2:30 **1848** Evaluation of some insecticides for the control of the African bollworm, *Helicoverpa armigera* Hübner (Lepidoptera: Noctuidae), on sorghum in the rain-fed and irrigated areas in the Sudan. **Elnayer Suliman** (elnayer\_s@hotmail.com), Gedarif Research Station, Sudan

**2:45 BREAK**

3:15 **1849** Diptera associated with citrus in the plain of Mitidja East (Ain Taya, Algeria). **Faiza Marniche** (fexena@hotmail.fr)1, Amel Milla1, and  
Salaheddine Doumandji2, 1National Veterinary School, El Alia, Algeria, 2National School of Agronomy,

El Harrach, Algeria

3:30 **1850** Implicit health consequences of the 2012 floods in Rivers State. **Mekeu Noutcha** (naemekeu@yahoo.com) and F. Nwoko-Omere, Univ. of Port Harcourt, Rivers State, Nigeria

3:45 **Discussion**

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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

**Symposium: The Role of National, Regional, and International Plant Protection Organizations to Prevent the Introduction and Spread of Plant Pests**

***Room W224 F (Convention Center)***

**Moderators and Organizers:** Lisa Neven1 and Rebecca Lee2, 1USDA - ARS, Wapato, WA, 2North American Plant Protection Organization, Ontario, ON, Canada

1:30 **1851** Inter-organizational collaboration to protect plant resources while facilitating trade. Rebecca Lee1 and **Stephanie Bloem** (sbloem.nappo@gmail.com)2, 1North American Plant Protection Organization, Ontario, ON, Canada, 2North American Plant Protection Organization, Raleigh, NC

1:45 **1852** Entomology in support of plant health — role  
of EPPO. **Philippe Reynaud** (philippe.reynaud@anses. fr)1 and Francoise Petter2, 1ANSES, Montferrier-sur-Lez, France, 2European and Mediterranean Plant Protection Organization, Paris, France

2:00 **1853** Wanted, dead or alive non-viable: The role  
of regulation in keeping pest risk off New Zealand’s shores. **Joanne Wilson** (joanne.wilson@mpi.govt.nz) and Stephen Butcher, Ministry for Primary Industries, Wellington, New Zealand

2:15 **1854** Inter-American cooperation in plant protection. **Lourdes Fonalleras** (lourdes.fonalleras@iica.int)1, Carol Thomas2, and Robert Ahern3, 1Inter-American Institute for Cooperation on Agriculture, Montevideo, Uruguay, 2Inter-American Institute for Cooperation

on Agriculture, Warrens, Barbados, 3Inter-American Institute for Cooperation on Agriculture, San José, Costa Rica

2:30 **1855** The emergency response mechanism as a tool to preventing spread of plant pests. **Maclean Vaqalo** (macleanv@spc.int) and Josua Wainiqolo, Secretariat of the Pacific Community, Suva, Fiji

2:45 **1856** Relevant programs to prevent the introduction and spread of plant pests: The case of Mexico. **Francisco Trujillo** (trujillo@senasica.gob.mx), Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food, Mexico City, Mexico

**3:00 BREAK**

3:15 **1857** The role of research in support of regulatory decisions. **Lisa Neven** (lisa.neven@ars.usda.gov), USDA - ARS, Wapato, WA

3:30 **1858** Fighting invasive species through training. **Carlos Urías** (svegetal@oirsa.org), Regional International Organization for Agricultural Health, San Salvador,  
El Salvador

3:45 **1859** Achieving Aichi biodiversity targets: Prevention, control, or eradication of invasive alien species that threaten biodiversity, agricultural production, and human well-being. **Junko Shimura** (junko.shimura@ cbd.int), Secretariat of the Convention on Biological Diversity, Montréal, QC, Canada

4:00 **1860** International efforts to develop phytosanitary treatment standards. **Guy J. Hallman** (g.j.hallman@ iaea.org) and Rui Pereira, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, Vienna, Austria

4:15 **1861** An alien buried in the snow: Risk assessment of invasive alien species in the Canadian context. **Thierry Poiré** (thierry.poire@inspection.gc.ca), Canadian Food Inspection Agency, Ottawa, ON, Canada

4:30 **1862** How to build consensus globally to prevent the introduction and spread of plant pests while facilitating safe trade. Jingyuan Xia, and **Craig Fedchock** (craig. fedchock@fao.org), International Plant Protection Convention, Rome, Italy

4:45 **Panel Discussion**

**Symposium: Forensic Entomology without Borders: Uniting the Worldwide Forensic Entomology Community**

***Room W222 B (Convention Center)***

**ModeratorsandOrganizers:** MichelleSanford1,AdrienneBrundage2, Meaghan Pimsler2, and Charity Owings3, 1Harris County Institute of Forensic Sciences, Houston, TX, 2Texas A&M Univ., College Station, TX, 3Indiana Univ.-Purdue Univ., Indianapolis, IN

1:30 **1863** Multiple independent discoveries, paradigm shifts, and testing the facilitation hypothesis of ecological succession. **J. P. Michaud** (jean-philippe. michaud@rcmp-grc.gc.ca)1, Gaétan Moreau2, and Kenneth Schoenly3, 1Royal Canadian Mounted Police, Airdrie, AB, Canada, 2Univ. of Moncton, Moncton, NB, Canada, 3California State Univ., Turlock, CA

1:45 **1864** The problem of temperature in forensic entomology casework. **Michelle Sanford** (michelle. sanford@ifs.hctx.net), Harris County Institute of Forensic Sciences, Houston, TX

2:00 **1865** History, accomplishments, and challenges of forensic entomology in Australia. **James Wallman** (jwallman@uow.edu.au), Univ. of Wollongong, Wollongong, Australia

2:15 **1866** Phenotypic plasticity in necrophagous flies – a (serious) source of error in forensic entomology?  
**Jens Amendt** (amendt@em.uni-frankfurt.de), Institute for Forensic Medicine, Frankfurt, Germany

2:30 **1867** High resolution gene expression analysis for estimating the age of blow fly pupae. **Barbara Zajac** (zajac@med.uni-frankfurt.de), University Hospital of Frankfurt, Frankfurt, Germany

2:45 **1868** Identification of necrophagous insects in Brazil: Status and challenges. **Patricia J. Thyssen** (thyssenpj@ yahoo.com.br), Univ. of Campinas, Campinas, Brazil

**SD1869** Bacterial fauna associated with forensically important flies in Thailand. Tarinee Chaiwong1, T. Srivoramas1,  
M. Sueabsamran Panya1, P. Panomket1, Michelle Sanford2, and **Adrienne Brundage** (adrienne.brundage@tamu. edu)3, 1Ubon Ratchathani Univ., Ubon Ratchathani, Thailand, 2Harris County Institute of Forensic Sciences, Houston, TX, 3Texas A&M Univ., College Station, TX

**3:00 BREAK AND POSTER SESSION**

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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

3:15 **1870** A comparative study of the decomposition and insect succession pattern between a human corpse and animal carcasses. **Jiangfeng Wang** (jfwang@suda.edu. cn), Soochow Univ., Suzhou, China

3:30 **1871** Mediators of population genetic structure in Indiana blow flies (Diptera: Calliphoridae). **Charity Owings** (charityowings@gmail.com) and Christine Picard, Indiana Univ.-Purdue Univ., Indianapolis, IN

3:45 **1872** The adult fly: An underestimated tool in forensic entomology. **Victoria Bernhardt** (victoria. bernhardt@hotmail.de), Institute for Forensic Medicine, Frankfurt, Germany

4:00 **1873** Entomotoxicology: Development and validation of CG-MS and LC/MS-MS methods for nicotine, metanfetamine, endosulfan, and coumatetraryl detection in blowflies. **Paola Magni** (doc.magni@gmail.com)1, Marco Pazzi2, Marco Vincenti2, and Ian Dadour3, 1Murdoch Univ., Crawley, Australia, 2Univ. of Turin, Torino, Italy, 3Boston Univ., Boston, MA

**Symposium: Reducing Transmission Rates of Infectious Diseases by Targeting Mosquito Olfaction**

***Room W331 A (Convention Center)***

**Moderators and Organizers:** Kostas Iatrou1 and Walter S. Leal2, 1National Centre for Scientific Research, Athens, Greece, 2Univ. of California, Davis, CA

1:30 **1874** Neurogenetics of mosquito behavior. **Leslie Vosshall** (leslie@mail.rockefeller.edu), The Rockefeller Univ., New York, NY

2:00 **1875** Behavioral control of mosquitoes using odorants. **Anandasankar Ray** (anand.ray@ucr.edu), Univ. of California, Riverside, CA

2:15 **1876** Olfaction gene expression changes in three behavioral states of the yellow fever mosquito. **Luciano V. Cosme** (cosme.simple@gmail.com)1,  
Craig J. Coates2, and Michel A. Slotman2, 1Yale Univ., New Haven, CT, 2Texas A&M Univ., College Station, TX

2:30 **1877** Prospecting of olfactory proteins from the American trypanosomiasis vector *Rhodnius prolixus* (Heteroptera: Reduviidae). **Ana C. A. Melo** (anamelo@ iq.ufrj.br)1, Daniele S. Oliveira1, Thiago A. Franco1, Nathalia F. Brito1, Pingxi Xu2, Monica F. Moreira1, Marcia R. Soares1, and Walter S. Leal2, 1Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil, 2Univ. of California, Davis, CA

2:45 **1878** Inhibition of insect odorant receptor function through antagonism of the odorant receptor co-receptor subunit. **Charles W. Luetje** (cluetje@med.miami.edu), Devin Kepchia, and Sissi Chen, Univ. of Miami, Miami, FL

**3:00 BREAK**

3:15 **1879** Mosquito anosmia-inducing and odor perception-enhancing compounds of natural origin targeting Orco function for malaria transmission control. **Kostas Iatrou** (iatrou@bio.demokritos.gr) and Panagiota Tsitoura, National Centre for Scientific Research, Athens, Greece

3:30 **1880** The role of grass volatiles in oviposition site selection by malaria mosquitoes. **Rickard Ignell** (rickard.ignell@slu.se), Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

3:45 **1881** Exploiting the evolutionary dynamics of chemosensation in mosquitoes for vector management. **Zainulabeuddin Syed** (zainulabeuddin.syed.5@ nd.edu), Univ. of Notre Dame, South Bend, IN

4:00 **1882** Mosquito olfaction: Reception of semiochemicals of medical importance. **Walter S. Leal** (wsleal@ucdavis. edu), Univ. of California, Davis, CA

**Symposium: Ticks Are Different: The Impact of Tick Biology on Their Role As Vectors**

***Room W224 A (Convention Center)***

**Moderators and Organizers:** Nicholas Ogden1 and Gabriele Margos2, 1Public Health Agency of Canada, Saint-Hyacinthe, QC, Canada, 2Bavarian Health and Food Safety Authority, Ober- schleissheim, Germany

1:30 **1883** Ticks are different. **Annapaola Rizzoli** (annapaola.rizzoli@fmach.it), Edmund Mach Foundation, Trento, Italy

2:00 **1884** Interactions among *Ixodes scapularis*-borne pathogens in the United States. **Maria Diuk-Wasser** (mad2256@columbia.edu), Columbia Univ., New York, NY

2:30 **1885** Host specialization in ticks and the circulation of tick-borne disease agents. **Karen McCoy** (karen. mccoy@ird.fr), National Center for Scientific Research, Montpellier, France

2:45 **1886** Presentation withdrawn

**3:00 BREAK**

3:15 **1887** The role of pathogen genomics in assessing tick-borne pathogen evolutionary dynamics. **Giovanna Carpi** (gcarpi1@jhu.edu), Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

3:30 **1888** Evidence for host-genotype associations of *Borrelia burgdorferi sensu stricto*. **Samir Mechai** (samir.mechai@umontreal.ca), Univ. of Montréal, Québec, QC, Canada

3:45 **Discussion**

**SD1889** Pathogenic bacteria in *Ixodes uriae* in Newfoundland and Labrador. **Hannah Munro** (hannah.munro@mun. ca), Memorial Univ. of Newfoundland, St. John’s, NF, Canada

**SD1890** *Borrelia bavariensis* — vector adaptation and species invasion. Fanny Gatzmann1, Noemie Becker2, Dirk Metzler2, Ai Takano3, Hiroki Kawabata4, Andreas Sing5, Melissa Rieger5, **Gabriele Margos** (gmargos1@gmail. com)5, and Volker Fingerle5, 1German Cancer Research Center, Heidelberg, Germany, 2Ludwig Maximilians Univ., München, Germany, 3Yagamuchi Univ., Yagamuchi, Japan, 4National Institute of Infectious Diseases, Tokyo, Japan, 5Bavarian Health and Food Safety Authority, Oberschleissheim, Germany

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**TUESDAY**

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* **SD1891**Spatial heterogeneity in *Ixodes scapularis* distribution in the Lyme disease emergence zone in southern Canada. **Marion Ripoche** (marion.ripoche@umontreal. ca), Univ. of Montréal, Saint-Hyacinthe, QC, Canada
* **SD1892**Distribution of ticks and the risk of Lyme disease and other tick-borne pathogens of public health significance in Ontario, Canada. **Katie Clow** (kclow@ uoguelph.ca), Univ. of Guelph, Guelph, ON, Canada
* **SD1893**eTick: A Lyme disease surveillance and public health information tool. **Jules Koffi** (jules.konan.koffi@ phac-aspc.gc.ca)1, Jade Savage2, Karine Thivierge3, L. Robbin Lindsay4, Catherine Bouchard5, and Nicholas Ogden1, 1Public Health Agency of Canada, Saint-Hyacinthe, QC, Canada, 2Bishop’s Univ., Sherbrooke, QC, Canada, 3National Institute of Public Health of Québec, Sainte-Anne-de-Bellevue, QC, Canada, 4Public Health Agency of Canada, Winnipeg, MB, Canada, 5Univ. of Montréal, Saint-Hyacinthe, QC, Canada

4:15 **Poster Session**

**Symposium: Advances in Ant Systematics: Global Sampling, New Phylogenetic Methods, and Major Taxonomic Changes**

***Room W231 A (Convention Center)***

**Moderators and Organizers:** Andrea Lucky1 and Philip S. Ward2, 1Univ. of Florida, Gainesville, FL, 2Univ. of California, Davis, CA

1:30 **1894** Advances in our understanding of ant taxonomy and evolution. **Philip Ward** (psward@ucdavis.edu), Univ. of California, Davis, CA

1:45 **1895** Ant evolution in the age of genomics. **Corrie Moreau** (cmoreau@fieldmuseum.org), The Field Museum of Natural History, Chicago, IL

2:00 **1896** Fossil ants and the dawn of phylogenomics. **John S. LaPolla** (jlapolla@towson.edu), Towson Univ., Towson, MD

2:15 **1897** Reconciling global macroecological pattern and macroevolutionary processes in ant biodiversity. **Evan Economo** (evaneconomo@gmail.com)1,  
Benoit Guenard2, Michael Weiser3, and Nitish Narula1, 1Okinawa Institute of Science and Technology,

Onna, Japan, 2Univ. of Hong Kong, Hong Kong, China, 3Univ. of Oklahoma, Norman, OK

2:30 **1898** Pavement ants to population genomics: Bringing citizen science into the molecular era.  
**Andrea Lucky** (alucky@ufl.edu)1, Tyler Vitone1,  
Rob R. Dunn2, Caroline Storer1, Jiri Hulcr1, Stuart McDaniel1, and Adam Payton1, 1Univ. of Florida, Gainesville, FL, 2North Carolina State Univ., Raleigh, NC

2:45 **1899** Phylogenomic methods advance our understanding of the evolution of formicine ants. **Bonnie Blaimer** (bonnieblaimer@gmail.com)1,  
Seán Brady1, Ted Schultz1, Brian L. Fisher2, and  
Philip Ward3, 1Smithsonian Institution National Museum of Natural History, Washington, DC, 2California Academy of Sciences, San Francisco, CA, 3Univ. of California, Davis, CA

**3:00 BREAK**

3:15 **1900** Biodiversity genomics and the future of ant systematics. **Michael Branstetter** (mgbranstetter@ gmail.com), Univ. of Utah, Salt Lake City, UT

3:30 **1901** Tropical cloud forest ants: Who are they and where did they come from? **John Longino** (jacklongino@ gmail.com), Univ. of Utah, Salt Lake City, UT

3:45 **1902** Male ants: Past, present, and prospects. **Brendon Boudinot** (boudinotb@gmail.com), Univ. of California, Davis, CA

4:00 **1903** It is time for taxonomists to embrace morphology. **Flavia Esteves** (flaviaesteves@gmail.com), California Academy of Sciences, San Francisco, CA

4:15 **1904** Advances in taxonomy and evolution of the Ectatomminae. **Rodrigo Feitosa** (rsmfeitosa@gmail. com), Gabriela Camacho, and Marcio R. Pie, Federal Univ. of Paraná, Curitiba, Brazil

4:30 **1905** Resolving Dorylinae: Promises and pitfalls of phylogenomics. **Marek L. Borowiec** (mlborowiec@ ucdavis.edu), Univ. of California, Davis, CA

4:45 **1906** Evolution, biogeography, and diversification of the genus *Terataner*. **Francisco Hita Garcia** (fhitagarcia@gmail.com)1 and Evan Economo2, 1Hessian State Museum, Darmstadt, Germany, 2Okinawa Institute of Science and Technology, Onna, Japan

5:00 **1907** The evolution of biomechanical complexity during the global radiation of *Strumigenys*.  
**Doug Booher** (dbooher@ucla.edu)1 and Evan Economo2, 1Univ. of California, Los Angeles, CA, 2Okinawa Institute of Science and Technology, Onna, Japan

5:15 **1908** Speciation patterns and evolution of convergently evolved obligate social parasites of fungus-growing ants. **Christian Rabeling** (crabeling@gmail.com)1, Mauricio Bacci2, Ted Schultz3, and Martin Bollazzi4, 1Univ. of Rochester, Rochester, NY, 2São Paulo State Univ., São Paulo, Brazil, 3Smithsonian Institution National Museum of Natural History, Washington, DC, 4Univ. of the Republic, Montevideo, Uruguay

**Symposium: Phylogeny and Evolution of Weevils (Coleoptera: Curculionoidea): A Symposium in Honor of Guillermo “Willy” Kuschel**

***West Hall F3 (WF3) (Convention Center)***

**Moderators and Organizers:** Duane D. McKenna and Dave Clarke, Univ. of Memphis, Memphis, TN

1:30 **1909** The 1,000 Curculionidae Phylogeny and Evolution Project (1K Weevils): An overview and preliminary results. **Duane D. McKenna** (dmckenna@ memphis.edu), Univ. of Memphis, Memphis, TN

2:00 **1910** Towards a comprehensive view of weevil morphological evolution: Prospects and progress from the 1K Weevils project. **Dave Clarke** (djclarke@memphis. edu)1, Adriana Marvaldi2, Rolf Oberprieler3, and  
Duane D. McKenna1, 1Univ. of Memphis, Memphis, TN, 2National Univ. of La Plata, Buenos Aires, Argentina, 3CSIRO, Canberra, Australia

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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

2:15 **1911** A backbone Phylogeny of Curculionidae from adult and larval morphology: Where do we stand  
after improving taxon and character sampling? **Adriana E. Marvaldi** (marvaldi@fcnym.unlp.edu.ar)1, Dave Clarke2, Rolf Oberprieler3, Miguel Alonso-Zarazaga4, Robert D. Anderson5, Roberto Caldara6, Steve Davis7, Jiri Hulcr8, Andrew Johnson8, Analía Lanteri9, Christopher Lyal10, Massimo Meregalli11, Marek Wanat12, and Duane D. McKenna2, 1National Univ. of La Plata, Buenos Aires, Argentina, 2Univ. of Memphis, Memphis, TN, 3CSIRO, Canberra, Australia, 4National Museum of Natural History, Madrid, Spain, 5Canadian Museum of Nature, Ottawa, ON, Canada, 6Univ. of Milan, Milano, Italy, 7American Museum of Natural History, New York, NY, 8Univ. of Florida, Gainesville, FL, 9Univ. of La Plata, La Plata, Argentina, 10The Natural History Museum, London, United Kingdom, 11Univ. of Turin, Torino, Italy, 12Univ. of Wroclaw, Wroclaw, Poland

2:30 **1912** The fossil record of weevils — separating facts from fiction. **Rolf Oberprieler** (rolf.oberprieler@csiro.au)1 and Steve Davis2, 1CSIRO, Canberra, Australia, 2American Museum of Natural History, New York, NY

2:45 **1913** Preliminary look at the phylogeny of New Zealand weevils. **Richard A. B. Leschen** (leschenr@ landcareresearch.co.nz)1, Talia Brav-Cubitt1,  
Thomas Buckley1, Samuel Brown2, Steve Davis3, and Natish Anand1, 1Landcare Research, Auckland, New Zealand, 2Lincoln Univ., Lincoln, New Zealand, 3American Museum of Natural History, New York, NY

* **SD1914**Weevil mitogenomics. **Conrad Gillett** (c.gillett@uea. ac.uk)1, Alex Crampton-Platt2, Martijn Timmermans3, Bjarte Jordal4, Brent Emerson5, and Alfried Vogler2,6, 1Univ. of East Anglia, Anglia, United Kingdom, 2The Natural History Museum, London, United Kingdom, 3Vrije Univ., Amsterdam, Netherlands, 4Univ. of Bergen, Bergen, Norway, 5Institute of Natural Products and Argobiology, La Laguna, Spain, 6Imperial College London, London, United Kingdom
* **SD1915**Barcoding European weevils: The Molecular Weevil Identification Project. André Schütte1, Peter Stüben2, and **Jonas Astrin** (j.astrin.zfmk@uni-bonn.de)1, 1Zoological Research Museum Alexander Koenig, Bonn, Germany, 2Curculio Institute, Mönchengladbach, Germany
* **SD1916**Taxonomy and evolution of New Zealand broad-nosed weevils (Coleoptera: Curculionidae: Entiminae). **Samuel Brown** (xsdjbx@gmail.com)1, Karen Armstrong2, Barbara Barratt3, Robert Cruickshank1, and Craig Phillips4, 1Lincoln Univ., Lincoln, New Zealand, 2Lincoln Univ., Christchurch, New Zealand, 3AgResearch Ltd, Mosgiel, New Zealand, 4AgResearch Ltd, Christchurch, New Zealand
* **SD1917**Introductions and the potential for interspecies gene flow in endemic Galápagos weevils (Entiminae: Naupactini). **Andrea Sequeira** (asequeir@wellesley. edu), Flavia Mendonca de Souza, Sarah Pangburn, and Mary Kate Dornon, Wellesley College, Wellesley, MA
* **SD1918**A phylogenetic approach to the aquatic weevil tribe Bagoini (Coleoptera: Curculionidae) using morphological characters of imagoes. Roberto Caldara1, Massimo

Meregalli2, Charles W. O’Brien3, and **Lois B. O’Brien** (lbobrien@cox.net)3, 1Univ. of Milan, Milano, Italy, 2Univ. of Turin, Torino, Italy, 3Univ. of Arizona, Tucson, AZ

**SD1919** Towards a reconstruction of the higher classification of the subfamily Ceutorhynchinae (Coleoptera: Curculionidae): A morphological approach.  
**Hiraku Yoshitake** (zoumushi@affrc.go.jp)1, Steve Davis2, and Enzo Colonnelli3, 1National Institute for Agro- Environmental Sciences, Tsukuba, Japan, 2American Museum of Natural History, New York, NY, 3Rome, Italy

**3:00 BREAK AND POSTER SESSION**

3:15 **1920** Primitive weevils. **Robert S. Anderson** (randerson@mus-nature.ca), Canadian Museum of Nature, Ottawa, ON, Canada

3:30 **1921** Evolution of Anthribidae: Which evidence describes the history of diversification? **José Ricardo Mermudes** (jrmermudes@gmail.com) and  
Ingrid Mattos, Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

3:45 **1922** Phylogeny of Entiminae, with special reference to the tribe Naupactini. **Analía Lanteri** (alanteri@ fcnym.unlp.edu.ar)1, María Guadalupe del Rio2, Vanina Pereyra1, and Adriana Marvaldi3, 1National Univ. of

La Plata, La Plata, Argentina, 2Museum of La Plata,  
La Plata, Argentina, 3National Univ. of La Plata, Buenos Aires, Argentina

4:00 **1923** Host plant use and its impact on patterns of evolutionary diversification in the weevil subfamily Ceutorhynchinae (Curculionidae: Coleoptera). **Harald Letsch** (harald.letsch@univie.ac.at)1,

Ariel Leib Leonid Friedman2, Enzo Colonnelli3,  
Duane D. McKenna4, and Hiraku Yoshitake5, 1Univ. of Vienna, Vienna, Austria, 2Tel Aviv Univ., Tel Aviv, Israel, 3Rome, Italy, 4Univ. of Memphis, Memphis, TN, 5National Institute for Agro-Environmental Sciences, Tsukuba, Japan

4:15 **1924** Phylogenetics and evolution of Platypodinae. **Bjarte Jordal** (bjarte.jordal@um.uib.no), Univ. of Bergen, Bergen, Norway

4:30 **1925** Scolytinae relationships resolved: Genomic, morphological, and symbiont data. **Andrew Johnson** (ajj@ufl.edu)1, Duane D. McKenna2, Alan Lemmon3, Emily Lemmon3, and Jiri Hulcr1, 1Univ. of Florida, Gainesville, FL, 2Univ. of Memphis, Memphis, TN, 3Florida State Univ., Tallahassee, FL

4:45 **1926** Making sense of the Molytinae. **Christopher Lyal** (c.lyal@nhm.ac.uk), The Natural History Museum, London, United Kingdom

5:00 **1927** Towards a new concept of Cryptorhynchinae (Coleoptera: Curculionoidea). **Alexander Riedel** (riedel@smnk.de)1, Rene Tänzler2, Joan Pons3, and Michael Balke2, 1State Museum of Natural History, Karlsruhe, Germany, 2Bavarian State Collection of Zoology, Munich, Germany, 3Mediterranean Institute for Advanced Studies, Esporles, Spain

5:15 **1928** Effects of insect-host interactions on the diversification of palm-associated weevils.  
**Bruno de Medeiros** (souzademedeiros@fas.harvard.edu) and Brian Farrell, Harvard Univ., Cambridge, MA



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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

**Symposium: Progress in Insect Phylogenomics: The Scale and Complexity of Next-Gen Datasets and Analyses**

***Room W315 A (Convention Center)***

**Moderators and Organizers:** Akito Y. Kawahara1, Jessica Ware2, Michelle Trautwein3, and David K. Yeates4, 1Univ. of Florida, Gainesville, FL, 2American Museum of Natural History, New York, NY, 3California Academy of Sciences, San Francisco, CA, 4CSIRO, Acton, Australia

1:30 **1929** Adaptive radiation in morphologically unremarkable scorpions. **Lauren Esposito** (espositola@ gmail.com), California Academy of Sciences,  
San Francisco, CA

1:45 **1930** Divergence time methodology for big datasets: Fossil calibrations and FASTDATE. Tomas Flouri 1  
and **Manpreet Kohli** (mkk24@njit.edu)2, 1Heidelberg Institute of Theoretical Studies, Crete, Greece, 2Rutgers, The State Univ. of New Jersey, Newark, NJ

2:00 **1931** Genome evolution and phylogenomics of heritable bacterial symbionts in insects. **Gordon Bennett** (gordon.bennett@utexas.edu), Univ. of Hawai’i, Honolulu, HI

2:15 **1932** Using transcriptome based phylogenomics to address previously intractable acalyptrate fly phylogeny (Diptera: Cyclorrhapha). **Keith M. Bayless** (kmbayles@ncsu.edu)1, Karen Meusemann2, Michelle Trautwein3, and Brian M. Wiegmann1,

1North Carolina State Univ., Raleigh, NC, 2CSIRO, Canberra, Australia, 3California Academy of Sciences, San Francisco, CA

2:30 **1933** There is more than just phylogeny from the 1KITE. **Xin Zhou** (xinzhou@genomics.cn), BGI, Shenzhen, China

2:45 **1934** A Pool-Seq approach to integrate genome and transcriptome variation affecting male fitness in the 12-spotted skimmer, *Libellula pulchella*. **Ruud Schilder** (rjs360@psu.edu), Pennsylvania State Univ., University Park, PA

**3:00 BREAK**

3:15 **1935** Fleas, flies, scorpionflies: Phylogenetic relationships of antliophora based on transcriptomics. **Karen Meusemann** (mail@karen-meusemann.de)1, David Yeates2, Bernhard Misof3, Frank Friedrich4,  
Rolf Beutel5, Katharina Schneeberg5, and Alexandros Vasilikopoulos3, 1Univ. of Freiburg, Freiburg, Germany, 2CSIRO, Australia, 3Zoological Research Museum Alexander Koenig, Bonn, Germany, 4Univ. of Hamburg, Hamburg, Germany, 5Friedrich Schiller Univ., Jena, Germany

3:30 **1936** Model selection for phylogenomics.  
**Paul B. Frandsen** (paul.frandsen@rutgers.edu)1, Bernhard Misof2, Christoph Mayer2, and Karl Kjer3, 1Smithsonian Institution, Herndon, VA, 2Zoological Research Museum Alexander Koenig, Bonn, Germany, 3Univ. of California, Davis, CA

3:45 **1937** Phylogeny of Lepidoptera utilizing transcriptomes and hybrid enrichment data. **Akito Y. Kawahara** (kawahara@flmnh.ufl.edu)1, Jesse Breinholt1,  
Karen Meusemann2, Andreas Zwick3, Charles Mitter3, Ralph Peters4, Karl Kjer5, and Bernhard Misof4, 1Univ. of Florida, Gainesville, FL, 2CSIRO, Canberra, Australia, 3Univ. of Maryland, College Park, MD, 4Zoological Research Museum Alexander Koenig, Bonn, Germany, 5Univ. of California, Davis, CA

4:00 **1938** Morphology and phylogenomics: Two sides of the same medal. **Benjamin Wipfler** (bwipfle@gwdg.de), Friedrich Schiller Univ., Jena, Germany

4:15 **1939** Transodonata: What 1KITE has taught us about the evolution of dragonflies and damselflies. **Jessica Ware** (jware42@andromeda.rutgers.edu)1, Alexander Blanke2, Oliver Niehuis3, Karl M. Kjer4, Bernhard Misof3, and Carola Greve3, 1American Museum of Natural History, New York, NY, 2Univ. of Hull, Hull, United Kingdom, 3Zoological Research Museum Alexander Koenig, Bonn, Germany, 4Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

4:30 **1940** Phylogenomics of the hemipteroid insect orders. **Kevin P. Johnson** (kjohnson@inhs.uiuc.edu), Univ. of Illinois, Champaign, IL

4:45 **1941** The phylogeny of Trichoptera: Coordinating big datasets. **Karl M. Kjer** (kjer@aesop.rutgers.edu)1, Paul B. Frandsen2, and Xin Zhou3, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2Smithsonian Institution, Herndon, VA, 3BGI, Shenzhen, China

5:00 **1942** Inferring the evolutionary history of wasps, ants, and bees from transcriptomic data (Insecta: Hymenoptera). **Oliver Niehuis** (o.niehuis.zfmk@ uni-bonn.de)1, Karen Meusemann2, Alexander Donath1, Xin Zhou3, Bernhard Misof1, Ralph Peters1, Shalin Liu3, Malte Petersen1, Christoph Mayer1, Lars Krogmann4, and Lars Podsiadlowski5, 1Zoological Research Museum Alexander Koenig, Bonn, Germany, 2CSIRO, Canberra, Australia, 3BGI, Shenzhen, China, 4State Museum of Natural History, Stuttgart, Germany, 5Univ. of Bonn, Bonn, Germany

**Symposium: Systematics and Diversity of Aquatic Beetles: An Emerging Model System in Evolutionary Biology**

***Room W223 A (Convention Center)***

**Moderator and Organizer:** Andrew Short, Univ. of Kansas, Lawrence, KS

1:30 **1943** Phylogenetics and diversification of the whirligig beetles (Coleoptera: Gyrinidae): A role for sexual selection? **Grey Gustafson** (gtgustafson@gmail. com), Univ. of New Mexico, Albuquerque, NM

1:45 **1944** Sexual selection and diversification patterns  
in diving beetles (Coleoptera: Dytiscidae). **Kelly Miller** (kbmiller@unm.edu), Univ. of New Mexico, Albuquerque, NM

2:00 **1945** Systematic survey of the genus *Laccophilus* (Coleoptera: Dytiscidae) — future prospects outlined. **Olof Biström** (olof.bistrom@helsinki.fi), Univ. of Helsinki, Helsinki, Finland

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**TUESDAY**

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2:15 **1946** Unraveling time and space in the evolution of diving beetles: A phylogenomic perspective to the biogeography of Gondwana. **Aurelie Desamore** (aurelie.desamore@nrm.se), Swedish Museum of Natural History, Stockholm, Sweden

2:30 **1947** Phylogeny, distribution, and speciation in the endemic river-dwelling genus *Pachynectes* (Bidessini) on Madagascar. **Johannes Bergsten** (johannes.bergsten@ nrm.se)1 and Rasa Bukontaite2, 1Swedish Museum of Natural History, Stockholm, Sweden, 2Stockholm Univ., Stockholm, Sweden

2:45 **1948** Phylogeny and classification of Noteridae. **Stephen Baca** (s953b810@ku.edu), Emmanuel Toussaint, and Andrew Short, Univ. of Kansas, Lawrence, KS

**3:00 BREAK**

3:15 **1949** Infrageneric structure of New Guinea *Exocelina* predaceous diving beetles. **Helena Shaverdo** (shaverdo@ mail.ru)1 and Michael Balke2, 1Vienna Museum of Natural History, Vienna, Austria, 2Bavarian State Collection of Zoology, Munich, Germany

3:30 **1950** Diversity and endemism in water beetles of the South African Cape. **David Bilton** (d.bilton@plymouth. ac.uk), Plymouth Univ., Plymouth, United Kingdom

3:45 **1951** The aquatic beetle fauna of Qinghai-Xizang Plateau, China. **Fenglong Jia** (fenglongjia@aliyun.com), Sun Yat-sen Univ., Guangzhou, China

4:00 **1952** CReAC: A cyberinfrastructure platform for facilitating systematic and evolutionary research on aquatic beetles. **Andrew Short** (aezshort@ku.edu), Univ. of Kansas, Lawrence, KS

4:15 **1953** Phylogeny and biogeography of the Lutrochidae and their relatives. **Crystal Maier** (crystal.maier@gmail. com), Univ. of Kansas, Lawrence, KS

4:30 **1954** 100 million years of waterfall beetle evolution. **Emmanuel Toussaint** (emmanuel.touss1@gmail.com) and Andrew Short, Univ. of Kansas, Lawrence, KS

4:45 **1955** Reconstructing the evolutionary history of the Acidocerinae (Coleoptera: Hydrophilidae): Advances in the *Chasmogenus* group. **Jennifer Girón** (entiminae@ gmail.com) and Andrew Short, Univ. of Kansas, Lawrence, KS

5:00 **1956** Phylogenetic analysis of Berosini with a focus on *Berosus* Leach, 1817 (Insecta: Coleoptera: Hydrophilidae). **Bruno Clarkson** (brclarkson@gmail. com), Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

**Symposium: The Evolution of Lepidoptera: Bringing it All Together**

***Room W224 G (Convention Center)***

**Moderators and Organizers:** Andreas Zwick1 and Jae-Cheon Sohn2, 1CSIRO, Acton, Australia, 2Smithsonian Institution Na- tional Museum of Natural History, Washington, DC

1:30 **1957** Higher phylogeny of Lepidoptera: Recent progress and future prospects. **Charles Mitter** (cmitter@umd.edu), Michael Cummings, Adam Bazinet, and Kim Mitter, Univ. of Maryland, College Park, MD

2:00 **1958** Discovery and characterization of a new family of primitive moths (Aenigmatineidae) from Kangaroo Island, South Australia. **Douglas Hilton** (dhilton@ unimelb.edu.au)1, Axel Kallies1, Liz Milla1, Jadranka Rota2, Niklas Wahlberg2, Stephen Wilcox1, Richard V. Glatz3, David Young3, Glenn Cocking4, Ted Edwards4,

George Gibbs5, Mike Halsey6, and Niels Kristensen7, 1The Univ. of Melbourne, Melbourne, Australia,  
2Lund Univ., Lund, Sweden, 3D’Estrees Entomology Scientific Services, MacGillivray, Australia, 4CSIRO, Acton, Australia, 5Victoria Univ., Kelburn, New Zealand, 6La Trobe Univ., Yackandandah, Australia, 7Univ. of Copenhagen, Copenhagen, Denmark

2:15 **1959** A preliminary phylogeny of Heliozelidae (Lepidoptera: Adeloidea), with a focus on endemic Australian genera. **Liz Milla** (emilla@student.unimelb. edu.au)1, David Young2, Axel Kallies1, Stephen Wilcox1, Tom McConville3, Qike Wang1, Brian Goodey4,

Mike Halsey5, Camiel Doorenweerd6, Erik van Nieukerken6, and Douglas Hilton1, 1The Univ. of Melbourne, Melbourne, Australia, 2D’Estrees Entomology Scientific Services, MacGillivray, Australia, 3The Univ. of Melbourne, Washington, DC, Australia, 4Colchester, United Kingdom, 5La Trobe Univ., Yackandandah, Australia, 6Naturalis Biodiversity Center, Leiden, Netherlands

2:30 **1960** The evolution of aposematism and chemical defense in Zygaenidae (Lepidoptera: Zygaenoidea). Chia-Hsuan Wei and **Shen-Horn Yen** (shenhornyen@ faculty.nsysu.edu.tw), National Sun Yat-Sen Univ., Kaohsiung, Taiwan

2:45 **1961** New insights and renewed focus on the behavioural and mechanical traits of the larvae of the limacodid-group and related families (Lepidoptera: Aididae, Anomoeotidae, Dalceridae, Himantopteridae, Limacodidae, Megalopygidae, and Somabrachyidae). Steen Dupont1 and **Marc Epstein** (marc.epstein@cdfa. ca.gov)2, 1The Natural History Museum, London, United Kingdom, 2California Dept. of Food and Agriculture, Sacramento, CA

**3:00 BREAK**

3:15 **1962** Redefining *Adelpha malea fundania* abundance and geographical distribution: A case of an overlooked species in Mexican scientific collections. **Blanca Prado** (brp\_c@yahoo.com)1, Carmen Pozo1, Moisés Luis-Martínez2 and Noemí Salas-Suárez1, 1College of the Southern Border, Chetumal, Mexico, 2National Autonomous Univ. of México, Mexico City, Mexico

3:30 **1963** Status of the phylogenetic-classification of the Blastobasidae (Lepidoptera: Gelechioidea) and insights to the evolution of host-plant preferences within  
its major clades. **David Adamski** (adamskid@si.edu), Smithsonian Institution National Museum of Natural History, Washington, DC

3:45 **1964** Pyraloidea: Resolution with highly derived genera and additional taxa. **M. Alma Solis** (alma.solis@ ars.usda.gov)1 and Charles Mitter2, 1USDA - ARS, Washington, DC, 2Univ. of Maryland, College Park, MD

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**TUESDAY**

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4:00 **1965** Phylotransciprotmics of the Noctuoidea. **Jesse Breinholt** (jessebreinholt@gmail.com)1, Nicholas Homziak1, Lei Xiao1, Andreas Zwick2, and Akito Y. Kawahara1, 1Univ. of Florida, Gainesville, FL, 2CSIRO, Acton, Australia

4:15 **1966** Since 2012: Updates and recent progresses  
in studies of fossil Lepidoptera. **Jae-Cheon Sohn** (jay.c.sohn@gmail.com)1, Donald R. Davis2,  
Conrad Labandeira2, Maria Heikkilä2, Charles Mitter3, Carmen Soriano4, and Sei-Woong Choi1, 1Mokpo National Univ., Moppo, South Korea, 2Smithsonian Institution National Museum of Natural History, Washington, DC, 3Univ. of Maryland, College Park, MD, 4U.S. Dept. of Energy, Lemont, IL

4:30 **1967** An improved time frame for the diversification of Lepidoptera. **Maria Heikkilä** (heikkilam@si.edu)1, Jae-Cheon Sohn2, Charles Mitter3, Michael Cummings3, Rienk de Jong4, Dany Azar5, Donald R. Davis1, Conrad Labandeira1, Thomas Simonsen6, Wolfram Mey7, and Kim Mitter3, 1Smithsonian Institution National Museum of Natural History, Washington, DC, 2Mokpo National Univ., Moppo, South Korea, 3Univ. of Maryland, College Park, MD, 4Naturalis Biodiversity Center, Leiden, Netherlands, 5Lebanese Univ., Fanar-Matn, Lebanon, 6Natural History Museum, Aarhus, Denmark, 7Museum of Natural History, Berlin, Germany

4:45 **1968** Genetic mining of Lepidoptera in museum collections — from DNA barcodes to genomes. **Andreas Zwick** (andreas.zwick@csiro.au) and Diana Hartley, CSIRO, Acton, Australia

**Symposium: Insect Biocomposites: Cuticles and Peritrophic Matrices**

***Room W331 C (Convention Center)***

**Moderators and Organizers:** Michael Kanost1, Tsunaki Asano2, and Hans Merzendorfer3, 1Kansas State Univ., Manhattan, KS, 2Tokyo Metropolitan Univ., Tokyo, Japan, 3Univ. of Siegen, Siegen, Germany

1:30 **1969** The assembly and turnover of the enigmatic insect cuticle. **Subbaratnam Muthukrishnan**

(smk@k-state.edu), Kansas State Univ., Manhattan, KS

2:00 **1970** Cuticle formation in *Cimex lectularius*. **Bernard Moussian** (bernard.moussian@tuebingen. mpg.de), Christin Froschauer and Klaus Reinhardt, Technical Univ., Dresden, Germany

2:15 **1971** Major cuticular proteins in adult *Tribolium castaneum*. **Yasuyuki Arakane** (arakane@chonnam. ac.kr)1, Mi Young Noh1, Seulgi Mun1, Neal Dittmer2,  
Karl J. Kramer3, Subbaratnam Muthukrishnan2, and Michael Kanost2, 1Chonnam National Univ.,  
Gwangju, South Korea, 2Kansas State Univ., Manhattan, KS, 3USDA - ARS, Manhattan, KS

2:30 **1972** Structural analysis on insect cuticular proteins. **Neal Dittmer** (ndittmer@ksu.edu), Kansas State Univ., Manhattan, KS

2:45 **1973** Laccase activation during the molting process. **Tsunaki Asano** (asano-tsunaki@tmu.ac.jp)1 and Michael Kanost2, 1Tokyo Metropolitan Univ., Tokyo, Japan, 2Kansas State Univ., Manhattan, KS

**3:00 BREAK**

3:15 **1974** Cuticle chitin degradation: An unrevealed complex process. **Qing Yang** (qingyang@dlut.edu.cn), Dalian Univ. of Technology, Dalian, China

3:30 **1975** Serosal cuticle formation and its waterproofing function during insect embryogenesis. **Gustavo Rezende** (grezende@uenf.br)1, Luana Farnesi2, Helena Vargas1, Chris Jacobs3, Ademir Martins2, Maurijn van der Zee4, and Denise Valle2, 1 State University of Northern Rio de Janeiro, Campos dos Goytacazes, Brazil, 2Oswaldo Cruz Foundation, Rio de Janeiro, Brazil, 3Max Planck Institute for Chemical Ecology, Jena, Germany, 4Leiden Univ., Leiden, Netherlands

3:45 **1976** Body shape regulation by cuticular proteins in *Drosophila melanogaster*. **Reiko Tajiri** (rtajiri1@gmail. com), The Univ. of Tokyo, Chiba, Japan

4:00 **1977** Molecular bases underlying the diversity of color pattern and color vision in dragonflies. **Ryo Futahashi** (ryo-futahashi@aist.go.jp)1 and Takema Fukatsu2, 1National Institute of Advanced Industrial Science and Technology, Ibaraki, Japan, 2Advanced Industrial Science and Technology, Tsukuba, Japan

4:15 **1978** New insights into lepidopteran peritrophic matrix synthesis. **Umut Toprak** (utoprak@agri.ankara. edu.tr)1, Dwayne Hegedus2, and Martin Erlandson2, 1Univ. of Ankara, Ankara, Turkey, 2Agriculture and Agri-Food Canada, Saskatoon, Canada

4:30 **1979** Functional analysis of peritrophic matrix proteins in the larval midgut of *Tribolium castaneum*. **Marco Kelkenberg** (kelkenberg@biologie.uni-osnabrueck. de)1, Sinu Agrawal2, and Khurshida Begum2, 1Univ. of Osnabrück, Osnabrück, Germany, 2Kansas State Univ., Manhattan, KS

4:45 **1980** Mucin fragments in caterpillar frass alter herbivore defenses in maize. **Dawn Luthe** (dsl14@psu. edu), Pennsylvania State Univ., University Park, PA

**Symposium: Ion Channels as Targets of Synthetic and Natural Neurotoxins**

***Room W340 B (Convention Center)***

**Moderators and Organizers:** Ke Dong1 and Vincent Salgado2, 1Michigan State Univ., East Lansing, MI, 2BASF, Research Triangle Park, NC

*This symposium is generously sponsored by BASF, Mitsui Chemical Agro, Inc., Sumitomo Chemical Company, Syngenta and Zhong Shan Lan Ju Daily Chemical Industrial Co. LTD.*

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1:30 **1981**  
at voltage-gated sodium channels. **Michael Gurevitz** (mamgur@post.tau.ac.il), Tel Aviv Univ., Tel Aviv, Israel

Mapping the receptor sites of scorpion toxins



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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

1:45 **1982** Glutamate-gated chloride channels of insects and ticks are targeted by okaramines, natural product leads for insecticides and acaricides. **David Sattelle** (d.sattelle@ucl.ac.uk)1, Makoto Ihara2, Shogo Furutani2, Steven Buckingham1, Kristin Lees1, Freddie Partridge1, Hideo Hayashi3, and Kazuhiko Matsuda2, 1Univ. College London, London, United Kingdom, 2Kinki Univ., Nara, Japan, 3Osaka Prefecture Univ., Osaka, Japan

2:00 **1983** Charge reversal mutations in the voltage sensor of domain III enhanced the sensitivity of an insect sodium channel to a scorpion -toxin. **Yuzhe Du** (duy@msu.edu), Michigan State Univ., East Lansing, MI

2:15 **1984** Investigating sodium channel function with insect toxins. Graham Nicholson1, Glenn F. King2, and **Frank Bosmans** (frankbosmans@jhmi.edu)3, 1Univ. of Technology, Sydney, Australia, 2Univ. of Queensland, Brisbane, Australia, 3Johns Hopkins Univ. School of Medicine, Baltimore, MD

2:30 **1985** Mode of action of haedoxan A from *Phryma leptostachya*. **Zhaonong Hu** (huzhaonong@live.cn), Northwest A&F Univ., Yangling, China

2:45 **1986** Mechanisms of resistance to insecticides targeting RDL GABA receptors. **Toshifumi Nakao** (toshifumi.nakao@mitsui-chem.co.jp), Mitsui Chemicals Agro, Inc., Mobara, Japan

**3:00 BREAK**

3:15 **1987** The – interface: A hidden binding site of neonicotinoids at nicotinic acetylcholine receptors. **Kazuhiko Matsuda** (kmatsuda@nara.kindai.ac.jp), Kinki Univ., Nara, Japan

3:30 **1988** Interactions of spinosad with insect nicotinic acetylcholine receptors. **Trent Perry** (trentp@unimelb. edu.au), The Univ. of Melbourne, Melbourne, Australia

3:45 **1989** Allosteric modulation of tick nicotinic acetylcholine receptor alpha 5 and alpha 6 by spinosad. **Mirel Puinean** (mirel.puinean@rothamsted.ac.uk), Rothamsted Research, Harpenden, United Kingdom

4:00 **1990** Diamide insecticides: Understanding the basis for insect selectivity and target-site resistance. **Daniel Cordova** (daniel.cordova@dupont.com)1,  
Eric Benner1, Yong Tao2, Steven Gutteridge1,

George Lahm1, Thomas Selby1, and Alan Williams3, 1DuPont Crop Protection, Newark, DE, 2Chinese Academy of Sciences, Beijing, China, 3Cardiff Univ., Cardiff, United Kingdom

4:15 **1991** Making a pest of *Drosophila*: Understanding field resistance to diamide insecticides. **Lucy Firth** (lucy.firth@syngenta.com), Jenny Willis, and Liz Hirst, Syngenta, Bracknell, United Kingdom

4:30 **1992** TRPV channels as insecticide targets.  
**Vincent Salgado** (vincent.salgado@basf.com)1, Ramani Kandasamy1, Katherine Lelito1, Brecht London1, Alexandre Nesterov1, Lynn Stam1, Christian Spalthoff2, and Martin Goepfert2, 1BASF, Research Triangle Park, NC, 2Georg August Univ., Göttingen, Germany

4:45 **1993** Potassium channels as targets of synthetic neurotoxins. **Jeffrey R. Bloomquist** (jbquist@epi.ufl.edu)1, Maxim Totrov2, and Paul R Carlier3, 1Univ. of Florida, Gainesville, FL, 2Molsoft LLC, San Diego, CA, 3Virginia Polytechnic Institute and State Univ., Blacksburg, VA

5:00 **1994** Pyrethroids and voltage sensors in sodium channels. **Eugenio Eduardo Oliveira** (eugenio@ufv.br), Federal Univ. of Viçosa, Viçosa, Brazil

5:15 **1995** Pyrethroids activate olfactory receptors and elict spatial repellency in *Drosophila melanogaster.* **Ke Dong** (dongk@cns.msu.edu), Michigan State Univ., East Lansing, MI

**Symposium: Mechanisms and Consequences of Phase Change in the Desert Locust, *Schistocerca gregaria***

***Room W232 A (Convention Center)***

**Moderators and Organizers:** Arianne Cease and Stephen Rogers, Arizona State Univ., Tempe, AZ

1:30 **1996** How should we quantify behavioural phase state in locusts across treatments, strains, and species? **Swidbert Ott** (so120@leicester.ac.uk), Univ. of Leicester, Leicester, United Kingdom

1:45 **1997** Diet mixing in locusts: Physiological and molecular insights. **Spencer Behmer** (s-behmer@tamu. edu)1, Gregory Sword1, Corinna Krempl2, and Heiko Vogel2, 1Texas A&M Univ., College Station, TX, 2Max Planck Institute for Chemical Ecology, Jena, Germany

2:00 **1998** Monoamine receptors and swarming behaviour in locusts. **Heleen Verlinden** (heleen.verlinden@bio. kuleuven.be)1, Rut Vleugels1, and Jozef Vanden Broeck2, 1Univ. of Leuven, Leuven, Belgium, 2Catholic Univ., Leuven, Belgium

2:15 **1999** Integrating ecology and phase polyphenism into preventative locust management. **Gregory Sword** (gasword@tamu.edu), Texas A&M Univ., College Station, TX

2:30 **2000** Transcriptome analysis for investigating the molecular basis of phase change in the desert locust, *Schistocerca gregaria*. **Rik Verdonck** (rik.verdonck@ bio.kuleuven.be)1, Jozef Vanden Broeck2, and Swidbert Ott3, 1Univ. of Leuven, Leuven, Belgium, 2Catholic Univ., Leuven, Belgium, 3Univ. of Leicester, Leicester, United Kingdom

2:45 **2001** The role of yellow protein in sexual signalling between gregarious locusts. **Darron Cullen** (darron. cullen@bio.kuleuven.be)1, Stephen Simpson2,  
Jozef Vanden Broeck3, and Gregory Sword4, 1Univ. of Leuven, Leuven, Belgium, 2The Univ. of Sydney, Camperdown, Australia, 3Catholic Univ., Leuven, Belgium, 4Texas A&M Univ., College Station, TX

**3:00 BREAK**

3:15 **2002** Phylogenetic perspective on the evolution of phase polyphenism. **Hojun Song** (hsong@tamu.edu), Texas A&M Univ., College Station, TX

3:30 **2003** Circadian biology of *Schistocerca gregaria* Forskål. **Tom Matheson** (tm75@le.ac.uk)1, Jonathan Shand1, Nathaniel Davies1, H Dowse2, Edward Gaten1, Benjamin Hunt1, Stephen Huston3, and Ezio Rosato1, 1Univ. of Leicester, Leicester, United Kingdom, 2Univ. of Maine, Orono, ME, 3Janelia Farm Research Campus, Ashburn, VA

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**TUESDAY**

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3:45 **2004** Locusts as models for collective behavior. **Amir Ayali** (ayali@tauex.tau.ac.il), Tel Aviv Univ., Tel Aviv, Israel

**Symposium: Physiological Systems for Arthropod Pest Management in the 21st Century**

***Room W330 A (Convention Center)***

**Moderators and Organizers:** Daniel R. Swale1 and Lacey Jenson2, 1Vanderbilt Univ., Nashville, TN, 2Virginia Polytechnic Institute and State Univ., Blacksburg, VA

1:30 **2005** Assessing the effects of hermetic storage on stored grain and pest physiology. **Scott Williams** (sbwillia88@gmail.com), Larry Murdock, and

Dieudonne Baributsa, Purdue Univ., West Lafayette, IN

1:45 **2006** Beetleomics: Targeting the *Tribolium* gut for control. **Lindsey Perkin** (lindsey.perkin@ars.usda.gov), USDA - ARS, Manhattan, KS

2:00 **2007** Presentation withdrawn

2:15 **2008** Mosquito attraction and semiochemical analysis for mosquito vectors of dog heartworm.  
**Chris J. Holderman** (chrish2@ufl.edu), Univ. of Florida, Gainesville, FL

2:30 **2009** Regulatory frameworks and field-site considerations in advancing new genetic strategies  
for control of mosquito vectors of malaria.  
**James M. Mutunga** (jmutunga@icipe.org), International Centre of Insect Physiology and Ecology, Nairobi, Kenya

2:45 **2010** Differential RNAi approaches to enhance knockdown efficiency of target gene transcript in the highly DDT-resistant 91-R strain of *Drosophila melanogaster*. **Kyong Sup Yoon** (kyoon@siue.edu), Southern Illinois Univ., Edwardsville, IL

**3:00 BREAK**

3:15 **2011** Characterization of inward rectifying potassium channels in the salivary glands of arthropod disease vectors. **Daniel R. Swale** (dswale@agcenter.lsu.edu), Louisiana State Univ., Baton Rouge, LA

3:30 **2012** The muscarinic acetylcholine receptor: An important and underexplored component of the cholinergic system in arthropods. **Aaron Gross** (adgross@epi.ufl.edu) and Jeffrey Bloomquist, Univ. of Florida, Gainesville, FL

3:45 **2013** Discovery of resistance-breaking chemistries for varroa mite management. **Troy D. Anderson** (anderst@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

4:00 **2014** Refining and redefining insecticide target sites. **Frank Rinkevich** (fdr5@lsu.edu), Louisiana State Univ., Baton Rouge, LA

4:15 **2015** Toxicity and potassium channel-directed effects of flonicamid analogs. **Jennina Taylor-Wells** (jtaylorwells@ufl.edu)1, Paul R Carlier2, Aaron Gross1, Joseph Clements2, and Jeffrey Bloomquist1, 1Univ. of Florida, Gainesville, FL, 2Virginia Polytechnic Institute and State Univ., Blacksburg, VA

4:30 **2016** Insect peptide neurohormone receptors as insecticide targets. **Andrew Nuss** (anuss@cabnr.unr. edu), Univ. of Nevada, Reno, NV

4:45 **2017** Mechanisms of action of pyrethroid insecticides. **Peng Xu** (xupengmsu@gmail.com), Michigan State Univ., East Lansing, MI

5:00 **2018** Control of biting midges: *Culicoides* attractants and toxicants. **Darren Snyder** (snyderd@ksu.edu), Kansas State Univ., Manhattan, KS

**Symposium: The Limits of Respiratory Function: External and Internal Constraints on Insect Gas Exchange**

***Room W331 B (Convention Center)***

**Moderators and Organizers:** Philip Matthews1, Kendra Greenlee2, and Wilco Verberk3, 1The Univ. of British Columbia, Vancouver, BC, Canada, 2North Dakota State Univ., Fargo, ND, 3Radboud Univ. Nijmegen, Nijmegen, Netherlands

*This symposium is generously sponsored by Loligo Systems and Sable Systems International.*

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1:30 **2019**  
Scaling of gas exchange capacities and tracheal structures in scarab beetles. **Jon F. Harrison** (j.harrison@ asu.edu), C. Jaco Klok, Meghan Duell, Jacob Campbell, and Julian Wagner, Arizona State Univ., Tempe, AZ

2:00 **2020** Gills versus spiracles: The respiratory physiology of amphibious insects. **Philip Matthews** (pmatthews@zoology.ubc.ca), The Univ. of British Columbia, Vancouver, BC, Canada

2:15 **2021** Supply and demand: How would variation in atmospheric oxygen over geologic time have influenced insect tracheal and mitochondrial networks?  
**John VandenBrooks** (jvandenbrooks@midwestern.edu), Midwestern Univ., Glendale, AZ

2:30 **2022** Flight metabolic rate variation and its consequences on muscle metabolic machinery. **Charles Darveau** (cdarveau@uottawa.ca), Univ. of Ottawa, Ottawa, ON, Canada

2:45 **2023** Origin and evolution of insect respiratory proteins. **Thorsten Burmester** (thorsten.burmester@ uni-hamburg.de), Univ. of Hamburg, Hamburg, Germany

**3:00 BREAK**

3:15 **2024** Temperature, oxygen, cell size, performance, and life history — an insect’s perspective.  
**Marcin Czarnołęski** (marcin.czarnoleski@uj.edu.pl), Jagiellonian Univ., Krakow, Poland

3:30 **2025** Tracheal system structure and function changes within an instar in insects. **Kendra Greenlee** (kendra. greenlee@ndsu.edu), North Dakota State Univ., Fargo, ND

3:45 **2026** Diffusion-convection switches in insect respiratory gas exchange. **John Terblanche** (jst@sun. ac.za), Stellenbosch Univ., Stellenbosch, South Africa

4:00 **2027** Thermal tolerance and its plasticity are shaped by the reliance on diffusive gas exchange within the *Deronectes* group of European diving beetles.

What does it take to be a massive insect?



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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

**Wilco Verberk** (wilco@aquaticecology.nl)1, Piero Calosi2, John Spicer3, Siegfried Kehl4, and David Bilton3, 1Radboud Univ. Nijmegen, Nijmegen, Netherlands, 2Univ. of Québec, Rimouski, QC, Canada, 3Plymouth Univ., Plymouth, United Kingdom, 4Univ. of Bayreuth, Bayreuth, Germany

4:15 **2028** Does temperature impose limits on aquatic insects via oxygen delivery/respiratory processes? **David Buchwalter** (david\_buchwalter@ncsu.edu), North Carolina State Univ., Raleigh, NC

4:30 **2029** Thermal tolerance of terrestrial insects: How do they solve a problem like hypoxia? **Leigh Boardman** (lboardman@ufl.edu), Univ. of Florida, Gainesville, FL

4:45 **2030** Interacting control systems and metabolic stimuli influence insect gas exchange patterns. **Erica Heinrich** (echeinrich@ucsd.edu), Univ. of California, La Jolla, CA

5:00 **2031** Inspiration from expiration: How active ventilation in the hissing cockroach informs the design of microfluidic devices. **Joel Garrett** (jfg@vt.edu), Rafael Davalos, and John Socha, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

5:15 **2032** Respiration in the brown locust: Size, phase, and environment. **Frances Duncan** (frances.duncan@ wits.ac.za), Univ. of the Witwatersrand, Johannesburg, South Africa

**Symposium: Advances in the Molecular Biology and Microbial Ecology of Important Urban Pests**

***Room W224 B (Convention Center)***

**Moderators and Organizers:** Dana Nayduch1 and Ludek Zurek2, 1USDA - ARS, Manhattan, KS, 2Kansas State Univ., Manhattan, KS

1:30 **2033** An antifungal defense strategy in termites. **Mark S. Bulmer** (mbulmer@towson.edu), Towson Univ., Towson, MD

2:00 **2034** Admixture mapping within a fire ant hybrid zone. **Elizabeth Wade** (elizabeth.wade@ars.usda.gov)1, Pnina Cohen2, Sean Ryan1, Lucinda Lawson1,  
Eyal Privman2, Kenneth Ross3, and DeWayne Shoemaker1, 1USDA - ARS, Gainesville, FL, 2Univ. of Haifa, Haifa, Israel, 3Univ. of Georgia, Athens, GA

2:15 **2035** Caste and cuticle development of *Camponotus floridanus* lacking the endosymbiont *Blochmannia*. **Marc Seid** (seidm2@scranton.edu), Veronica Sinotte, and Samantha Freedman, The Univ. of Scranton, Scranton, PA

2:30 **2036** Gut bacteria mediate aggregation in the German cockroach. **Ayako Wada-Katsumata** (akatsum@ncsu.edu)1, Ludek Zurek2, Godfrey Nalyana1, Wendell L. Roelofs3, Aijun Zhang4, and Coby Schal1, 1North Carolina State Univ., Raleigh, NC, 2Kansas State Univ., Manhattan, KS, 3Cornell Univ., Geneva, NY, 4USDA - ARS, Beltsville, MD

2:45 **2037** Insect pests represent a link between food animal farms and the urban environment for antibiotic resistance traits. **Ludek Zurek** (lzurek@ksu.edu) and Anuradha Ghosh, Kansas State Univ., Manhattan, KS

**3:00 BREAK**

3:15 **2038** Expression of *defensin* paralogs across house fly life history: Insights into fly-microbe interactions. **Dana Nayduch** (dana.nayduch@ars.usda.gov), USDA - ARS, Manhattan, KS

3:30 **2039** Genome sequence of the bed bug reveals underlying aspects of *Cimex lectularius* biology. **Jacob Hendershot** (henderj8@mail.uc.edu) and Joshua Benoit, Univ. of Cincinnati, Cincinnati, OH

**Undergraduate Student Oral Competition: Entomology Around the World**

***Room W232 C (Convention Center)***

**Moderator:** Chandra Moffat, Univ. of New Brunswick, Fredericton, NB, Canada

1:30 **2040** *Apis mellifera* visit different flowers of located in the northern of Bogotá (Colombia). **Felipe Sarmiento** (mcgomez@campestre.edu.co), Federico Villota, Ignacio Leyva, and Martha Cecilia Gómez Tobar, Gimnasio Campestre, Bogotá, Colombia

1:45 **2041** First taxonomic list of diurnal butterfly species was compiled from two areas, Soratama (environmental reserve in the northeast of the city) and Colombo-Sueco (environmental classroom) Usaquén-Bogotá, Colombia. **Santiago Abril** (sguevara@campestre.edu.co), Alejandro Páez, Pablo Parodi, Sergio Perdomo, and Sussy Fidull Guevara, Gimnasio Campestre, Bogotá, Colombia

2:00 **2042** Review of the Family Cosmopterigidae Heinemann & Wocke, 1876 (Lepidoptera: Gelechoiodea) in Korea. **Hyun-Kyung Yoon** (hkyoon1130@gmail.com) and Bong-Kyu Byun, Hannam Univ., Daejeon, South Korea

2:15 **2043** A taxonomic review of the Genus *Phyllonorycter* Hübner (Lepidoptera: Gracillariidae) from South Korea. **Da-Som Kim** (n4311@hanmail.net)1, Chung-Won Choi2, and Bong-Kyu Byun1, 1Hannam Univ., Daejeon, South Korea, 2Sejong Univ., Seoul, South Korea

2:30 **2044** Bionomic and developmental study of *Laptaulax koreanus* (Coleoptera: Passalidae) in Korea. **TaeHee Yoo** (019426@naver.com) and Bong-Kyu Byun, Hannam Univ., Daejeon, South Korea

2:45 **2045** Taxonomic study of the Psychidae (Lepidoptera) from Korea, with two newly recorded species.  
**Seung Jin Roh** (gorsj@hanmail.net) and Bong-Kyu Byun, Hannam Univ., Daejeon, South Korea

**3:00 BREAK**

3:15 **2046** An updated checklist of the bees of the Commonwealth of Dominica (Hymenoptera: Apoidea: Anthophila). **Shelby Kilpatrick** (entorocks527@tamu. edu)1, Jason Gibbs2, and James Woolley1, 1Texas A&M Univ., College Station, TX, 2Michigan State Univ., East Lansing, MI

3:30 **2047** A survey of *Odontomachus* (Hymenoptera: Formicidae) and general observations of nesting preferences in the Commonwealth of Dominica in the West Indies. **Andrew Graf** (cipher\_the\_noble@tamu. edu) and James Woolley, Texas A&M Univ., College Station, TX

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**TUESDAY**

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3:45 **2048** A comparison of spider family diversity on 2:15 vegetation between primary rainforest and secondary rainforest. **Ryan Selking** (optimus1@email.tamu.edu),  
Texas A&M Univ., College Station, TX

4:00 **2049** Key to *Septobasidium* of the southeastern  
United States. **Gabriel Somarriba** (gabe.somarriba@ 2:30 gmail.com), Andrea Lucky, and Matthew Smith, Univ. of  
Florida, Gainesville, FL

4:15 **2050** Investigating the influence of geospatial  
attributes on spider species richness and diversity.  
**Katherine Russell** (krussell1995@gmail.com)1, 2:45 Alisa Coffin2, Dawn Olson2, Tim Strickland2, and  
Jason Schmidt1, 1Univ. of Georgia, Tifton, GA, 2USDA -  
ARS, Tifton, GA

4:30 **2051** llustrated guide to the tribe Coccidulini  
Mulsant, 1846 (Coleoptera: Coccinellidae) of Mexico. **3:00**

**2058** Neonicotinoids in sunflower (*Helianthus annuus*) extra-floral nectar: How are beneficial insects affected? **Mike Bredeson** (michael.bredeson@sdstate. edu)1 and Jonathan Lundgren2, 1South Dakota State Univ., Brookings, SD, 2Ecdysis Foundation, Estelline, SD

**2059** Comparison of neonicotinoid concentrations in target and non-target members of the soil invertebrate community of Pennsylvania soybean fields.  
**Kirsten Pearsons** (kfp5094@psu.edu) and John Tooker, Pennsylvania State Univ., University Park, PA

**2060** Assessing the impacts of systemically-applied imidacloprid on the generalist hemipteran predator *Jalysus wickhami*. **Peter Nelson** (pnnelson@ncsu.edu), Hannah Burrack, and Clyde E. Sorenson, North Carolina State Univ., Raleigh, NC

**BREAK**

**Enya Ramírez Del Valle** (ayne\_icneumon\_@hotmail.com) and Paulina Cifuentes Ruiz, National Autonomous Univ. of México, Mexico City, Mexico

4:45 **2052** Body morphometric, crop histologic structure, and their correlations with dragonflies preying habit (Anisoptera: Libellulidae: *Orthetrum sabina*, *Pantala flavescens*, and *Brachythemis contaminata*).

**Amelia Nugrahaningrum** (nugrahaningrum.amelia@ gmail.com)1,2, 1Gadjah Mada Univ., Yogyakarta, Indonesia, 2Indonesia Dragonfly Society, Sleman, Indonesia

5:00 **2053** Differences in tarsal morphology between arboreal and nonarboreal ants. **Andrew Nisip** (andre. wnisip@ufl.edu) and Andrea Lucky, Univ. of Florida, Gainesville, FL

5:15 **2054** Phylogeography of symbiotic fungi grown by two sympatric fungus-gardening ant species.

**Joseph Luiso** (jluiso@patriots.uttyler.edu) and Jon Seal, The Univ. of Texas, Tyler, TX

**Graduate Student Oral Competition: Ecology of Pesticides, Resistance, Toxicology, and Genetically Modified Crops: Insecticides**

3:15 **2061** Evaluation of residual toxicity of neonicotinoids and resistance issues in thrips management in peanut. **Pin-Chu Lai** (pclai@uga.edu), Mark R. Abney, Albert  
K. Culbreath, and Rajagopalbabu Srinivasan, Univ. of Georgia, Tifton, GA

3:30 **2062** Resistance in thrips to spinosyn and neonicotinoid insecticides. **Danielle Sprague** (dsprague@ufl.edu), Joseph E. Funderburk, and Mrittunjai Srivastava, Univ. of Florida, Quincy, FL

3:45 **2063** Current status of the susceptibility of *Helicoverpa armigera* (Lepidoptera: Noctuidae) to insecticides in Brazil. **Mariana Durigan** (mariana.durigan@yahoo. com), Natália Leite, Dayana Sousa, Rogério Pereira, Douglas Amado, Alberto Correa, and Celso Omoto, Univ. of São Paulo, Piracicaba, Brazil

4:00 **2064** Chemical control of western bean cutworm (*Striacosta albicosta*): Susceptibility to insecticides and effects on non-target arthropods. **Debora Goulart Montezano** (deiagm@gmail.com)1, Thomas Hunt2, Jeffrey Bradshaw3, Blair Siegfried4, and Julie Peterson1, 1Univ. of Nebraska, North Platte, NE, 2Univ. of Nebraska, Concord, NE, 3Univ. of Nebraska, Scottsbluff, NE,

4Univ. of Florida, Gainesville, FL

**2065** Effects of systemic thiamethoxam exposure on the population dynamics of soybean aphids. **Matheus Ribeiro** (matheusgpmr@gmail.com)1, Thomas Hunt2, and Blair Siegfried3, 1Univ. of Nebraska, Lincoln, NE, 2Univ. of Nebraska, Concord, NE, 3Univ. of Florida, Gainesville, FL



***Room W230 B (Convention Center)*** 4:15

**Moderator:** Neelendra Joshi, Univ. of Arkansas, Fayetteville, AR

1:30 **2055** Non-target effects of neonicotinoid seed treatment in a three-year field crop rotation. **Aditi Dubey** (aditid26@gmail.com)1, Galen Dively1, Margaret Lewis2, and Kelly Hamby3, 1Univ. of Maryland, College Park, MD, 2Pennsylvania State Univ., University Park, PA, 3Univ. of California, Davis, CA

1:45 **2056** A season-long study of pesticide exposure  
in Ontario and Québec. **Nadejda Tsvetkov** (nadiats@ yorku.ca)1, Olivier Samson-Robert2, Valérie Fournier2, and Amro Zayed1, 1York Univ., Toronto, ON, Canada, 2Univ. Laval, Québec City, QC, Canada

2:00 **2057** Spatiotemporal associations between herbivory and neonicotinoid insecticides in milkweeds neighboring agricultural land. **Paola Olaya-Arenas** (polayaar@ purdue.edu) and Ian Kaplan, Purdue Univ., West Lafayette, IN

4:30 **2066** Length of thiamethoxam seed treatment activity against soybean aphid (*Aphis glycines*).  
**Carlos Esquivel** (esquivelpalma.1@buckeyemail.osu. edu), Luis A. Cañas, and Andrew Michel, The Ohio State Univ., Wooster, OH

4:45 **2067** The efficacy of sulfoxaflor and flupyradifurone on sugarcane aphids when temperatures change. **Brittany Lipsey** (bse37@msstate.edu)1, Angus Catchot1, Jeff Gore2, Erick Larson1, Don Cook2, and Fred Musser1, 1Mississippi State Univ., Mississippi State, MS, 2Mississippi State Univ., Stoneville, MS



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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

5:00 **2068** Characterization of pyrethroid resistance in the western corn rootworm, *Diabrotica virgifera virgifera* LeConte. **Dariane Souza** (dariane\_lyra@hotmail.com)1, Nicholas Miller2, Blair Siegfried3, and Lance Meinke1, 1Univ. of Nebraska, Lincoln, NE, 2Univ. of Illinois, Chicago, IL, 3Univ. of Florida, Gainesville, FL

5:15 **2069** Roles of carboxyesterases in pyrethroid resistant house flies, *Musca domestica*. **Xuechun Feng** (xzf0005@auburn.edu) and Nannan Liu, Auburn Univ., Auburn, AL

**Graduate Student Oral Competition: Insect Chemical Ecology**

***Room W230 D (Convention Center)***

**Moderators:** Jason Wulff1 and Amanda Winters2, 1Texas A&M Univ., College Station, TX, 2Bowling Green State Univ., Bowling Green, OH

1:30 **2070** Olfactory mediated responses to host- and non-host volatiles by female grape berry moths (*Paralobesia viteana*). **Michael Wolfin** (msw266@ cornell.edu), Gregory M. Loeb, and Charles E. Linn, Cornell Univ., Geneva, NY

1:45 **2071** Apples infested with the oriental fruit moth are a source of HIPVs for host-habitat location of the larval parasitoid *Lytopylus rufipes*. **Chia-Ming Liu** (cobras770920@hotmail.com)1, Shigeru Matsuyama1, Masatake Sasaki2, Akihiro Arakawa3, and

Yooichi Kainoh1, 1Univ. of Tsukuba, Tsukuba, Japan, 2Fukushima Plant Protection Association, Fukushima-shi, Japan, 3Fukushima Agricultural Technology Centre, Fukushima-shi, Japan

2:00 **2072** Silk gland secretion of *Bombyx mori* larvae inhibits the production of herbivory-induced volatiles in mulberry leaves. **Hiroki Takai** (takai@ss.ab.a.u-tokyo. ac.jp), The Univ. of Tokyo, Tokyo, Japan

2:15 **2073** Evidence of shared chemistry between polyester bees of the genus *Colletes* Latreille and their brood parasites of the bee genus *Epeolus* Latreille. **Thomas Onuferko** (onuferko@yorku.ca)1, Joshua Krupp2, Joel Levine2, and Laurence Packer1, 1York Univ., Toronto, ON, Canada, 2Univ. of Toronto, Mississauga, ON, Canada

2:30 **2074** The effect of caterpillar oral secretions on indirect plant defenses. **Anne Jones** (acj152@psu.edu), James Tumlinson, and Gary Felton, Pennsylvania State Univ., University Park, PA

2:45 **2075** Navel orangeworm (*Amyelois transitella*) performance and insecticide detoxification in the presence of the fungus *Aspergillus flavus*. **Daniel Bush** (dsbush2@illinois.edu)1, Mark Demkovich1, Joel Siegel2, and May R. Berenbaum1, 1Univ. of Illinois, Champaign, IL, 2USDA - ARS, Parlier, CA

**3:00 BREAK**

3:15 **2076** Picture-winged fly (Diptera: Ulidiidae: *Euxesta*, *Chaetopsis* spp.) semiochemical investigations.  
**David Owens** (owensd119@ufl.edu)1, Gregg Nuessly1, Paul E. Kendra2, Thomas Colquhoun3,

Wayne S. Montgomery2, Daniel Hahn3, and Dakshina Seal4, 1Univ. of Florida, Belle Glade, FL, 2USDA - ARS, Miami, FL, 3Univ. of Florida, Gainesville, FL, 4Univ. of Florida, Homestead, FL

3:30 **2077** Effects of glucosonolates in host diets on parasitism by the endoparasitoid *Cotesia kariyai*. **Kazumu Kuramitsu** (tsuki.hi.hoshi.hoihoi@gmail.com) and Yooichi Kainoh, Univ. of Tsukuba, Tsukuba, Japan

3:45 **2078** Developmental differences in olfactory processing for predaceous insects. **Ulianova Vidal Gomez** (uvidalgo@purdue.edu) and Ian Kaplan, Purdue Univ., West Lafayette, IN

4:00 **2079** Quest to identify the attractive volatile bouquet of selected fungal species isolated from the mushroom sciarid fly, *Lycoriella ingenua,* to gravid female flies. **Kevin Cloonan** (krc204@psu.edu)1, Stefanos Andreadis1, Haibin Chen2, and Thomas C. Baker1, 1Pennsylvania State Univ., University Park, PA, 2Wenzhou Medical Univ., Wenzhou, China

4:15 **2080** Contextualizing combat: the effects of prior experience, cuticular hydrocarbons, and seasonality on territorial aggression in the red harvester ant, *Pogonomyrmex barbatus*. **Elizabeth Cash** (elizabeth. cash@asu.edu) and Jürgen Gadau, Arizona State Univ., Tempe, AZ

4:30 **2081** Extraordinary case of intrasexual cuticular hydrocarbon (CHC) profile dimorphism in a mason wasp, *Odynerus spinipes*, sheds light on genes involved in CHC biosynthesis. **Victoria Moris** (victoria.carla. moris@gmail.com)1, Thomas Schmitt2, and

Oliver Niehuis1, 1Zoological Research Museum Alexander Koenig, Bonn, Germany, 2Univ. of Würzburg, Würzburg, Germany

**Graduate Student Oral Competition: Integrated Pest Management and Sustainable Agriculture: Agricultural Systems**

***Room W240 A (Convention Center)***

**Moderator:** Doris Lagos-Kutz Ms., Dept. of Entomology, Univ. of Illinois, Urbana, IL

1:30 **2082** Impact of flea beetle feeding injury on cabbage and eggplant. **James Mason** (jmason91@vt.edu) and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

1:45 **2083** Foliar insecticides in soybean: Implications for spectral detection of pest stress. **Tavvs Alves** (alves011@umn.edu)1,2, Zach Marston1, Ian MacRae3, and Robert Koch1, 1Univ. of Minnesota, St. Paul, MN, 2National Council for Scientific and Technological Development, Brasília, Brazil, 3Univ. of Minnesota, Crookston, MN

2:00 **2084** Influence of potassium, micronutrients, and their combinations as foliar applications to suppress soybean stem fly *Melanagromyza sojae* (Diptera: Agromyzidae) on four soybean common varieties. **Hanan Alfy** (hanan\_isaac1@yahoo.com), Agricultural Research Center, Alexandria, Egypt

2:15 **2085** Lethal effects of short-wavelength visible  
light on insects. **Kazuki Shibuya** (bwtmh349@yahoo. co.jp)1,2, Mitsunari Sato1, Yoshino Saito1, Shun Onodera1, and Masatoshi Hori1, 1Tohoku Univ., Sendai, Japan, 2Japan Society for the Promotion of Science, Tokyo, Japan

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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

2:30 **2086** Comparing the effects of organic and conventional soil management on plant gene expression and insect development. **Karol Krey** (karol.krey@wsu. edu), Dorrie Main, and William E. Snyder, Washington State Univ., Pullman, WA

2:45 **2087** Behavioral and developmental effects of mineral oil on potato pests. **Andrew Galimberti** (andrew.galimberti@maine.edu) and Andrei Alyokhin, Univ. of Maine, Orono, ME

**3:00 BREAK**

3:15 **2088** Control of codlling moth (*Cydia pomonella*) using reduced pesticide rates and rapid reapplication. **Paul Owen-Smith** (pcowensmith@gmail.com),  
John Wise, and Matthew Grieshop, Michigan State Univ., East Lansing, MI

3:30 **2089** Temperature effects on mating and fruit infestation by the grape berry moth, *Paralobesia viteana* Clemens (Lepidoptera: Tortricidae). **Keith Mason** (masonk@msu.edu), Laura Bizzarri, and Rufus Isaacs, Michigan State Univ., East Lansing, MI

3:45 **2090** The role of botanical pesticides in IPM. Baoliang Tian1, Qizhi Liu2 and **Yanwei Wang** (cauwangyanwei@163.com)2, 1Henan Univ., Kaifeng, China, 2China Agricultural Univ., Beijing, China

4:00 **2091** Differences in fitness traits between E and Z pheromone races of European corn borer, *Ostrinia nubilalis*, on different host plants. **Holly Lynn Walker** (hollylyn@udel.edu) and Charles Mason, Univ. of Delaware, Newark, DE

4:15 **2092** Spider community responses to contrasting grazing management in upland calcareous grasslands. **Ashley Lyons** (lyonsa@edgehill.ac.uk), Edge Hill Univ., Ormskirk, United Kingdom

4:30 **2093** Assessment of a novel Hessian fly, *Mayetiola destructor* (Diptera: Cecidomyiidae), monitoring method under field conditions. **Ryan Schmid** (rbschmid@ksu.edu)1,2, Darren Snyder1,3, Lee Cohnstaedt1,3, and Brian McCornack1,2, 1Kansas State Univ., Manhattan, KS, 2Plant Biosecurity Cooperative Research Centre, Bruce, Australia, 3USDA - ARS, Manhattan, KS

4:45 **2094** Revising sticky trap thresholds for corn rootworms (*Diabrotica* spp.): How long will these thresholds stick? **Trisha Leaf** (trisha.franz@gmail.com) and Ken Ostlie, Univ. of Minnesota, St. Paul, MN

5:00 **2095** Herbicide-induced effects in rice (*Oryza sativa*) on the rice water weevil (*Lissorhoptrus oryzophilus*). **Emily Kraus** (ekraus@agcenter.lsu.edu)1 and  
Michael Stout2, 1Louisiana State Univ., Baton Rouge, LA, 2Louisiana State Univ. AgCenter, Baton Rouge, LA

**Graduate Student Oral Competition: Medical and Veterinary Entomology: Biting Diptera**

***Room W230 A (Convention Center)***

**Moderators:** Nicola Gallagher1 and Michael Reiskind2, 1Syngenta, Columbus, OH, 2North Carolina State Univ., Raleigh, NC

1:30 **2096** Population dynamics, species composition, and transmission potentials of *Simulium damnosum* Theobald complex (Diptera: Simuliidae) in three ecological zones in Osun State, southwestern Nigeria.

**Linda Oforka** (lindaoforka@gmail.com)1, Monsuru Adeleke2, Joseph Anikwe1, Winifred Ayinke Makanjuola1, and Henry Fadamiro3, 1Univ. of Lagos, Lagos, Nigeria, 2Osun State Univ., Osogbo, Nigeria, 3Auburn Univ., Auburn, AL

1:45 **2097** Gnats, rivers, and people: A spatial and social analysis of black fly (Diptera: Simuliidae) nuisance swarms. **Rebecca Wilson** (rcwilson@umd.edu) and William O. Lamp, Univ. of Maryland, College Park, MD

2:00 **2098** A combined morphological and molecular approach in study some phlebotomine sandflies of medical importance from Sudan. **Sara Saeed** (sarakhider@hotmail.com)1,2, Omran Osman2,  
Luisa Nardini1, and Lizette Koekemoer1, 1Wits Research Institute for Malaria, Johannesburg, South Africa, 2Univ. of Khartoum, Khartoum, Sudan

2:15 **2099** Mosquito surveillance in the Tongatapu Island Group, Kingdom of Tonga. **Tom Swan** (tomswanie@ gmail.com)1, Jon Harding1, and Milen Marinov2, 1Univ. of Canterbury, Christchurch, New Zealand, 2Ministry for Primary Industries, Auckland, New Zealand

2:30 **2100** Dengue fever surveillance in Asia using text mining cluster analysis. **Andrea Villanes** (avillan@ncsu. edu), North Carolina State Univ., Raleigh, NC

2:45 **2101** Zooprophylaxis and endectocides: Using cattle in the war on malaria. **Annie Rich** (aerich@uga.edu) and Nancy Hinkle, Univ. of Georgia, Athens, GA

**3:00 BREAK**

3:15 **2102** Characterization of immunogenic proteins in *Aedes* saliva with antibodies of indigenous dengue patients in northern Taiwan. **Tsai-Ying Yen** (farscape@ ms38.hinet.net) and Kun-Hsien Tsai, National Taiwan Univ., Taipei, Taiwan

3:30 **2103** The interplay of carbon dioxide, human skin odor, and visual cues in the host-seeking behavior of *Aedes aegypti*. **Benjamin DeMasi-Sumner** (bdema001@ ucr.edu), Univ. of California, Riverside, CA

3:45 **2104** Fitness effects of permethrin resistance in the yellow fever mosquito, *Aedes aegypti*. **Leticia Smith** (lbs97@cornell.edu), Cornell Univ., Ithaca, NY

4:00 **2105** The effects of non-traditional IGRs on *Aedes aegypti* mosquitoes. **Kristen Stevens** (kcstevens93@ufl.edu), Philip G. Koehler, and Roberto M. Pereira, Univ. of Florida, Gainesville, FL

4:15 **2106** Examining the consequences of land use on vector diversity. **Meredith Spence** (mrspenc2@ncsu. edu) and Michael Reiskind, North Carolina State Univ., Raleigh, NC

4:30 **2107** Midgut basal lamina remodeling during arbovirus dissemination in *Aedes aegypti*. **Asher Kantor** (amkt33@mail.missouri.edu)1, Shengzhang Dong1, Rollie Clem2, Lorena Passarelli2, and Alexander Franz1, 1Univ. of Missouri, Columbia, MO, 2Kansas State Univ., Manhattan, KS

4:45 **2108** Increasing the effective duration of mosquito suppression on a small spatial scale (less than 0.25 ha). **Andrea Skiles** (glennskiles@gmail.com)1, Grayson Brown1, Kyndall Dye1, and Nicola T. Gallagher2, 1Univ. of Kentucky, Lexington, KY, 2Syngenta, Greensboro, NC

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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

**Graduate Student Oral Competition: Morphology, Systematics, and Phylogeny: Beetles, Bugs, and Others**

***Room W230 C (Convention Center)***

**Moderators:** Joseph V. McHugh1 and Helen LeBlanc2, 1Univ. of Georgia, Athens, GA, 2Univ. of Ontario Institute of Technology, Oshawa, ON, Canada

1:30 **2109** Why the long face? Insights into the mechanical behavior of the rostrum in the genus *Curculio* Linnaeus, 1758. **Michael Andrew Jansen** (entojansen@gmail. com), Arizona State Univ., Tempe, AZ

1:45 **2110** Allometry and morphometrics of colored facial markings in three species of burying beetle (Coleoptera: *Nicrophorus*). **Jillian Wormington** (jillianwormington@ gmail.com) and Barney Luttbeg, Oklahoma State Univ., Stillwater, OK

2:00 **2111** Preliminary phylogeny and revised classification of sap beetles in the Carpophilinae (Coleoptera: Nitidulidae). **Gareth Powell** (powellg@purdue.edu)1, Andrew R. Cline2, and Jennifer Zaspel1, 1Purdue Univ., West Lafayette, IN, 2California Dept. of Food and Agriculture, Sacramento, CA

2:15 **2112** Novel trait evolution in weevils (Coleoptera: Curculionidae): Insights from *Diaprepes abbreviatus*. **Kyle DeMarr** (kad259@cornell.edu)1 and Steve Davis2, 1Cornell Univ., Ithaca, NY, 2American Museum of Natural History, New York, NY

2:30 **2113** Preliminary phylogeny of the South American xyleborine genera *Coptoborus* and *Theoborus* (Coleoptera: Curculionidae: Scolytinae). **Rachel Osborn** (rachelkosborn@gmail.com)1 and Anthony I. Cognato2, 1Michigan State Univ., Okemos, MI, 2Michigan State Univ., East Lansing, MI

2:45 **2114** Phylogenetic revision of the Neotropical weevil genus *Trichodocerus* Chevrolat (Coleoptera: Curculionidae). **Salvatore S. Anzaldo** (sanzaldo@asu.edu), Arizona State Univ., Tempe, AZ

**3:00 BREAK**

3:15 **2115** Phylogenetics and revision of the rove beetle genus *Phlaeopterus* Motschulsky, 1853 (Coleoptera: Staphylinidae: Omaliinae). **Logan Mullen** (ljmullen2@ alaska.edu) and Derek Sikes, Univ. of Alaska Museum, Fairbanks, AK

3:30 **2116** The systematics and microbial associations  
of psyllids (Hemiptera: Psylloidea): What is the biosecurity risk? **Francesco Martoni** (francesco.martoni@ lincolnuni.ac.nz)1, Simon Bulman2, and Karen Armstrong3,

1Lincoln Univ., Lincoln, New Zealand, 2Plant and Food Research, Lincoln, New Zealand, 3Plant Biosecurity Cooperative Research Centre, Canberra, Australia

3:45 **2117** A tale of two ends: Evolution of head and male genitalic morphology of *Nannocoris* Reuter (Hemiptera: Schizopteridae). Christiane Weirauch and **Sarah Frankenberg** (sfran012@ucr.edu), Univ. of California, Riverside, CA

4:00 **2118** Molecular and morphology-based phylogeny of Australian Orthotylini (Heteroptera: Miridae: Orthotylinae). **Marina Cheng** (marina.cheng@unsw. edu.au)1 and Gerry Cassis2, 1Univ. of New South Wales, Kensington, Australia, 2Univ. of New South Wales, Sydney, Australia

4:15 **2119** Blunt labium, acute problem: Taxonomic mess in the *Corixidea* genus group (Heteroptera: Schizopteridae). **Alexander Knyshov** (aknys001@ucr.edu), Rochelle Hoey-Chamberlain, and Christiane Weirauch, Univ. of California, Riverside, CA

4:30 **2120** Significance of male supra-anal plate and cerci in the classification of Acridoidea and Pyrgomorphoidea (Orthoptera). **Shahnila Usmani** (persona.usmani@ gmail.com), Aligarh Muslim Univ., Aligarh, India

4:45 **2121** Evaluation of body-size effect on parameters of calling and courtship songs of the two-spotted cricket, *Gryllus bimaculatus*. **Atsushi Miyashita** (4298898886@mail.ecc.u-tokyo.ac.jp), Hayato Kizaki, Kazuhisa Sekimizu, and Chikara Kaito, The Univ. of Tokyo, Tokyo, Japan

5:00 **2122** Towards a comprehensive knowledge of Pyrgomorphidae (Orthoptera: Caelifera) systematics. **Ricardo Marino-Perez** (pselliopus@yahoo.com.mx) and Hojun Song, Texas A&M Univ., College Station, TX

5:15 **2123** Function of internal genitalia of bushcrickets: Comparative evidence of copulatory courtship (Orthoptera: Ensifera: Tettigoniidae). **Nadja Wulff** (nadja\_wulff@yahoo.de) and Gerlind Lehmann, Humboldt Univ., Berlin, Germany

**Contributed Papers: Agricultural and Forest Entomology: Forest Insects**

***Room W225 B (Convention Center)***

**Moderators:** Angela M. Mech1 and Alvaro Fuentealba2, 1Univ. of Georgia, Athens, GA, 2Concordia Univ., Montréal, QC, Canada

1:30 **2124** Determining the role of bacterial symbionts on the heat tolerance of *Adelges tsugae*. **Angela M. Mech** (angmech@gmail.com) and Gaelen Burke, Univ. of Georgia, Athens, GA

1:45 **2125** Prediction of the large scale outbreak patterns of pine caterpillars under climate scenarios. **Hongbin Wang** (wanghb@caf.ac.cn), Sufang Zhang, Xiangbo Kong, and Zhen Zhang, Chinese Academy of Forestry, Beijing, China

2:00 **2126** Chemical communication of *Ips subelongatus* in relation to its hosts, nonhosts, and major associated fungi. **Xiangbo Kong** (xbkong@sina.com), Hongbin Wang, Sufang Zhang, and Zhen Zhang, Chinese Academy of Forestry, Beijing, China

2:15 **2127** Incidence of *Monochamus* species and pinewood nematode in Nova Scotia Christmas tree plantations. **Suzanne Blatt** (suzanne.blatt@agr.gc.ca)1, Charlane Bishop2, Karen Burgher-MacLellan1, and

Jon Sweeney3, 1Agriculture and Agri-Food Canada, Kentville, NS, Canada, 2Christmas Tree Council of Nova Scotia, Newtonville, NS, Canada, 3Natural Resources Canada, Fredericton, NB, Canada

**2128** Thermal limitations to the biological control of *Gonipterus* sp. n. 2 in *Eucalyptus* plantations. **Michelle Schröder** (michelle.schroder@fabi.up.ac.za), Michael Wingfield, Brett Hurley, and Jeff Garnas, Univ. of Pretoria, Pretoria, South Africa

2:45 **2129** Molecular markers confirm the origin and reveal complex global invasion history of the eucalyptus gall wasp, *Leptocybe invasa*. **Gudrun Dittrich-Schröder** (gudrun.dittrich@fabi.up.ac.za)1, Brett Hurley1,

Michael Wingfield1, Bernard Slippers1, Simon Lawson2, and Helen Nahrung2, 1Univ. of Pretoria, Pretoria, South Africa, 2Univ. of the Sunshine Coast, Sippy Downs, Australia

**3:00 BREAK**

2Concordia Univ., Montréal, QC, Canada, 3Natural Resources Canada, Québec City, QC, Canada

**Contributed Papers: Functional Genomics and Transgenesis**

***Room W223 B (Convention Center)***

**Moderators:** Alexie Papanicolaou1 and Margaret Allen2, 1Hawkesbury Institute for the Environment, Richmond, Australia, 2USDA - ARS, Stoneville, MS

1:30 **2138** Transcriptomic analysis reveals the molecular mechanism of *Conopomorpha sinensis* Bradley (Lepidoptera: Gracillariidae) preference for host-plant. **Xiang Meng** (mengxiangxs@126.com), Guangdong Academy of Agricultural Sciences, Guangzhou, China

3:15 **2130** Impact of climate change on the evolution of the  
pine processionary moth, *Thaumetopoea pityocampa* 1:45 (Lepidoptera Notodontidae), at the Aures, Algeria.  
**Nacer Tarai** (tarainacer@yahoo.fr)1 and Mihi Ali2, 1Univ.  
of Biskra, Biskra, Algeria, 2Univ. of Setif, Setif, Algeria

3:30 **2131** Mountain pine beetle, *Dendroctonus ponderosae*,  
as an emerging threat to eastern pine forests of  
North America. **Brian Aukema** (brianaukema@umn.  
edu)1, Robert Venette2, Mark Abrahamson3, and Derek 2:00 Rosenberger1, 1Univ. of Minnesota, St. Paul, MN, 2USDA

- Forest Service, St. Paul, MN, 3Minnesota Dept. of Agriculture, St. Paul, MN

**2139** Genomic interactions of whitefly (*Bemisia tabaci*, MEAM 1) with ToCV and management of whitefly through RNAi. **Navneet Kaur** (navneet.kaur@ ars.usda.gov)1, Wenbo Chen2, Yi Zheng2, Daniel Hasegawa2, Kai-Shu Ling3, Zhangjun Fei2, and William Wintermantel1, 1USDA - ARS, Salinas, CA, 2Cornell Univ., Ithaca, NY, 3USDA - ARS, Charleston, SC

**2140** Expansion of a bitter taste receptor family in a polyphagous insect herbivore. **Wei Xu** (w.xu@murdoch. edu.au)1, Alexie Papanicolaou2, Hui-Jie Zhang3, and Alisha Anderson4, 1Murdoch Univ., Murdoch, Australia, 2Hawkesbury Institute for the Environment, Richmond, Australia, 3CSIRO, Black Mountain, Australia, 4CSIRO, Acton, Australia



3:45 **2132** Responses of *Tomicus piniperda* and  
*Acanthocinus aedilis* in stands with different amounts  
of created deadwood. **Jan Weslien** (jan.weslien@skogforsk.  
se), The Forestry Research Institute of Sweden, Uppsala, 2:15  
Sweden pheromone transmission in honey bees (*Apis mellifera*).

4:00 **2133** High release rate MCH dispensers increase  
efficiency of applications to prevent Douglas-fir beetle (*Dendroctonus pseudotsugae*) infestations.  
**Darrell W. Ross** (darrell.ross@oregonstate.edu)1,  
Harrison Brookes1, and Kimberly F. Wallin2, 1Oregon 2:30 State Univ., Corvallis, OR, 2Univ. of Vermont,

Burlington, VT

**Rong Ma** (rong.ma@utexas.edu)1, Gabriel Villar2, Christina M. Grozinger2, and Juliana Rangel3, 1The Univ. of Texas, Austin, TX, 2Pennsylvania State Univ., University Park, PA, 3Texas A&M Univ., College Station, TX

**2142** Molecular mechanism underlying wing dimorphism in planthoppers. **Hai-Jun Xu** (haijunxu@ zju.edu.cn) and Chuan-Xi Zhang, Zhejiang Univ., Hangzhou, China

**2143** Genome-wide association study reveals genetic determinants of nutritional phenotypes in insect-bacterial symbiosis. **Seung Ho Chung** (sc776@cornell.edu) and Angela Douglas, Cornell Univ., Ithaca, NY

4:15 **2134** Modelling range shifts of native and  
invasive forest insects under changing climate. 2:45 **Päivi Lyytikäinen-Saarenmaa** (paivi.lyytikainen- saarenmaa@helsinki.fi)1, Tuula Kantola1, Hannu Saarenmaa2,  
and Robert Coulson3, 1Univ. of Helsinki, Helsinki,  
Finland, 2Univ. of Eastern Finland, Joensuu, Finland,  
3Texas A&M Univ., College Station, TX

4:30 **2135** PCR multiplexes to discriminate *Fusarium* symbionts of exotic *Euwallacea* ambrosia beetles. **Matther Kasson** (mtkasson@mail.wvu.edu) and Dylan Short, West Virginia Univ., Morgantown, WV

4:45 **2136** New approaches for studying natural enemies of the mountain pine beetle (*Dendroctonus ponderosae*) in standing trees may answer long-standing questions. **Lawrence Haimowitz** (lhaimowi@uwyo.edu), Univ. of Wyoming, Laramie, WY

5:00 **2137** Black spruce susceptibility to Eastern spruce budworm defoliation under a changing climate: Phenological and biochemical responses.  
**Alvaro Fuentealba** (alvaro.fuentealba-morales.1@ ulaval.ca)1,2, Emma Despland2, Deepa Pureswaran3, and Eric Bauce1, 1Univ. Laval, Québec City, QC, Canada,

**3:00 BREAK**

3:15 **2144** Chitinase 7 is required for cuticle laminar organization and chitin deposition in *Tribolium castaneum*. **Mi Young Noh** (annemi@chonnam.ac.kr)1, Subbaratnam Muthukrishnan2, Karl J. Kramer2, and Yasuyuki Arakane1, 1Chonnam National Univ., Gwangju, South Korea, 2Kansas State Univ., Manhattan, KS

3:30 **2145** Presentation withdrawn

3:45 **2146** CRISPR/Cas9-induced anosmia in the crop pest moth *Spodoptera littoralis*. Fotini Koutroumpa1, Christelle Monsempes1, Marie-Christine François1, Corinne Royer2, Anne de Cian3, Jean-Paul Concordet3, and **Emmanuelle Jacquin-Joly** (emmanuelle.jacquin@ versailles.inra.fr)1, 1INRA, Versailles, France, 2INRA, Villeurbanne, France, 3National Museum of Natural History, Paris, France

**2141** Behavioral and molecular mechanisms of



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**TUESDAY**

**Tuesday, September 27 • AFTERNOON •**

4:00 **2147** Pipeline technology from Oxitec, Ltd.: Genetic 2:30 control of *Aedes* mosquitoes. **Edward Sulston** (edward. sulston@pmb.ox.ac.uk)1, Kelly Matzen2, Simon Warner2,  
and Sebastian Shimeld1, 1Univ. of Oxford, Oxford, United Kingdom, 2Oxitec Ltd, Abingdon, United Kingdom

4:15 **2148** Analysis of the sex determination pathway in  
the African malaria mosquito, *Anopheles gambiae*. 2:45 **Jaroslaw Krzywinski** (jaroslaw.krzywinski@pirbright.  
ac.uk) and Elzbieta Krzywinska, The Pirbright Institute, Pirbright, United Kingdom

4:30 **2149** Knockout of DNA damage repair genes in the  
disease vector *Aedes aegypti*. **Justin Overcash** (justmo1@ vt.edu)1,2, Azadeh A. Aryan2, Zach Adelman1, and **3:00** Kevin M. Myles2, 1Texas A&M Univ., College Station, TX,  
2Virginia Polytechnic Institute and State Univ.,  
Blacksburg, VA

4:45 **2150** Does the Y-chromosome facilitate sexual dimorphic evolution in insects or constrain autosomal evolution? **Ian Kutch** (kutch.bio@knights.ucf.edu) and Ken Fedorka, Univ. of Central Florida, Orlando, FL

5:00 **2151** Constraints, independence, and evolution of 3:30 thermal plasticity: Probing genetic architecture of long  
and short-term thermal plasticity. **Daniel Hahn** (dahahn@ufl.edu)1, Alison Gerken2, and Theodore

**2156** Pharmacophagy in green lacewings (Neuroptera: Chrysopidae: *Chrysopa* spp.)? **Jeffrey Aldrich** (drjeffaldrich@gmail.com)1, Kamlesh R. Chauhan2, and Qing-He Zhang3, 1Univ. of California, Davis, CA, 2USDA - ARS, Beltsville, MD, 3Sterling International, Inc., Spokane, WA

**2157** Suboptimal larval habitats modulate oviposition of the malaria vector mosquito *Anopheles gambiae*. **Eunho Suh** (eunhosuh@gmail.com)1, Dong-Hwan Choe2, Ahmed Saveer1, and Laurence Zwiebel1, 1Vanderbilt Univ., Nashville, TN, 2Univ. of California, Riverside, CA

**BREAK**

3:15 **2158** Identification of the aggregation pheromone of the American cockroach, *Periplaneta americana*. **Masayuki Sakuma** (sakuma@kais.kyoto-u.ac.jp)1, Yukihiro Nishimura1, Masashi Tanaka1, Tamio Ueno2, Noritada Matsuo2, and Yasuyuki Koutani2, 1Kyoto Univ., Kyoto, Japan, 2Dainihon Jochugiku Co.,Ltd, Osaka, Japan



Morgan2, 1Univ. of Florida, Gainesville, FL, 2Kansas State Univ., Manhattan, KS

**Contributed Papers: Insect Chemical Ecology**

3:45 **2160** Regulation of worker reproduction in the polydomous ant species *Novomessor cockerelli*. **Jessica Ebie** (jebie@asu.edu), Bert Hölldobler, and Jürgen Liebig, Arizona State Univ., Tempe, AZ

**2159** The pollination ecology of *Platanthera* orchids by snow mosquitoes. **Chloé Lahondère** (lahonder@ uw.edu), Clement Vinauger, Ryo Okubo, and Jeff Riffell, Univ. of Washington, Seattle, WA



***Room W314 B (Convention Center)*** 4:00 **Moderators:** Jeffrey Aldrich1 and Dipsikha Bora2, 1Univ. of

California, Davis, CA, 2Dibrugarh Univ., Dibrugarh, India

1:30 **2152** How competitive interactions between parasitoid species are shaped by herbivores, a model study. **Lia Hemerik** (lia.hemerik@wur.nl)1, Erik Poelman1, Astrid Potiek2, and Tibor Bukovinszky3, 1Wageningen Univ. and Research Centre, Wageningen, Netherlands, 2Univ. of Bielefeld, Bielefeld, Germany, 3Koppert BV, Berkel en Rodenrijs, Netherlands

1:45 **2153** Restricted diet breadth and host defense specific adaptation in *Antheraea assamensis* Helfer: A case study. **Dipsikha Bora** (dipsikhabora03@yahoo. com), Amrita Mech, Bhabesh Deka, and Urbbi Devi, Dibrugarh Univ., Dibrugarh, India

2:00 **2154** Pollinator interactions with the “sweet” scent of cocoa flowers. **Sarah Arnold** (s.e.j.arnold@greenwich. ac.uk)1, Samantha Forbes2, Puran Bridgemohan3, Dudley Farman1, David Hall1, Daniel Bray1,

Gustavo Spinelli4, Garvin Perry5, Leroy Grey6,  
Steven Belmain1, and Philip Stevenson1,7, 1Univ. of Greenwich, Chatham, United Kingdom, 2James Cook Univ., Townsville, Australia, 3Univ. of Trinidad and Tobago, Carapichaima, Trinidad and Tobago, 4Museum of La Plata, La Plata, Argentina, 5Univ. of Trinidad and Tobago, Centeno via Arima, Trinidad and Tobago, 6Ministry of Agriculture, Kingston, Jamaica, 7Royal Botanic Gardens, Surrey, United Kingdom

2:15 **2155** Caste specific volatiles in the red imported fire ants, *Solenopsis invicta*. **Jian Chen** (jian.chen@ars. usda.gov) and Michael Grodowitz, USDA - ARS, Stoneville, MS

**2161** The evolution of geadephagan chemical defense: A phylogenetic understanding of the diversity and stasis of compounds and gland structures in carabid beetles. **Kipling Will** (kipwill@berkeley.edu)1, Athula Attygalle2, Aman Gill3, Wendy Moore4, and Tanya Renner5, 1Univ. of California, Berkeley, CA, 2Stevens Institute of Technology, Hoboken, NJ, 3Stony Brook Univ., Stony Brook, NY, 4Univ. of Arizona, Tucson, AZ, 5San Diego State Univ., San Diego, CA

4:15 **2162** Deciphering the nestmate recognition system in a stingless bee (Hymenoptera: Apidae, *Melipona scutellaris*). **Fabio Nascimento** (fsnascim@usp.br), Daniela Nascimento, and Ivelize Tannure-Nascimento, Univ. of São Paulo, Ribeirão Preto, Brazil

4:30 **2163** Plants, microbes, and odorants in insect host location: Who’s making the message? **Charles Linn Jr.** (cel1@cornell.edu)1, Sara Volo2, Ronnald Chilson3, Michael Wolfin1, and Gregory M. Loeb1, 1Cornell Univ., Geneva, NY, 2Hobart and William Smith Colleges, Geneva, NY, 3Penn Yan Academy High School, Penn Yan, NY

4:45 **2164** Identification and field evaluation of yeast volatiles attractive to *Philornis downsi*, a hematophagous invasive parasite of Darwin’s finches in the Galapagos. **Dong Cha** (dongho.cha1@gmail.com)1, Alejandro Mieles1, Charlotte Causton2, Paola Lahuatte2, Andrea Cahuana2, Piedad Lincango2,3, and Stephen Teale1, 1State Univ. of New York, Syracuse, NY, 2Charles Darwin Foundation for the Galapagos Islands, Galapagos Islands, Ecuador, 3Central Univ. of Ecuador, Quito, Ecuador

**2165** Red imported fire ant (*Solenopsis invicta* Buren) foraging behavior in the presence of swarming bacteria *Proteus mirabilis*. **Elida Espinoza** (ellyspnz@ gmail.com)1, Tawni L. Crippen2, Jeffery K. Tomberlin1, and Roger Gold1, 1Texas A&M Univ., College Station, TX, 2USDA - ARS, College Station, TX

5:15 **2166** *Meloe* nest parasites locally adapt chemistry and behavior to match bee hosts. **Leslie Saul-Gershenz** (lsaulgershenz@ucdavis.edu), Univ. of California, Davis, CA

**Contributed Papers: Medical and Veterinary Entomology: Repellents, Toxicants, and Resistance**

***Room W231 C (Convention Center)***

**Moderators:** M. Patricia Juárez1 and Juli Wuliandari2, 1Biochemical Research Institute of La Plata, La Plata, Argentina, 2The Univ. of Melbourne, Parkville, Australia

1:30 **2167** Insecticide resistance at the surface: Contribution of the integument genes in *Triatoma infestans*. **M. Patricia Juárez** (mjuarez@isis.unlp.edu. ar) and Gustavo Calderón Fernández, Biochemical Research Institute of La Plata, La Plata, Argentina

1:45 **2168** Acetylcholinesterases of arthropod ectoparasites: Roles in organophosphate resistance and host-parasite interaction. **Kevin B. Temeyer** (kevin.temeyer@ars.usda.gov)1, Fan Tong2,  
Jeffrey Bloomquist2, Paul R Carlier3, Maxim Totrov4, Daniel R. Swale5, Andrew Li6, and Adalberto A. Pérez de León1, 1USDA - ARS, Kerrville, TX, 2Univ. of Florida, Gainesville, FL, 3Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 4Molsoft LLC, San Diego, CA, 5Louisiana State Univ., Baton Rouge, LA, 6USDA - ARS, Beltsville, MD

2:00 **2169** Assessment of efficacy of essential oil based combination(s) against the dengue vector *Aedes aegypti* (Diptera: Culicidae) in NE India. **Bulbuli Khanikor** (khanikorbulbuli@yahoo.co.in), Riju Sarma, Sudarshana Mahanta, Sangeeta Hakmao, Sumana Das, Tulika Kuli, Rashmita Ardao, Kamal Adhikari, Alomwara Begum, Rima Rabha, and Chayanika Devi, Gauhati Univ., Guwahati, India

2:15 **2170** Association between three mutations, F1565C, V1023G and S996P, in the voltage-sensitive sodium channel gene and knockdown resistance (kdr) in *Aedes aegypti* from Yogyakarta, Indonesia. **Juli Wuliandari** (jwuliandari@gmail.com)1, Siu Fai Lee1, Vanessa White1, Warsito Tantowijoyo2, Ary Hoffmann1, and

Nancy Endersby-Harshman1, 1The Univ. of Melbourne, Parkville, Australia, 2Eliminate Dengue Project, Yogyakarta, Indonesia

2:30 **2171** MicroRNA-275 directly targets sarco/endoplasmic reticulum Ca2+ adenosine triphosphatase (SERCA) to control key functions in the mosquito gut. **Bo Zhao** (nkzhaobo@gmail.com)1,2, Keira Lucas1, Tusar Saha1, Jisu Ha1, Chun-Hong Chen3, Sourav Roy1, and Alexander Raikhel1, 1Univ. of California, Riverside, CA, 2North Carolina State Univ., Raleigh, NC, 3Institute of Molecular and Genomic Medicine, Zhunan, Taiwan

2:45 **2172** Cytochrome P450 monooxigenase genes (CYP) associated with pyrethroid resistance in the Chagas disease vector *Triatoma infestans*. **Nicolás Pedrini** (nicopedrini@yahoo.com)1, Gustavo Calderón-Fernández1, Jhon Salamanca-Moreno1, Suresh Kumar2, Wilma Fleita1, and M. Patricia Juárez1, 1Biochemical Research Institute of La Plata, La Plata, Argentina, 2Management & Science Univ., Selangor, Malaysia

**3:00 BREAK**

3:15 **2173** Solution for developing countries: a novel in-vitro bioassay to explore the repellent effects of compounds against the mosquito *Aedes aegypti* (Diptera: Culicidae). **Junaid Rehman** (junaiddua@gmail. com), Univ. of Mississippi, Univ., MS

3:30 **2174** Popular homemade Brazilian mosquito repellent recipe may be misleading. **Kaiming Tan** (ktan@ucdavis.edu)1, Garisson Buss1, Ana C. A. Melo1,2, and Walter S. Leal1, 1Univ. of California, Davis, CA, 2Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

3:45 **2175** Laboratory evaluation of residual efficacy of Deltamethrin K-OTHRINE 250 WG and pirimiphos- methyl ACTELLIC 300 CS on different wall surfaces against *Culex quinquefasciatus* Say (Diptera: Culicidae). **Kolade Ibrahim** (koladeibrahim@hotmail. com), Kabir Popoola Kok, and Kenneth Akure, Univ. of Ibadan, Ibadan, Nigeria

4:00 **2176** Global research and development of a non- DEET insect repellent ethyl butylacetylaminopropi- onate (IR3535). **Howard Epstein** (howard.epstein@ emdgroup.com), EMD Performance Materials Corp., Philadelphia, PA

4:15 **2177** Quantitative analysis of vector movement behavior following subacute exposure to behavior modifiers. **Kyndall Dye** (kyndall.dye@uky.edu), Univ. of Kentucky, Lexington, KY

4:30 **2178** Mosquitocidal activity and mode of action of the isoxazoline fluralaner. **Shiyao Jiang** (shiyao.jiang@ ufl.edu)1, Maia Tsikolia1,2, Ulrich Bernier2, and  
Jeffrey Bloomquist1, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Gainesville, FL

4:45 **2179** Green synthesis of silver nanoparticle (AgNPs) from *Argemone mexicana* for control of the dengue vector *Aedes aegypti*. **Siva Kamalakannan** (kamal410@ yahoo.com) and Kadarkarai Murugan, Bharathiar Univ., Coimbatore, India

5:00 **2180** Insecticidal properties of three plant extracts against *Culex quinquefasciatus* Say and *Aedes aegypti* Linnaeus. **Abhay Khandagle** (ajkhandagle@gmail.com), Arts, Commerce and Science College, Pune, India

5:15 **2181** Studies on knockdown resistance (kdr) mutations in *Aedes aegypti* and *Aedes albopictus* in India. **Neera Kapoor** (neerakapoor@ignou.ac.in), Indira Gandhi National Open Univ., New Delhi, India

**Symposium: Agronomic and Economic Benefits of Seed Treatments: The IPM Perspective**

***Room W331 A (Convention Center)***

**Moderators and Organizers:** Palle Pedersen1, Bill Striegel2, and Bradley W. Hopkins3, 1Syngenta Plant Protection, Greensboro, NC, 2Bayer CropScience, Research Triangle Park, NC, 3Dow AgroSciences, Indianapolis, IN

9:15 **2186** Seed treatments and modern agriculture: Do seed treatments breach IPM principles?  
Kevin Steffey1 and **Marlin Rice** (marlinrice@gmail. com)2, 1Dow AgroSciences, Indianapolis, IN, 2DuPont Pioneer, Johnston, IA

9:30 **2187** History of seed treatments and their advantage. **Ray Knake** (ray.knake@aol.com), Ray Knake Consulting, Johnston, IA

9:45 **2188** Agronomic advantages and benefits of seed treatments. **Shawn Conley** (spconley@wisc.edu),  
Paul D. Mitchell, and Adam Gaspar, Univ. of Wisconsin, Madison, WI

10:00 **2189** Enhancing IPM with neonicotinoid seed treatments in the Mid-Southern U.S. **Jeff Gore** (jgore@ drec.msstate.edu)1, Angus Catchot2, Don Cook1, Scott Stewart3, Gus Lorenz4, Glenn Studebaker5, and David L. Kerns6, 1Mississippi State Univ., Stoneville, MS, 2Mississippi State Univ., Mississippi State, MS, 3Univ. of Tennessee, Jackson, TN, 4Univ. of Arkansas, Lonoke, AR, 5Univ. of Arkansas Cooperative Extension Service, Keiser, AR, 6Louisiana State Univ., Winnsboro, LA

**10:15 BREAK**

10:30 **2190** Insecticidal seed treatment — a physiological assessment *re* soybean yield - bean leaf beetle - Bean pod mottle virus. **James Specht** (jspecht1@unl.edu), Univ. of Nebraska, Lincoln, NE

10:45 **2191** Current US regulatory process. **James Aidala** (jaidala@lawbc.com), Bergeson & Campbell, Washington, DC

11:00 **2192** Economic benefits of neonicotinoid insecticides in the U.S. and Canada: Implications for IPM. **Peter Nowak** (pnowak@wisc.edu), Paul D. Mitchell, and Nicola Carey, Univ. of Wisconsin, Madison, WI

11:15 **2193** The role of seed treatments and the seed treatment application across the seed industry. **Jane DeMarchi** (jdemarchi@amseed.org), American Seed Trade Association, Alexandria, VA

11:30 **Panel Discussion**

**Symposium: Public-Private Partnerships for Development of Next-Generation Pest Management Methods**

***Room W314 A (Convention Center)***

**Moderators and Organizers:** Bryony Bonning1 and Subba Reddy Palli2, 1Iowa State Univ., Ames, IA, 2Univ. of Kentucky, Lexington, KY

9:15 **2194** The Center for Arthropod Management Technologies: Industry perspective. **Ronald Flannagan** (ron.flannagan@monsanto.com)1, Kevin Donohue2, Kimberly Sampson3, John Dorsch4, Amit Sethi5,  
Dror Avisar6, and Tom Meade7, 1Monsanto Company, Chesterfield, MO, 2Syngenta Crop Protection, Research Triangle Park, NC, 3Bayer CropScience, Morrisville, NC, 4BASF, Research Triangle Park, NC, 5DuPont Pioneer, Johnston, IA, 6FuturaGene Ltd., Park Tamar, Israel, 7Dow AgroSciences, Indianapolis, IN

9:30 **2195** Developing novel cell lines from selected insects. **Cynthia Goodman** (cindy.goodman@ars.usda. gov) and David Stanley, USDA - ARS, Columbia, MO

9:45 **2196** Mechanisms of transcytosis across the gut of *Spodoptera frugiperda*. **Mariah Kemmerer** (mjkem@ iastate.edu) and Bryony Bonning, Iowa State Univ., Ames, IA

10:00 **2197** Insect resistance traits for control of insect pests in transgenic crops. **Tom Meade** (meade@dow. com), Dow AgroSciences, Indianapolis, IN

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**TUESDAY/ WEDNESDAY**

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**10:15 BREAK**

10:30 **2198** Identification of factors responsible for differential efficiency of RNAi between coleopteran and lepidopteran insects. **Megha Kalsi** (meghakalsi@uky. edu)1, Jayendra Shukla1, Amit Sethi2, Kenneth Narva3, Elane Fishilevich3, and Subba Reddy Palli1, 1Univ. of Kentucky, Lexington, KY, 2DuPont Pioneer, Johnston, IA, 3Dow AgroSciences, Indianapolis, IN

10:45 **2199** Enveloped porous nanoparticles for RNA delivery to insects. **Bruce Webb** (bawebb@email.uky. edu), Stephen Rankin, and Barbara Knutson, Univ. of Kentucky, Lexington, KY

11:00 **2200** Use of RNAi for agricultural pest control. **Renata Bolognesi** (renata.bolognesi@monsanto.com), Monsanto Company, Chesterfield, MO

11:15 **2201** RNA-based biocontrol for Colorado potato beetle and corn rootworm control. Pascale Feldmann1, Jason Vincent2, and **Kevin Donohue** (kevin.donohue@ syngenta.com)3, 1Syngenta, Zwijnaarde, Belgium, 2Syngenta, Bracknell, United Kingdom, 3Syngenta Crop Protection, Research Triangle Park, NC

**Symposium: IPM Strategies for the Management and Sustainability of Honey Bees (*Apis mellifera*) Across the Globe**

***Room W224 F (Convention Center)***

**Moderators and Organizers:** Jennifer M. Tsuruda1 and Juliana Rangel2, 1Clemson Univ., Clemson, SC, 2Texas A&M Univ., College Station, TX

9:15 **2202** Non-chemical control of varroa mites in honey bee colonies. **Meghan McConnell** (memcconnell89@ gmail.com) and Dennis vanEngelsdorp, Univ. of Maryland, College Park, MD

9:30 **2203** RNAi therapeutics as a non-chemical control method for *Varroa* and viruses. **Gerald Hayes** (gerald.w.hayes.jr@monsanto.com), Monsanto Company, St. Louis, MO

9:45 **2204** Evaluation of the predatory mite *Stratiolaelaps scimitus* for biological control of the honey bee ectoparasitic mite *Varroa destructor*. **Juliana Rangel** (jrangel@tamu.edu) and Lauren Ward, Texas A&M Univ., College Station, TX

10:00 **2205** Marker-assisted selection for disease-resistance traits is an effective IPM tool in honey bees.  
**Shelley Hoover** (shelley.hoover@gov.ab.ca)1,  
Miriam Bixby2, Stephen Pernal3, Rob Currie4,

Marta Guarna3, and Leonard J. Foster2, 1The Univ. of British Columbia, Lethbridge, AB, Canada, 2The Univ. of British Columbia, Vancouver, BC, Canada, 3Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, 4Univ. of Manitoba, Winnipeg, MB, Canada

**10:15 BREAK**

10:30 **2206** Sustainability of honey bees through increased genetic diversity at the colony and population levels. **David Tarpy** (drtarpy@ncsu.edu), North Carolina State Univ., Raleigh, NC

10:45 **2207** Do different management approaches result  
in reduced *Nosema ceranae* levels? **Brenna E. Traver** (bet12@psu.edu)1, Robyn Underwood2, Kristine Nichols3, and Dennis vanEngelsdorp4, 1Pennsylvania State Univ., Schuylkill Haven, PA, 2Kutztown Univ., Kutztown, PA, 3Rodale Institute, Kutztown, PA, 4Univ. of Maryland, College Park, MD

11:00 **2208** Treatment of varroa mites with formic acid and thymol in Africanized honey bee colonies in Costa Rica. **Rafael Calderon Fallas** (rafael.calderon.fallas@una.cr)1, Marianyela Ramírez2, and Fernando Ramírez2, 1National University of Costa Rica, Heredia, Costa Rica, 2Tropical Bee Research Center, Heredia, Costa Rica

11:15 **2209** Pests and pathogens of honey bees in East Africa. **Harland M. Patch** (hmpatch@psu.edu)1, Christina M. Grozinger1, Elliud Muli2,3, and  
Maryann Frazier1, 1Pennsylvania State Univ., University Park, PA, 2International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 3South Eastern Kenya Univ., Kitui, Kenya

11:30 **Panel Discussion**  
**Symposium: Insect Vectors as Drivers of**

**Emerging Plant Diseases**

***Room W230 D (Convention Center)***

**Moderators and Organizers:** Alberto Fereres1, Rodrigo Almeida2, and Joao R. S. Lopes3, 1Institute of Agricultural Sciences, Madrid, Spain, 2Univ. of California, Berkeley, CA, 3Univ. of São Paulo, Piracicaba, Brazil

9:15 **2210** Behavioral responses of insect vectors of plant disease to climate change. **Alberto Fereres** (a.fereres@ csic.es), Institute of Agricultural Sciences, Madrid, Spain

9:30 **2211** Environmental factors and infection with *Candidatus Liberibacter asiaticus* influence long-range dispersal of the Asian citrus psyllid. **Xavier Martini** (xmartini@ufl.edu), Hannah Lewis-Rosenblum,

Mark Hoffmann, Kirsten P. Stelinski, and  
Lukasz Stelinski, Univ. of Florida, Lake Alfred, FL

9:45 **2212** Manipulation of host-derived olfactory cues by vector-borne pathogens. **Mark Mescher** (mcmescher@ psu.edu), Pennsylvania State Univ., University Park, PA

10:00 **2213** *Xylella fastidiosa* as a new worldwide emerging vector-borne plant pathogen. **Rodrigo Almeida** (rodrigo@nature.berkeley.edu), Univ. of California, Berkeley, CA

**10:15 BREAK**

10:30 **2214** Epidemiological significance of vector behavior: Interactions with plant resistance traits and climate. **Matthew P. Daugherty** (matt.daugherty@ucr.edu)1, Adam Zellinger2, and Rodrigo Almeida2, 1Univ. of California, Riverside, CA, 2Univ. of California, Berkeley, CA

10:45 **2215** Presentation withdrawn 11:00 **Panel Discussion**

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**WEDNESDAY**

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**Symposium: Insects, Ecosystem Functioning, and Services: New Questions and Experimental Perspectives**

***Room W224 C (Convention Center)***

**Moderators and Organizers:** Jorge Noriega, Joaquin Hortal, and Ana Santos, National Museum of Natural Sciences, Madrid, Spain

9:15 **2216** How good is our knowledge of the ecosystem services provided by insects from an experimental perspective? **Jorge Noriega** (jnorieg@hotmail.com), Ana Santos, and Joaquin Hortal, National Museum of Natural Sciences, Madrid, Spain

9:30 **2217** Extending the trait-based approach to multi-trophic systems to assess effects on ecosystem processes — First attempts and perspectives.  
**Marco Moretti** (marco.moretti@wsl.ch), Swiss Federal Research Institute WSL, Birmensdorf, Switzerland

9:45 **2218** Impacts of fertilization amount and quality on top-down control of crop pest insects. **Laura Riggi** (laura.riggi@slu.se), Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

10:00 **2219** Heavy metal bees: How do they indicate the transference of heavy metals through terrestrial food webs? **Yasmine Antonini** (antonini.y@gmail.com), Nathália de Oliveira Nascimento, and Alessandra Rodrigues Kozovits, Federal Univ. of Ouro Preto, Ouro Preto, Brazil

**10:15 BREAK**

10:30 **2220** Adding honey bees increases oilseed yields but also affects wild pollinators. **Sandra Lindström** (sandra. lindstrom@hushallningssallskapet.se), Swedish Univ. of Agricultural Sciences, Lund, Sweden

10:45 **2221** Impacts of insect herbivory and nitrogen deposition on grassland plant communities and func- tioning. **Pernilla Borgström** (pernilla.borgstrom@slu. se), Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

9:45 **2224** Potential of old fields for increasing habitat heterogeneity and connectivity for arthropod natural enemies in farmland mosaics. **Rene Gaigher** (reneg@ sun.ac.za)1, James Pryke2, and Michael J. Samways2, 1Stellenbosch Univ., Matieland, South Africa, 2Stellenbosch Univ., Stellenbosch, South Africa

10:00 **2225** Enhancing insect diversity in agricultural landscapes while providing multiple additional benefits. **Morgan Shields** (morgan.shields@lincolnuni. ac.nz), Lincoln Univ., Lincoln, New Zealand

**10:15 BREAK**

10:30 **2226** Presentation withdrawn

10:45 **2227** The effect of plantations and road in fragmenting natural forest arthropod populations. **Francois Roets** (fr@sun.ac.za), Stellenbosch Univ., Stellenbosch, South Africa

11:00 **2228** The importance of natural forests for maintaining biodiversity and ecological processes within a production landscape. **Inam Yekwayo** (yekwayoinam@gmail.com), James Pryke,  
Francois Roets, and Michael J. Samways, Stellenbosch Univ., Stellenbosch, South Africa

11:15 **2229** Identifying surrogates for conserving insect diversity in human-modified landscapes in south- eastern Australia. **Ding Li Yong** (zoothera@yahoo. com) and Philip Barton, The Australian National Univ., Canberra, Australia

**Symposium: Biological Control Perspective in South and Southeast Asia**

***Room W414 B (Convention Center)***

**Moderators and Organizers:** Alberto Barrion and Divina Amalin, De La Salle Univ., Manila, Philippines

9:15 **2230** Biological control initiatives of the Central Bicol State University of Agriculture (CBSUA), Bicol region, Southern Luzon, Philippines. **Maria Dulce Mostoles** (mdjmostoles@yahoo.com) and Lilia Pasiona, Central Bicol State Univ. of Agriculture, Camarines Sur, Philippines

9:30 **2231** Search for potential biological control agent of cattle fever tick in the Philippines. **Mary Jane Flores** (mary.jane.flores@dlsu.edu.ph)1, Bianca Mari Dizon1, Yasmin Dawud1, Bianca Victoria Pena1, Divina Amalin1, John A. Goolsby2, and Alexis Racelis3, 1De La Salle Univ., Manila, Philippines, 2USDA - ARS, Edinburg, TX, 3The Univ. of Texas, Edinburg, TX

9:45 **2232** Presence of *Wolbachia* sp. in mosquito species of metro Manila, Philippines. **Thaddeus Carvajal** (thaddeus.carvajal@dlsu.edu.ph)1, Kristin Joyce Go2, Monique Martinez2, Jayson Capistrano2, Vincent Stefano2, Divina Amalin2, and Kozo Watanabe1, 1Ehime Univ., Matsuyama, Japan, 2De La Salle Univ., Manila, Philippines

10:00 **2233** Biological control of invasive pest species in  
the Philippines: The case of coconut scale insect, *Aspidiotus rigidus*. **Billy Joel Almarinez** (billy.almarinez@ dlsu.edu.ph), Divina Amalin, and Jose Santos Carandang, De La Salle Univ., Manila, Philippines

**10:15 BREAK**

11:00 **Panel Discussion**  
**Symposium: Using Insect Diversity to Plan and**



**Manage Conservation in Transformed Landscapes**

***Room W224 D (Convention Center)***

**Moderators and Organizers:** James Pryke1 and Rene Gaigher2, 1Stellenbosch Univ., Stellenbosch, South Africa, 2Stellenbosch Univ., Matieland, South Africa

9:15 **2222** Using multiple arthropod taxa to determine conservation targets for ecological networks within timber plantations. **James Pryke** (jpryke@sun.ac.za), Stellenbosch Univ., Stellenbosch, South Africa

9:30 **2223** Drivers of ground-dwelling arthropod species richness and assemblage structure in the savannah biome. **Colin Schoeman** (colin.schoeman@univen. ac.za)1, Michelle Hamer2, and Stefan Foord1, 1Univ. of Venda, Thohoyando, South Africa, 2South African National Biodiverstiy Institute, Silverton, South Africa

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**WEDNESDAY**

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10:30 **2234** Ecological engineering: A new paradigm in rice pest management in China with emphasis on biological control. **Zhongxian Lyu** (luzxmh2004@yahoo.com), Zhejiang Academy of Agricultural Sciences, Hangzhou, China

10:45 **2235** Push-pull: A climate-smart platform technology for enhancing food security in Africa. **Charles Midega** (cmidega@mbita.icipe.org)1,  
Zeyaur Khan1, Jimmy Pittchar1, Toby Bruce2, and  
John Pickett2, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Rothamsted Research, Harpenden, United Kingdom

11:00 **2236** Rice ecosystem services in tropical Asia — an overview based on LEGATO approaches and results. **Josef Settele** (josef.settele@ufz.de)1, Joachim Spangenberg2, Kong Luen Heong3, Ingolf Kühn4, Stefan Klotz4,

Nguyen Quynh Anh5, Johnathen Anthony6, Gertrudo Arida7, Dang Kinh Bac8, Alexis Beaurepaire9, Silke Beck1,  
Erwin Bergmeier10, Benjamin Burkhard8, Roland Brandl11, Jesus Victor Bustamante12, Adam Butler13, Jimmy Cabbigat12, Le Canh14, Josie Catindig15, Ho Chien16, Le Cuong16, Monina Escalada17, Christophe Dominik1, Markus Franzén4, Christoph Görg1, Volker Grescho4, Sabine Grossmann4, Geoffrey Gurr18, Buyung Hadi15, Le Hai19, Alexander Harpke4, Norbert Hirneisen20, Finbarr G. Horgan15, Stefan Hotes21, Yuzuru Isoda22, Reinhold Jahn9,

Helen Kettle13, Thimo Klotzbücher9, Fanny Langerwisch23, Wai-Hong Loke24, Yu-Pin Lin6, Zhong-Xian Lu25, Keng-Yeang Lum26, Damasa Magcale-Macandog27, Glenn Marion13, Leonardo Marquez7, Anika Marxen4, Robin Moritz9, Felix Müller8, Paolo Oliveira23, Jürgen Ott4, Lyubomir Penev28, Thai Pham29, Nico Radermacher10, Beatriz Rodriguez-Labajos30, Christina Sann10,

Cornelia Sattler4, Martin Schädler4, Stefan Scheu31, Anja Schmidt4, Oliver Schweiger4, Ralf Seppelt1, Susanne Stoll-Kleemann32, Vera Tekken32,  
Kirsten Thonicke23, Andi Trisyono33, Teja Tscharntke10, Manfred Türke34, Tomáš Václavík1, Doris Vetterlein4, Stefan Vidal10, Silvia Villareal15, Wolfgang Weisser34, Catrin Westphal10, Zeng-Rong Zhu35, and Martin Wiemers4, 1Helmholtz Centre for Environmental Research, Leipzig, Germany, 2Sustainable Europe Research Institute SERI Germany e.V., Vorsterstr, Cologne, Germany, 3CGIAR Consortium, Montpellier, France, 4Helmholtz Centre

for Environmental Research, Halle, Germany, 5Univ.  
of Social Sciences and Humanities, Hanoi, Vietnam, 6National Taiwan Univ., Taipei, Taiwan, 7Philippine Rice Research Institute, Nueva Ecija, Philippines, 8Kiel Univ., Kiel, Germany, 9Martin Luther Univ., Halle, Germany, 10Georg August Univ., Göttingen, Germany, 11Univ. of Marburg, Marburg, Germany, 12LEGATO, Ifugao, Philippines, 13Biomathematics & Statistics Scotland, Edinburgh, Scotland, 14Vietnam Academy of Science and Technology, Hanoi, Vietnam, 15 International Rice Research Institute, Metro Manila, Philippines, 16Southern Regional Plant Protection Center, Tien Giang, Vietnam, 17Visayas State Univ., Baybay City, Philippines, 18Charles Sturt Univ., Orange, Australia, 19Tien Giang Univ., Tien Giang, Vietnam, 20Science & Communication, Bonn, Germany, 21Philipps Univ., Marburg, Germany, 22Tohoku Univ., Sendai, Japan, 23Potsdam Institute for Climate Impact Research, Potsdam, Germany, 24CABI,

Selangor, Malaysia, 25Zhejiang Academy of Agricultural Sciences, Hangzhou, China, 26CABI, Kuala Lumpur, Malaysia, 27Univ. of the Philippines, Los Baños, Philippines, 28Bulgarian Academy of Sciences and Pensoft Publishers, Sofia, Bulgaria, 29Vietnam National Museum of Nature, Hanoi, Vietnam, 30Autonomous Univ. of Barcelona, Barcelona, Spain, 31Technical

Univ., Darmstad, Germany, 32Ernst Moritz Arndt Univ., Greifswald, Germany, 33Univ. of Gadjah Mada, Yogyakarta, Indonesia, 34Technical Univ., Freising, Germany, 35Zhejiang Univ., Hangzhou, China

11:15 **2237** The two faces of arthropod biodiversity exploration for natural enemies of rice insect pests in Hainan Island, China. Qianhua Yuan1, Ducheng Cai1, **Alberto Barrion** (bertbarriontapaysr@yahoo.com)2, and Kong Luen Heong3, 1Hainan Univ., Hainan, China, 2De La Salle Univ., Manila, Philippines, 3CABI, Selangor, Malaysia

11:30 **2238** Biodiversity of natural biological control agents in the agricultural landscape of irrigated low-land rice in Brunei Darussalam. **Amaniah Besar** (barc@gmail. com)1, Alberto Barrion2, and Sastroutomo Soetikno3, 1Brunei Agricultural Research Center, Darussalam, Brunei, 2De La Salle Univ., Manila, Philippines, 3CABI, Selangor, Malaysia

**Symposium: Critical Factors Modifying the Effects of Climate Change on the Distributions of Vector-Borne Diseases**

***Room W230 B (Convention Center)***

**Moderators and Organizers:** Jean Tsao1 and Howard Ginsberg2, 1Michigan State Univ., East Lansing, MI, 2U.S. Geological Survey, Kingston, RI

9:15 **2239** Interactions of climate change with geology, infrastructure, and human demography: Implications for vectors and pathogens. **Howard Ginsberg** (hginsberg@usgs.gov), U.S. Geological Survey, Kingston, RI

9:45 **2240** An investigation of key abiotic and genetic factors affecting blacklegged tick population dynamics in the eastern United States. **Genevieve Pang** (gcpang@gmail.com)1, Howard Ginsberg2,  
Graham J. Hickling3, Nicholas Ogden4, and Jean I. Tsao1, 1Michigan State Univ., East Lansing, MI, 2U.S. Geological Survey, Kingston, RI, 3Univ. of Tennessee, Knoxville, TN, 4Public Health Agency of Canada, Saint-Hyacinthe, QC, Canada

10:00 **2241**  
Linking larval competition, climate change, and vector-borne disease. **Sarah Bowden** (sabowden@uga. edu), Univ. of Georgia, Athens, GA

**10:15 BREAK**

10:30 **2242** Effect of climate change on disease transmission by temperate vectors. **Matthew Baylis** (matthew.baylis@ liverpool.ac.uk)1, Maya Wardeh1, Cyril Caminade1, Elizabeth Sutton2, Elisabeth Waldmann3, and

Marcus Blagrove1, 1Univ. of Liverpool, Liverpool, United Kingdom, 2Univ. of Oxford, Oxford, United Kingdom, 3Friedrich Alexander Univ., Erlangen, Germany

Community ecology of mosquito vectors:



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10:45 **2243** The impact of irrigation in arid areas of the Middle East and North Africa on the emergence of visceral leishmaniasis. **Elyes Zhioua** (elyes.zhioua@ gmail.com), Pasteur Institute, Tunis, Tunisia

11:00 **2244** Presentation withdrawn

11:15 **2245** Local modulation of climate change impact on vector-borne diseases. **Uriel Kitron** (ukitron@emory.edu), Emory Univ., Atlanta, GA

11:45 **Discussion**

**Symposium: Department of Defense Entomology and Global Public Health: Working Together to Combat Vector Borne Disease and Protect the Environment**

***Room W222 B (Convention Center)***

**Moderator and Organizer:** Mark Pomerinke, U.S. Armed Forces Pest Management Board, Silver Spring, MD

9:15 **2246** Military entomology: Contributions to medical entomology and global public health. **Jamie Blow** (jamie.a.blow.mil@mail.mil), Armed Forces Pest Management Board, Silver Spring, MD

9:30 **2247** Is military entomology evidence-based? **Steven Schofield** (steven.schofield@forces.gc.ca), Dept. of National Defence, Ottawa, ON, Canada

9:45 **2248** Novel use of an old technology: Thermal fogging for *Aedes aegypti* larval control. **James Cilek** (james.e.cilek.civ@mail.mil), Navy Entomology Center of Excellence, Jacksonville, FL

10:00 **2249** Phytochemical synergists for insecticides: Replacements for piperonyl butoxide. **Joel R. Coats** (jcoats@iastate.edu)1, Edmund Norris1, Aaron Gross2, and Lyric Bartholomay1, 1Iowa State Univ., Ames, IA, 2Univ. of Florida, Gainesville, FL

**10:15 BREAK**

10:30 **2250** Fipronil as a systemic insecticide for vector control. **Richard Poche** (richard@genesislabs.com), Larisa Polyakova, and Daniel Hartman, Genesis Laboratories, Inc., Wellington, CO

10:45 **2251** Biosurveillance efforts and the public health significance of mass migration in the Syria refugee crisis. **Yvonne-Marie Linton** (linton.yvonne3@gmail. com)1, Koray Ergunay2, Filiz Gunay2, Ozge Kasap2, Luke Mitchell1, Rami Mukbel3, Nawal Hijjawi4, and Bulent Alten5, 1Walter Reed Biosystematics Unit, Suitland, MD, 2Hacettepe Univ., Ankara, Turkey, 3Jordanian Univ. of Science and Technology, Irbid, Jordan, 4Hashemite Univ., Zarqa, Jordan, 5Hacettepe Univ., Beytepe, Turkey

11:00 **2252** The Vectormap project: A global resource combining multiple data sources used to inform vector-borne disease risk assessment. **David Pecor** (pecord@si.edu)1, Jeffrey Clark2, and Desmond Foley3, 1Walter Reed Biosystematics Unit, Suitland, MD, 2U.S. Army Walter Reed Army Institute of Research, Silver Spring, MD, 3Walter Reed Army Institute of Research, Washington, DC

11:15 **2253** Navy entomology during Continuing Promise 2015: Strengthening international partnerships and advancing global public health. **James Dunford** (james.c.dunford.mil@mail.mil), Navy and Marine Corps Public Health Center, Portsmouth, VA

11:30 **2254** Combating vector borne disease in the Pacific. **Elizabeth Gerardo** (elizabeth.m.gerardo2.mil@mail.mil), Navy Environmental and Preventive Medicine Unit Six, Pearl Harbor, HI

11:45 **2255** Pathway to implementing novel technologies in Hawaii to address avian malaria. **Joshua Fisher** (joshua\_fisher@fws.gov), U.S. Fish and Wildlife Service, Honolulu, HI

12:00 **2256** USDA research in support of deployed military troops. **Robert Aldridge** (robert.aldridge@ars.usda. gov), Seth Britch, and Kenneth J. Linthicum, USDA - ARS, Gainesville, FL

12:15 **2257** Highlights of the U.S. Armed Forces Pest Management Board research program for deployed war-fighter protection against disease vectors of public health importance. **Daniel Szumlas** (daniel.e.szumlas. mil@mail.mil), Armed Forces Pest Management Board, Silver Spring, MD

**Symposium: Modern Studies of Gerromorphan Insects: Behavior, Phylogeny, Physiology, and Ecology**

***Room W224 H (Convention Center)***

**Moderators and Organizers:** Tetsuo Harada1 and John Spence2, 1Kochi Univ., Kochi, Japan, 2Univ. of Alberta, Edmonton, AB, Canada

9:15 **2258** Photoperiodic response in body color and reproductive diapause in a waterstrider, *Limnoporus esakii*. **Shiro Nakao** (nakao@kpu.ac.jp), Kyoto Prefectural Univ., Kyoto, Japan

9:30 **2259** Effect of sex, hunger, and relative body size on the use of ripple signals in the interactions among water striders, *Gerris latiabdominis*. **Jae Hak Son** (dunnyson@gmail.com), Seoul National Univ., Seoul, South Korea; Univ. of Houston, Houston, TX

9:45 **2260** Cool coma temperature and oceanographic properties in habitat of oceanic sea skaters, *Halobates*. **Takahiro Furuki** (tfuruki9269@gmail.com), Kochi Univ., Kochi, Japan

10:00 **2261** Life history traits and temperature changes  
in accordance with global warming in a water strider, *Aquarius paludum*. **Tetsuo Harada** (haratets@kochi-u. ac.jp), Kochi Univ., Kochi, Japan

**10:15 BREAK**

10:30 **2262** Migration and dispersal patterns of semiaquatic bugs from lentic and lotic freshwater habitats.  
**Tomas Ditrich** (ditom@pf.jcu.cz), Univ. of South Bohemia, České Budějovice, Czech Republic

10:45 **2263** The biology and natural history of *Gigantometra gigas*, the Earth’s most ancient gerrid, making its last stand in Hainan Island, China. **Pingying Chen** (chpingy@mail2.sysu.edu.cn),  
Sun Yat-sen Univ., Guangzhou, China

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11:00 **2264** Life histories, seasonal adaptation, and population dynamics of five gerrids on a single  
pond: Results of a 25-year ‘bug-count’. **John Spence** (jspence@ualberta.ca), Univ. of Alberta, Edmonton, AB, Canada

**Symposium: Weaving Your Web: Science Com- munication and Social Media for Insect Scientists**

***Room W414 A (Convention Center)***

**Moderators and Organizers:** Margaret Hardy1 and Gwen Pearson2, 1Univ. of Queensland, Brisbane, Australia, 2Purdue Univ., West Lafayette, IN

9:15 **2265** Science communication as a career: How,  
why, and when to build your expertise. **Gwen Pearson** (gpearso@purdue.edu), Purdue Univ., West Lafayette, IN

9:30 **2266** Evolution of a science communicator: Promoting your work and career with social media. **Aaron Pomerantz** (apomerantz@ufl.edu) and Michael Bentley, Univ. of Florida, Gainesville, FL

9:45 **2267** Web comics, entomology, and outreach education. **Carly M. Tribull** (ctribull@amnh.org), American Museum of Natural History, New York, NY

10:00 **2268** Training science communicators in Africa. **Joy Owango** (joy.owango@tcc-africa.org), Training Centre in Communication, Nairobi, Kenya

**10:15 BREAK**

10:30 **2269** Science communication to help shape policy and funding. **Rayda Krell** (rayda.krell@earthlink.net), Rayda K. Krell, LLC, Entomological and Agricultural Communications, Ridgefield, CT

10:45 **2270** If you can sell bugs, you can sell anything: How studying and promoting insects can somehow lead to a career in television. **Phil Torres** (phillip.juan.torres@ gmail.com), Al Jazeera America, Los Angeles, CA

10:45 **2275** Silkworm transgenics. **Hanfu Xu** (xuhf@swu. edu.cn), Southwest Univ., Chongqing, China

11:00 **2276** Trials and tribulations associated with transforming a non-model organism. **Marcé Lorenzen** (marce\_lorenzen@ncsu.edu), North Carolina State Univ., Raleigh, NC

11:15 **2277** Developing the CRISPR/Cas9 system in the pea aphid. **Jennifer A. Brisson** (jbrisso3@ur.rochester.edu), Univ. of Rochester, Rochester, NY

11:30 **2278** The origin of novel complex traits addressed with phylogenetic and transgenic experiments in butterflies. Antónia Monteiro1, Jeffrey Oliver2,  
Nesibe Ozsu1, Bin Chen3, and **Heidi Connahs** (hconnahs@ gmail.com)1, 1National Univ. of Singapore, Singapore, Singapore, 2Yale Univ., New Haven, CT, 3Chongqing Normal Univ., Chongqing, China

11:45 **2279** Functional genomics techniques in *Drosophila* and their potential application in non-model insects. **Stephanie Mohr** (smohr@genetics.med.harvard. edu)1, Yanhui Hu1, Ben Housden1, Ben Ewen-Campen1, Raghuvir Viswanatha1, Shuailiang Lin2, Jianquan Ni2, Liz Perkins1 and Norbert Perrimon1,3, 1Harvard Medical School, Boston, MA, 2Tsinghua Univ., Beijing, China, 3The Howard Hughes Medical Institute, Boston, MA

12:00 **2280** Genetic technologies in honey bees. **Martin Beye** (martin.beye@uni-duesseldorf.de), Heinrich Heine Univ., Düsseldorf, Germany

12:15 **2281** Genome-engineering with CRISPR-Cas9 in the mosquito *Aedes aegypti*. **Ben Matthews** (bmatthews@ mail.rockefeller.edu)1, Katie Kistler1,2, and Leslie Vosshall1, 1The Rockefeller Univ., New York, NY, 2The Howard Hughes Medical Institute, New York, NY

**Symposium: Jumping Genes: Horizontal Gene Transfer in Insects and Beyond**

***Room W340 A (Convention Center)***

**Moderators and Organizers:** Yannick Pauchet and Roy Kirsch, Max Planck Institute for Chemical Ecology, Jena, Germany

9:15 **2282** Lateral gene transfer from bacteria to animals, including humans. **Julie Dunning-Hotopp** (jdhotopp@ som.umaryland.edu), Univ. of Maryland, Baltimore, MD

9:45 **2283** Horizontal gene transfers and evolution of plant parasitism by invertebrates. **Etienne Danchin** (etienne. danchin@sophia.inra.fr)1, Marie-Noëlle Rosso2, John Jones3, Annelies Haegeman4, Bernard Henrissat5, and

Pierre Pontarotti5, 1Sophia Institute of Agrobiotechnology, Sophia Antipolis, France, 2INRA, Marseille, France, 3The James Hutton Institute, Dundee, United Kingdom, 4Institute for Agricultural and Fisheries Research, Melle, Belgium, 5Aix-Marseille Univ., Marseille, France

**10:15 BREAK**

10:30 **2284** How important are bacteria-eukaryote lateral gene transfers to arthropod evolution? **John H. Werren** (werr@mail.rochester.edu), Univ. of Rochester, Rochester, NY

11:00 **Discussion**  
**Symposium: Insect Genetic Technologies: State**



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**of the Art and Promise for the Future**

***Room W340 B (Convention Center)***

**Moderators and Organizers:** Jennifer A. Brisson1 and Marcé Lorenzen2, 1Univ. of Rochester, Rochester, NY, 2North Carolina State Univ., Raleigh, NC

9:15 **2271** CRISPR gene drives for engineering pest populations. **Kevin Esvelt** (esvelt@mit.edu), Massachusetts Institute of Technology, Cambridge, MA

9:45 **2272** Engineered sterile insects: From lab to field. **Luke Alphey** (luke.alphey@pirbright.ac.uk), The Pirbright Institute, Woking, United Kingdom

10:00 **2273** Genetic engineering of fruit fly genomes for population control. **Alfred Handler** (al.handler@ars. usda.gov), USDA - ARS, Gainesville, FL

**10:15 BREAK**

10:30 **2274** Decoding complex systemic protein expression patterns towards single cells using on-demand exon flipping. **Koen Venken** (kv134369@bcm.edu), Baylor College of Medicine, Houston, TX



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**WEDNESDAY**

**Wednesday, September 28 • MORNING •**

10:45 **2285** Evolutionary history of plant cell wall degrading enzymes in phytophagous beetles. **Yannick Pauchet** (ypauchet@ice.mpg.de), Roy Kirsch, André Busch,  
and David Heckel, Max Planck Institute for Chemical Ecology, Jena, Germany

11:00 **2286** Evolution of pectin breakdown in herbivorous beetles. **Roy Kirsch** (rkirsch@ice.mpg.de), Wiebke Häger, David Heckel, and Yannick Pauchet, Max Planck Institute for Chemical Ecology, Jena, Germany

11:15 **2287** A horizontally transferred gene enables arthropods to detoxify cyanide, a common plant defense compound. **Nicky Wybouw** (n.r.wybouw@uva. nl)1, Wannes Dermauw2, Rene Feyereisen2, and  
Thomas Van Leeuwen2, 1Univ. of Amsterdam, Amsterdam, Netherlands, 2Ghent Univ., Ghent, Belgium

11:30 **2288** Frequency and mechanism of horizontal transfer of transposable elements from moth to virus. **Clément Gilbert** (clement.gilbert@univ-poitiers.fr)1, Jean Peccoud1, Elisabeth Herniou2, Aurélien Chateigner2, and Richard Cordaux3, 1Univ. of Poitiers, Poitiers, France, 2 François Rabelais Univ., Tours, France, 3National Center for Scientific Research, Poitiers, France

**Symposium: Endocrine and Neural Network in Control of Physiology**

***Room W330 C (Convention Center)***

**Moderators and Organizers:** Jan Veenstra1 and Yoonseong Park2, 1Univ. of Bordeaux, Pessac, France, 2Kansas State Univ., Manhattan, KS

9:15 **2289** Disruption of neuropeptidergic system in arthropod pest control: Are we there yet?  
**Yoonseong Park** (ypark@ksu.edu), Kansas State Univ., Manhattan, KS

9:45 **2290** Elucidating physiological roles of the ancient glycoprotein hormone, GPA2/GPB5, and its receptor  
in the mosquito, *Aedes aegypti*. David Rocco, Andreea Matei, Doo Hyun Kim, and **Jean-Paul Paluzzi** (paluzzi@ yorku.ca), York Univ., Toronto, ON, Canada

10:00 **2291** Neuropeptide signaling in the red imported fire ant in nutrition, reproduction, and division of labor. **Patricia V. Pietrantonio** (p-pietrantonio@tamu.edu), Texas A&M Univ., College Station, TX

**10:15 BREAK**

10:30 **2292** Mapping the neuropeptidergic network in *Drosophila melanogaster*. **Michael Texada** (texadam@ janelia.hhmi.org)1 and James W. Truman2, 1The Howard Hughes Medical Institute, Ashburn, VA, 2Univ. of Washington, Seattle, WA

10:45 **2293** The *Drosophila* enteroendocrine network. **Jan Veenstra** (jan.veenstra@u-bordeaux.fr)1,  
Michael Texada2, and James W. Truman3, 1Univ. of Bordeaux, Pessac, France, 2The Howard Hughes Medical Institute, Ashburn, VA, 3Univ. of Washington, Seattle, WA

11:00 **2294** Endocrine and neuronal control of intestinal plasticity in *Drosophila melanogaster*. Irene Miguel- Aliaga and **Jake Jacobson** (jake.jacobson@csc.mrc.ac.uk), Imperial College London, London, United Kingdom

11:30 **2295** Peptide-receptor couples implicated in  
the control of feeding and digestion in locusts.  
**Jozef Vanden Broeck** (jozef.vandenbroeck@bio.kuleuven. be), Catholic Univ., Leuven, Belgium

11:45 **2296** Neuropeptides and their potential physiological functions in the oriental fruit fly, *Bactrocera dorsalis* (Hendel). **Hongbo Jiang** (jhb8342@swu.edu.cn), Southwest Univ., Chongqing, China

**Symposium: Securing Borders While Promoting Trade: Regional Approaches to Control Agricultural Pests in the Greater Caribbean Area**

***Room W223 A (Convention Center)***

**Moderator and Organizer:** Robert G. Ahern, Agricultural Health and Food Safety, San Jose, Costa Rica

9:15 **2297** The Greater Caribbean Safeguarding  
Initiative — promoting collaboration and cooperation on regional safeguarding activities to detect and mitigate the impact of plant pests and diseases. **Dennis Martin** (dennis.w.martin@aphis.usda.gov) and Andrea Simao, USDA - APHIS, Riverdale, MD

9:45 **2298** A model for securing borders while promoting trade: Case study of the Jamaica/USDA-APHIS preclearance. **Carol Thomas** (carol.thomas@iica.int), Inter-American Institute for Cooperation on Agriculture, Warrens, Barbados

**10:15 BREAK**

10:30 **2299** Market access through a systems approach: Study of the clean stock program. **Marco González** (marco.v.gonzalez@aphis.usda.gov), USDA - APHIS, San Jose, Costa Rica

10:45 **2300** Thwarting the invasion: How a regional approach mitigated the impact of exotic arthropods  
in the greater Caribbean basin. **Wayne De Chi** (wayne. dechi@aphis.usda.gov)1 and Amy L. Roda2, 1USDA  
- APHIS, Port of Spain, Trinidad, and Tobago, 2USDA - APHIS, Miami, FL

11:00 **2301** Modernizing agricultural health systems for improved trade and economic development in the CARIFORUM region. **Janet Lawrence** (janet.lawrence@ iica.int)1, Carol Thomas1, and Robert Ahern2, 1Inter- American Institute for Cooperation on Agriculture, Warrens, Barbados, 2Inter-American Institute for Cooperation on Agriculture, San José, Costa Rica

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**WEDNESDAY**

**Wednesday, September 28 • MORNING •**

**Symposium: Advances in Insect Control and in Resistance Management**

***Room W224 B (Convention Center)***

**Moderators and Organizers:** A. Rami Horowitz1 and Isaac Ishaaya2, 1Gilat Research Center and Katif Research Center, M.P. Negev, Israel, 2Agricultural Research Organisation, Bet-Dagan, Israel

*This symposium is generously sponsored by Adama Agricultural Solutions Ltd.*

9:15 **2302** Advances in insect control and in resistance management: An overview. **Isaac Ishaaya** (vpisha@ volcani.agri.gov.il)1 and A. Rami Horowitz2, 1Agricultural Research Organisation, Bet-Dagan, Israel, 2Gilat Research Center and Katif Research Center, M.P. Negev, Israel

9:30 **2303** Botanical insecticides finding their place in the 21st century. **Murray B. Isman** (murray.isman@ubc.ca), The Univ. of British Columbia, Vancouver, BC, Canada

10:00 **2304** Advances in organic farming. **Elias Bloom** (elias.bloom@email.wsu.edu) and David Crowder, Washington State Univ., Pullman, WA

**10:15 BREAK**

10:30 **2305** Disruption of insect reproductive systems as  
a tool in pest control. **Ally R. Harari** (aharari@volcani. agri.gov.il)1, Rakefet Sharon2, and Phyllis Weintraub3, 1Agricultural Research Organisation, Bet-Dagan, Israel, 2Northern Research & Development, Kiryat Shemona, Israel, 3Agricultural Research Organisation, Gilat, Israel

10:45 **2306** Enhancing performance of biorational insecticides with novel delivery systems in tree fruit IPM. **John Wise** (wisejohn@msu.edu), Anthony Hale VanWoerkom, Srdjan Aćimović, George Sundin, Bert M. Cregg, and Christine Vandervoort, Michigan State Univ., East Lansing, MI

11:00 **2307** Presentation withdrawn

11:15 **2308** Role of mixtures in bed bug management. **Yasmin Akhtar** (yasmin.akhtar@ubc.ca) and Murray B. Isman, The Univ. of British Columbia, Vancouver, BC, Canada

11:30 **2309** Pyrethroid resistance in *Helicoverpa armigera* conferred by the chimeric P450 CYP337B3.

Nicole Joußen and **David Heckel** (heckel@ice.mpg.de), Max Planck Institute for Chemical Ecology, Jena, Germany

11:45 **2310** Dynamics of insecticide resistance in *Bemisia* species. **A. Rami Horowitz** (hrami@volcani.agri.gov.il)1 and Isaac Ishaaya2, 1Gilat Research Center and  
Katif Research Center, M. P. Negev, Israel, 2Agricultural Research Organisation, Bet-Dagan, Israel

12:00 **2311** Mechanism of insecticide resistance in diamondback moth (Lepidoptera: Plutellidae)  
with special reference to target-site mutations. **Denise Steinbach** (denise.steinbach@bayer.com)1,2 and Ralf Nauen2, 1Martin Luther Univ., Halle, Germany, 2Bayer CropScience, Monheim, Germany

12:15 **2312** Insecticide resistance and its impact on vector control. Basil Brooke1 and **Mark Paine** (mark.paine@ lstmed.ac.uk)2, 1Wits Research Institute for Malaria, Johannesburg, South Africa, 2Liverpool School of Tropical Medicine, Liverpool, United Kingdom

**Symposium: What Happens When Pest Occurrence Data is Shared: End of the World or New Horizons?**

***Room W224 E (Convention Center)***

**Moderator and Organizer:** Joseph LaForest, Univ. of Georgia, Tifton, GA

9:15 **2313** What happens when pest occurrence data  
is shared: End of the world or new horizons?  
**Joseph LaForest** (laforest@uga.edu), Univ. of Georgia, Tifton, GA

9:30 **2314** For the greater good: Perspectives of a plant disease diagnostician on sharing data. **Carrie L. Harmon** (clharmon@ufl.edu), Univ. of Florida, Gainesville, FL

9:45 **2315** Perspectives of an early detection system with Citizen Science reporters. **C. T. Bargeron** (cbargero@ uga.edu), Univ. of Georgia, Tifton, GA

10:00 **2316** Aggregating pest-sampling records and the advantages of using multiple data platforms. **Wendy Johnson** (wendyann@ksu.edu) and  
Brian McCornack, Kansas State Univ., Manhattan, KS

**10:15 BREAK**

10:30 **2317** Perspectives of an extension and research network on sharing data. **Scott Isard** (sai10@psu.edu), Pennsylvania State Univ., University Park, PA

10:45 **2318** Perspectives of a state Department of Agriculture on data sharing. **Angie Ambourn** (angie. ambourn@state.mn.us), Monika Chandler, and  
Mark Abrahamson, Minnesota Dept. of Agriculture, St. Paul, MN

11:00 **2319** Perspectives of agribusiness intelligence.  
**Joe Russo** (russo@zedxinc.com), Zedx, Inc., Hamburg, PA

11:15 **2320** Perspectives of a network hub: Accommodating data standards and providing services for self-service exchange of information. **Rebekah Wallace** (bekahwal@ uga.edu), Univ. of Georgia, Tifton, GA

**Symposium: *Sirex noctilio*: A Global Forest Insect *Room W330 B (Convention Center)***

**Moderators and Organizers:** Jeremy D. Allison1 and Bernard Slippers2, 1Natural Resources Canada, Sault Ste. Marie, ON,

Canada, 2Univ. of Pretoria, Pretoria, South Africa

9:15 **2321** Population ecology of *S. noctilio* and its biological control agents. **Juan Corley** (jcorley@ bariloche.inta.gov.ar), Victoria Lantschner, Deborah Fischbein, Andres Martinez, and

José Villacide, INTA, Bariloche, Argentina

9:30 **2322** Patterns in *Sirex noctilio*-associated tree mortality across four continents. **Flora Krivak-Tetley** (flora.e.krivak-tetley.gr@dartmouth.edu)1, Matthew Ayres1, and Andrew M. Liebhold2, 1Dartmouth College, Hanover, NH, 2USDA - Forest Service, Morgantown, WV

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9:45 **2323** Important factors that limit *Sirex noctilio* in North America. **Laurel J. Haavik** (ljhaavik@gmail.com)1, Kevin J. Dodds2, Kathleen Ryan3, and Jeremy Allison4, 1Univ. of Kansas, Lawrence, KS, 2USDA - Forest Service, Durham, NH, 3Silv-Econ Ltd., Newmarket, ON, Canada, 4Natural Resources Canada, Sault Ste. Marie, ON, Canada

10:00 **2324** Interactions of *Sirex noctilio* in North  
American Forests. Jeremy D. Allison1, Kevin J. Dodds2, **Laurel J. Haavik** (ljhaavik@gmail.com)3, and Jean Turgeon1, 1Natural Resources Canada, Sault Ste. Marie, ON, Canada, 2USDA - Forest Service, Durham, NH, 3Univ. of Kansas, Lawrence, KS

**10:15 BREAK**

10:30 **2325** *Sirex noctilio* history and interactions in Australian plantations. **Helen Nahrung** (hnahrung@ usc.edu.au)1, Manon Griffiths2, and Angus Carnegie3, 1Univ. of the Sunshine Coast, Sippy Downs, Australia, 2Dept. of Agriculture and Fisheries, Dutton Park, Australia, 3New South Wales Dept. of Primary Industries, New South Wales, Australia

10:45 **2326** The global diversity of *Deladenus siricidicola*. **Osmond Mlonyeni** (osmond.mlonyemi@fabi.up.ac.za)1, Katrin Fitza1, Jeff Garnas1, Jaco Greeff1, Michael Wingfield1, Brenda Wingfield1, Matthew Ayres2, Maria Lombardero3, and Bernard Slippers1, 1Univ. of Pretoria, Pretoria, South Africa, 2Dartmouth College, Hanover, NH, 3Univ. of Santiago, Lugo, Spain

11:00 **2327** *Sirex*-*Deladenus*-environment interactions: Lessons from tens of thousands of dissections. **Brett Hurley** (brett.hurley@up.ac.za), Jeff Garnas, Bernard Slippers, and Michael Wingfield, Univ. of Pretoria, Pretoria, South Africa

11:15 **2328** *Sirex noctilio*-*Amylostereum*-*Deladenus* interactions in North America. **Ann E. Hajek** (aeh4@ cornell.edu)1, Louela Castrillo1, Stefanie Kroll1,  
Tonya Bittner1, Jacob Henry1, Laurel J. Haavik2, Jeremy Allison3, György Csóka4, Juan Pajares5, and David Williams6, 1Cornell Univ., Ithaca, NY, 2Univ. of Kansas, Lawrence, KS, 3Natural Resources Canada, Sault Ste. Marie, ON, Canada, 4Forest Research Institute, Métrafüred, Hungary, 5Univ. of Valladolid, Palencia, Spain, 6USDA - APHIS, Buzzards Bay, MA

11:30 **2329** *Sirex noctilio* — microbial symbiont interactions and nutrition. **Brian Thompson** (brian.thompson@ montana.edu), Montana State Univ., Conrad, MT

11:45 **2330** The genomes of *Sirex noctilio*, *Amylostereum areolatum,* and *Deladenus siricidicola*: Insights into symbiosis and invasion processes. **Alisa Postma Smidt** (alisa.postma@fabi.up.ac.za), Magriet van der Nest, Osmond Mlonyeni, Katrin Fitza, Edohan Clasen, Gabriella Barnard, Sze-Huei Yek, Martin Coetzee, Michael Wingfield, Fourie Joubert, and Bernard Slippers, Univ. of Pretoria, Pretoria, South Africa

12:00 **2331** The chemistry between a male and a female *Sirex noctilio*. **Katalin Boroczky** (kborocz@ncsu.edu)1 and Coby Schal2, 1Cornell Univ., Ithaca, NY, 2North Carolina State Univ., Raleigh, NC

12:15 **2332** *Sirex noctilio* venom and host plant interactions. **Jeffrey Dean** (jeffdean@bch.msstate.edu)1,  
John Bordeaux2, and Walter Lorenz2, 1Mississippi State Univ., Mississippi State, MS, 2Univ. of Georgia, Athens, GA

**Symposium: Medical and Veterinary Entomology in Florida**

***Room W414 C (Convention Center)***

**Moderator and Organizer:** Rui-De Xue, Anastasia Mosquito Control District, St. Augustine, FL

9:15 **2333** Program overview of USDA/ARS/Center for Medical, Agriculture, and Veterinary Entomology. **Kenneth Linthicum** (kenneth.linthicum@ars.usda.gov), USDA - ARS, Gainesville, FL

9:45 **2334** The Mosquito Wars: A history of Florida’s war against mosquitoes. **Gordon Patterson** (patterso@fit. edu), Florida Institute of Technology, Melbourne, FL

10:00 **2335** Highlights of veterinary entomology in Florida. **Jerome A. Hogsette** (jerry.hogsette@ars.usda.gov), USDA - ARS, Gainesville, FL

**10:15 BREAK**

10:30 **2336** *Aedes aegypti* and *Aedes albopictus* in Florida. **L. Philip Lounibos** (lounibos@ufl.edu), Univ. of Florida, Vero Beach, FL

10:45 **2337** Mosquito control program in Florida. **Adriane Rogers** (adriane.rogers@freshfromflorida. com), Florida Dept. of Agriculture and Consumer Services, Tallahassee, FL

11:00 **2338** Infectivity and importance of Florida vectors in dog heartworm transmission. **Phillip E. Kaufman** (pkaufman@ufl.edu), Univ. of Florida, Gainesville, FL

11:15 **2339** Presentation withdrawn

11:30 **2340** Benefits from applied research and collaboration in Anastasia Mosquito Control District. **Rui-De Xue** (rudy.xue@yahoo.com), Anastasia Mosquito Control District, St. Augustine, FL

11:45 **Florida Entomological Society activity**

**Symposium: Microbiome and Vector Immunity**

***Room W230 C (Convention Center)***

**Moderator and Organizer:** George Dimopoulos, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

9:15 **2341** Tsetse’s (*Glossina* sp.) symbiotic bacteria regulate host immuno-stimulatory pathways.  
**Brian Weiss** (brian.weiss@yale.edu), Serap Aksoy, and Joshua Benoit, Yale Univ., New Haven, CT

9:30 **2342** Role of the microbiome in mosquito development. **Kerri L. Coon** (kerri@uga.edu), Michael Strand, Luca Valzania, Kevin J. Vogel, and Mark R. Brown, Univ. of Georgia, Athens, GA

9:45 **2343** The mosquito microbiota: Implications in the control of mosquito-borne diseases. **Guido Favia** (guido.favia@unicam.it), Univ. of Camerino, Camerino, Italy

10:00 **2344** The mosquito microbiome: Fighting bugs with bugs. **George Dimopoulos** (gdimopo1@jhu.edu), Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

**10:15 BREAK**

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10:30 **2345** Tick gut microbiota and transmission of the Lyme disease agent. **Erol Fikrig** (erol.fikrig@yale.edu), Yale Univ., New Haven, CT

11:00 **2346** Microbiome and the healthy *Anopheles* mosquito. **Ken Vernick** (kvernick@pasteur.fr), Pasteur Institute, Paris, France

**Symposium: The Role of Microbiota in Vectors**

***Room W331 B (Convention Center)***

**Moderators and Organizers:** Mariangela Bonizzoni1 and Shannon Bennett2, 1Univ. of Pavia, Pavia, Italy, 2California Academy of Sciences, San Francisco, CA

9:15 **2347** The activity of the obligate mutualist *Wigglesworthia* within field-caught tsetse flies.  
**Rita Rio** (rita.rio@mail.wvu.edu), West Virginia Univ., Morgantown, WV

9:30 **2348** Exploring the role of endosymbionts in  
male reproductive physiology: Impact on ejaculate composition and function in the tsetse fly *Glossina m. morsitans*. **Francesca Scolari** (francesca.scolari@unipv. it)1, Grazia Savini1, Anna Malacrida1, Serap Aksoy2, and Geoffrey Attardo2, 1Univ. of Pavia, Pavia, Italy, 2Yale Univ., New Haven, CT

9:45 **2349** Paratransgenic strategies to control transmission of Chagas disease and leishmaniasis. **Ravi Durvasula** (ravi.durvasula@va.org), Univ. of New Mexico, Albuquerque, NM

10:00 **2350** Microbiota of *Anopheles gambiae* mosquitoes: Impacts of environmental changes and role on larval survival. **Guiyun Yan** (guiyuny@uci.edu), Univ. of California, Irvine, CA

**10:15 BREAK**

10:30 **2351** Integrated analysis of miRNAs and transcriptomes in *Aedes albopictus* midgut reveals the differential expression profiles of immune-related genes during dengue virus serotype-2 infection. **Xiao-Guang Chen** (xgchen2001@hotmail.com), Southern Medical Univ., Guangzhou, China

10:45 **2352** Non-retroviral RNA virus integrations in *Aedes albopictus*. **Mariangela Bonizzoni** (mbonizzoni@gmail. com), Univ. of Pavia, Pavia, Italy

**Symposium: The Use of Plant Resources Against Biting Flies**

***Room W414 D (Convention Center)***

**Moderators and Organizers:** Tong-Yan Zhao1 and Gunter Muller2, 1Beijing Institute of Microbiology & Epidemiology, Beijing, China, 2The Hebrew Univ., Jerusalem, Israel

9:15 **2353** Attractive toxic sugar baits (ATSB): From basic science to product. **Gunter Muller** (guntercmuller@ hotmail.com)1 and John Beier2, 1The Hebrew Univ., Jerusalem, Israel, 2Univ. of Miami, Miami, FL

9:30 **2354** Bromeliads (Family Bromeliaceae) as habitat and potential sugar resources for mosquitoes.  
**Lisa L. Drake** (ldrakeamcd@gmail.com),  
Catherine Lippi, and Rui-De Xue, Anastasia Mosquito Control District, St. Augustine, FL

9:45 **2355** Flower attraction for adult mosquitoes. **Daniel L. Kline** (dan.kline@ars.usda.gov)1 and Phillip E. Kaufman2, 1USDA - ARS, Gainesville, FL, 2Univ. of Florida, Gainesville, FL

10:00 **2356** Botanical based repellents against biting flies in China. **Tong-Yan Zhao** (tongyanzhao@126.com), Beijing Institute of Microbiology & Epidemiology, Beijing, China

**10:15 BREAK**

10:30 **2357** Impact of vegetation types on efficacy of  
ATSB against two species of *Culex* mosquitoes. **Whitney Qualls** (w.qualls@med.miami.edu)1,  
Rui-De Xue2, and Gunter Muller3, 1Univ. of Miami, Miami, FL, 2Anastasia Mosquito Control District, St. Augustine, FL, 3The Hebrew Univ., Jerusalem, Israel

10:45 **2358** Attractive toxic sugar baits (ATSB): A new, efficient, and environmentally friendly control for malaria vectors. **Mohamed Traore** (mohamedmoumine@ gmail.com), Malaria Research and Training Center, Bamako, Mali

11:00 **2359** Control of sand flies with attractive toxic sugar baits (ATSB). **Edita Revey** (edita@tx.technion.ac.il), Univ. of Haifa, Haifa, Israel

11:15 **2360** Barrier spraying for mosquito control (Diptera: Culicidae). **James Clauson** (jamesclauson@comcast. net), Beach Mosquito Control District, Panama, FL

11:30 **2361** Fifty plus years of integrated management of aquatic weeds and mosquitoes in Lee County, Florida. **Wayne Gale** (gale@lcmcd.org), Lee County Mosquito Control District, Lehigh Acres, FL

**Symposium: Vertebrate Host Factors: Effect on Vector Biology**

***Room W230 A (Convention Center)***

**Moderators and Organizers:** Shirley Luckhart1, Luciano Moriera2, and Michael A. Riehle3, 1Univ. of California, Davis, CA, 2Oswaldo Cruz Foundation, Belo Horizonte, Brazil, 3Univ. of Arizona, Tucson, AZ

9:15 **2362**

9:30 **2363**  
mosquito reproduction. **Immo Hansen** (immoh@nmsu. edu), New Mexico State Univ., Las Cruces, NM

9:45 **2364** Non-blood formulations to support the gonotrophic cycle in vector mosquitoes. **R. Jason Pitts** (j.pitts@vanderbilt.edu), Vanderbilt Univ., Nashville, TN

10:00 **2365** Host complement: Evasion to protect midgut and activation to shape microbiome. **Ayman Khattab** (ayman.khattab@helsinki.fi), Marta Barroso,  
Marija Malusev, Tiera Miettinen, Willem de Vos, and Seppo Meri, Univ. of Helsinki, Helsinki, Finland

**10:15 BREAK**

10:30 **2366** Strive to survive: Adaptive responses between the mosquito and the malaria parasite. **Stefan Kanzok** (skanzok@luc.edu), Loyola Univ., Chicago, IL

10:45 **2367** Targeting malaria vectors through their blood meals for malaria transmission control. **Brian D. Foy** (brian.foy@colostate.edu), Colorado State Univ., Fort Collins, CO

Presentation withdrawn

Amino acid transceptors and the regulation of

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**WEDNESDAY**

**Wednesday, September 28 • MORNING •**

11:00 **2368** Hemozoin as an immune stimulant of the mosquito *Anopheles gambiae* response against the malaria parasite. **Maria Simões** (maria.luisa.simoes@ ihmt.unl.pt)1,2, Luzia Gonçalves1, and Henrique Silveira1, 1New Univ. of Lisbon, Lisbon, Portugal, 2Johns Hopkins Univ., Baltimore, MD

11:15 **2369** Immune response and insulin signaling alter mosquito feeding behavior to enhance malaria transmission potential. **Lauren Cator** (l.cator@imperial. ac.uk)1, Jose Pietri2, Courtney Murdock3, Justin George4, Johanna Ohm5, Ed Lewis2, Thomas C. Baker5,

Andrew Read5, Shirley Luckhart2, and Matthew B. Thomas5, 1Imperial College London, London, United Kingdom, 2Univ. of California, Davis, CA, 3Univ. of Georgia, Athens, GA, 4USDA - ARS, Ft. Pierce, FL, 5Pennsylvania State Univ., University Park, PA

**Symposium: Molecular Bases of Behavior in Kissing Bug Vectors of Human Disease**

***Room W330 A (Convention Center)***

**Moderator and Organizer:** Marcelo Lorenzo, Oswaldo Cruz Foundation, Belo Horizonte, Brazil

9:15 **2370** The thermal sense of disease-vector insects: On physics, receptors, and behavior. **Claudio Lazzari** (claudio.lazzari@univ-tours.fr), Univ. of Tours, Tours, France

9:30 **2371** Neuropeptides and olfaction in *Rhodnius prolixus*. **José Latorre-Estivalis** (josmantorres@gmail. com), Laboratory of Insect Neurobiology, La Plata, Argentina

9:45 **2372** Salts control feeding decisions in kissing bugs: Linking peripheral detection to behavior. **Romina Barrozo** (rbarrozo@bg.fcen.uba.ar), CONICET, Buenos Aires, Argentina

10:00 **2373** New pieces in the puzzle: The molecular circadian clock of *Rhodnius prolixus*. **Rafaela Bruno** (rafaelabruno@gmail.com), Oswaldo Cruz Foundation, Rio de Janeiro, Brazil

**10:15 BREAK**

10:30 **2374** The antennal transcriptome of a Chagas disease vector. **Marcelo Lorenzo** (marcelo@cpqrr. fiocruz.br), Oswaldo Cruz Foundation, Belo Horizonte, Brazil

10:45 **2375** Behavioral and molecular changes induced by trypanosome infection in triatomine. **Alessandra Guarneri** (guarneri@cpqrr.fiocruz.br), Oswaldo Cruz Foundation, Belo Horizonte, Brazil

11:00 **2376** Chemosensory transcriptomes in Chagas disease vectors: Insights to understand the domiciliation process. **Myriam Harry** (myriam.harry@egce.cnrs-gif.fr), Univ. of Paris-Sud, Gif-sur-Yvette, France

**Symposium: 9th International Symposium on the Chrysomelidae**

***Room W224 A (Convention Center)***

**Moderators and Organizers:** Michael Schmitt1 and Caroline S. Chaboo2, 1Ernst Moritz Arndt Univ., Greifswald, Germany, 2Univ. of Kansas, Lawrence, KS

9:15 **2377** The relationship of Galerucini and Alticini based on mitochondrial genomes (Coleoptera: Chrysomeloidea: Chrysomelidae). **RuiE Nie** (niere@ioz.ac.cn)1,  
Xing-Ke Yang1, and Alfried Vogler2,3, 1Chinese Academy of Sciences, Beijing, China, 2Imperial College London, London, United Kingdom, 3The Natural History Museum, London, United Kingdom

9:30 **2378** Geometric morphometrics of the hindwing shape of leaf beetles: Modularity of the hindwing pattern. Jing Ren, Ming Bai, Xing-Ke Yang, and **Si-Qin Ge** (gesq@ioz.ac.cn), Chinese Academy of Sciences, Beijing, China

9:45 **2379** *Delocrania* Guérin, 1844, a genus at the transition from ‘hispines’ to tortoise beetles (Chrysomelidae: Cassidinae s.l.). **Caroline Chaboo** (cschaboo@ku.edu), Univ. of Kansas, Lawrence, KS

10:00 **2380** *Oulema* taxonomy using microCT.  
**Michael Schmitt** (michael.schmitt@uni-greifswald.de) and Gabriele Uhl, Ernst Moritz Arndt Univ., Greifswald, Germany

**SD2381** Phylogenetic analysis on morphological characters and evolution in host-plant use of the seed beetle genus *Caryedes* (Hummel) (Coleoptera: Chrysomelidae: Bruchinae). Isaac Jorge and **Cibele Ribeiro-Costa** (cibele.ribeirocosta@gmail.com), Federal Univ. of Paraná, Curitiba, Brazil

**SD2382** Morphological phylogeny of Cassidini Gyllenhal  
1813 (Coleoptera: Chrysomelidae: Cassidinae).  
**Sara López Pérez** (slopez.p@hotmail.com), Univ. City, Cubículo, Mexico

**10:15 BREAK AND POSTER SESSION**

10:30 **2383** Dynamics of diversification in the Bruchinae. **Geoffrey Morse** (gmorse@sandiego.edu), Univ. of San Diego, San Diego, CA

10:45 **2384** Recent advances in the knowledge of Mexican Alticinae. **David Furth** (furthd@si.edu), Smithsonian Institution National Museum of Natural History, Washington, DC

11:00 **2385** Opaque to CoL: A highly diverse coleopteran subfamily and its invisible digital footprint.  
**R. Wills Flowers** (rflowers7@earthlink.net), Florida A&M Univ., Tallahassee, FL

11:15 **2386** Fitness effects of polyandry in *Acromis sparsa* (Chrysomelidae: Cassidinae). **Paula Trillo** (ptrillo@ gettysburg.edu), Gettysburg College, Gettysburg, PA

11:30 **2387** Chrysomelidae (Coleoptera) ecology in  
a tropical montane forest in Southeast Brazil. **Margarete de Macedo** (margaretevmacedo@gmail. com), Vivian Flinte, Carolina Colares, André Abejanella, Carlos Vinicius da S. Gomes, and Ricardo Monteiro, Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

11:45 **2388** Quo vadis biodiversity? Species richness after twenty years of taxonomic revision on Afrotropical Galerucinae (Coleoptera: Chrysomelidae).  
**Thomas Wagner** (thwagner@uni-koblenz.de), Univ.

of Koblenz-Landau, Koblenz, Germany

12:00 **2389** Discovering a new Alticini frontier: Leaf  
litter- and moss-inhabiting species. **Adelita Linzmeier** (alinzmeier@yahoo.com.br), Federal Univ. of Fronteira Sul, Realeza, Brazil

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**Symposium: Insect Molecular Physiology and Ecology: The Post-Genomic Era**

***Room W224 G (Convention Center)***

**Moderator and Organizer:** Klaus Hoffmann, Univ. of Bayreuth, Bayreuth, Germany

9:15 **2390** RNA-interference — a tool for evaluating hormonal functions in insects. **Klaus Hoffmann** (klaus.hoffmann@uni-bayreuth.de)1, Intisar Hassanien1, Laura Vannini2, Mohadmed Abdel-latief1, and

Franziska Wende1, 1Univ. of Bayreuth, Bayreuth, Germany, 2Univ. of Siena, Siena, Italy

9:30 **2391** Advances in insect neuroendocrinology/ physiology through genomics and peptidomics: Diuresis in *Rhodnius prolixus*. **Ian Orchard** (ian.orchard@ utoronto.ca) and Angela Lange, Univ. of Toronto, Mississauga, ON, Canada

9:45 **2392** Bioengeneering of TMOF to control mosquitoes and other insects. **Dov Borovsky** (dovborovsky@gmail. com)1, Charles A. Powell2, Robert Shatters1, Arieh Zaritsky3, and Etan Ben Dov4, 1USDA - ARS, Ft. Pierce, FL,

2Univ. of Florida, Ft. Pierce, FL, 3Ben-Gurion Univ. of the Negev, Beer Sheva, Israel, 4Achva Academic College, Beer Sheva, Israel

10:00 **2393** Cold case files: Molecular mechanisms of insect winter hardiness. **Kenneth Storey** (kenneth.storey@ carleton.ca), Carleton Univ., Ottawa, ON, Canada

**10:15 BREAK**

10:30 **2394** The role of the circadian clock in photoperiodism of the bean bug *Riptortus pedestris*. **Shin Goto** (shingoto@ sci.osaka-cu.ac.jp)1 and Hideharu Numata2, 1Osaka City Univ., Osaka, Japan, 2Kyoto Univ., Kyoto, Japan

10:45 **2395** Sequestration and transport proteins in leaf beetle larvae. **Wilhelm Boland** (boland@ice.mpg.de), Max Planck Institute for Chemical Ecology, Jena, Germany

11:00 **2396** The coleopteran gut and targets for pest control. **Brenda Oppert** (bso@ksu.edu), Kansas State Univ., Manhattan, KS

11:15 **2397** Functional proteomics-assisted selection of protease inhibitors useful in plant protection against coleopteran herbivores. **Dominique Michaud** (dominique.michaud@fsaa.ulaval.ca) and

Asieh Rasoolizadeh, Univ. Laval, Québec City, QC, Canada

**Symposium: The Insect Circulatory System: Vital but Widely Neglected!**

***Room W222 A (Convention Center)***

**Moderators and Organizers:** Julian F. Hillyer1 and Günther Pass2, 1Vanderbilt Univ., Nashville, TN, 2Univ. of Vienna, Vienna, Austria

9:15 **2398** Development and transdifferentiation of the heart-associated alary muscles in *Drosophila*. **Manfred Frasch** (mfrasch@biologie.uni-erlangen.de), Christoph Schaub, Ingolf Reim, and Johannes März, Univ. of Erlangen, Erlangen, Germany

9:30 **2399** The ups and downs of cardiac contractility: How RFamides impact heart rate. **Ruthann Nichols** (nicholsr@umich.edu), Univ. of Michigan, Ann Arbor, MI

9:45 **2400** Mechanism and drive for the accessory  
hearts of the cricket ovipositor. Reinhold Hustert1, **Alexander Böhm** (a.boehm@univie.ac.at)2, and Günther Pass2, 1Univ. of Göttingen, Göttingen, Germany, 2Univ. of Vienna, Vienna, Austria

10:00 **2401** Ultrastructure of the heart in different mosquito species. **Gustavo Martins** (gmartins@ufv.br),  
Henrique da Silva, Ana Leodido, and Caroline Gonçalves Macedo, Federal Univ. of Viçosa, Viçosa, Brazil

**10:15 BREAK**

10:30 **2402** Structural mechanics of hemolymph circulation in mosquitoes. **Julian F. Hillyer** (julian.hillyer@vanderbilt. edu), Vanderbilt Univ., Nashville, TN

10:45 **2403** Circulatory and immune system interactions in a mosquito. **Leah T. Sigle** (leah.t.sigle@vanderbilt.edu) and Julian F. Hillyer, Vanderbilt Univ., Nashville, TN

11:00 **2404** New methods for understanding flow production in the dorsal vessel. **John Socha** (jjsocha@ vt.edu)1, Matthew Giarra1, Jon Harrison2, Melissa Kenny1, Laura Miller3, Craig Goergen4, and Pavlos Vlachos4, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Arizona State Univ., Tempe, AZ,  
3Univ. of North Carolina, Chapel Hill, NC, 4Purdue Univ., West Lafayette, IN

11:15 **2405** Butterfly hemolymph as a complex fluid and mechanical challenges of its flow through complex shaped channels. **Konstantin G. Kornev** (kkornev@ clemson.edu), Pavel Aprelev, Chadwick Walls,  
Arthur Salamatin, Peter H. Adler, and Charles E. Beard, Clemson Univ., Clemson, SC

**Symposium: Psocids as Global Pests of Stored Products**

***Room W231 A (Convention Center)***

**Moderators and Organizers:** James Throne1 and Christos Athanassiou2, 1USDA - ARS, Parlier, CA, 2Univ. of Thessaly, Nea Ionia, Greece

9:15 **2406** Psocids as global pests of stored products. **James Throne** (james.throne@ars.usda.gov), USDA - ARS, Parlier, CA

9:30 **2407** Biology and ecology of stored-product psocid pests. Christos Athanassiou1, **Nickolas Kavallieratos** (nick\_kaval@hotmail.com)2, James Throne3, and Christos Nakas1, 1Univ. of Thessaly, Nea Ionia, Greece, 2Agricultural Univ. of Athens, Attica, Greece, 3USDA - ARS, Parlier, CA

9:45 **2408** Sampling, trapping, and attractants for stored-product psocid pests. **James Campbell** (james.campbell@ars.usda.gov)1, John Diaz-Montano2, Thomas Phillips3, and James Throne4, 1USDA - ARS, Manhattan, KS, 2Colombian Corporation for Agricultural Research, Rionegro, Colombia, 3Kansas State Univ., Manhattan, KS, 4USDA - ARS, Parlier, CA

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10:00 **2409** Chemical control of stored-product psocid pests. **Christos Athanassiou** (athanassiou@agr.uth.gr)1, James Throne2, Frank Arthur3, Nickolas Kavallieratos4, and Thomas Phillips5, 1Univ. of Thessaly, Nea Ionia, Greece, 2USDA - ARS, Parlier, CA, 3USDA - ARS, Manhattan, KS, 4Agricultural Univ. of Athens, Attica, Greece, 5Kansas State Univ., Manhattan, KS

**10:15 BREAK**

10:30 **2410** Alternatives to insecticides for control of stored-product psocid pests. **George Opit** (george. opit@okstate.edu), Oklahoma State Univ., Stillwater, OK

10:45 **2411** Mitochondrial genomes in *Liposcelis*: Minicircles with varied gene rearrangement. **Jin-Jun Wang** (jjwang7008@yahoo.com), Wei Dou, and Dan Dan Wei, Southwest Univ., Chongqing, China

11:00 **2412** Molecular methods for identification of stored- product psocid pests. **Zhihong Li** (lizh@cau.edu.cn)1, Qianqian Yang1, Bingyi Cui1, Aohan Pang1, Shiqian Feng1, Zuzana Kucerová2, Vaclav Stejskal2, George Opit3, and Yang Cao4, 1China Agricultural Univ., Beijing, China, 2Crop Research Institute, Prague, Czech Republic, 3Oklahoma State Univ., Stillwater, OK, 4Academy of State Administration of Grain, Beijing, China

**Symposium: Ecology and Adaptation for Survival of Termites**

***Room W331 C (Convention Center)***

**Moderator and Organizer:** Kok-Boon Neoh, National Chung Hsing Univ., Taichung, Taiwan

9:15 **Welcoming Remarks**

9:30 **2413** Presentation withdrawn

10:00 **2414** Effects of group size and starvation on survival of *Coptotermes gestroi* foragers. **Ives Haifig** (haifig@ ufu.br)1 and Ana Maria Costa-Leonardo2, 1Federal Univ. of Uberlândia, Monte Carmelo, Brazil, 2 São Paulo State Univ., Rio Claro, Brazil

**10:15 BREAK**

10:30 **2415** Effect of flooding on the survival and population distribution of Formosan subterranean termites in New Orleans, Louisiana. **Mary Cornelius** (mary.cornelius@ars.usda.gov), USDA - ARS, Beltsville, MD

10:45 **2416** Surveillance of ectoparasitic fungus *Laboulbeniopsis termitarius* Thaxt on *Reticulitermes* spp. in Japan. **Guswenrivo Ikhsan** (ikhsan.guswenrivo@ biomaterial.lipi.go.id)1,2, Hiroki Sato3, Tsuyoshi Yoshimura1, and Izumi Fujimoto1, 1Kyoto Univ., Uji, Japan, 2Indonesian Institute of Sciences, West Java, Indonesia, 3Forestry and Forest Products Research Institute, Ibaraki, Japan

11:00 **2417** Foraging activities of *Coptotermes formosanus* and *Reticulitermes flaviceps* and potential genes associated with foraging behavior through transcriptome analysis. **Dayu Zhang** (zhangdayu@zafu.edu.cn), Zhejiang A&F Univ., Hangzhou, China

11:15 **2418** Ecological adaptation of the sympatric *Macrotermes* spp. **Kok-Boon Neoh** (neohkokboon@ nchu.edu.tw), National Chung Hsing Univ., Taichung, Taiwan

12:00 **Concluding Remarks**

**Symposium: Novel Techniques in Urban IPM**

***Room W331 D (Convention Center)***

**Moderator and Organizer:** Dong-Hwan Choe, Univ. of California, Riverside, CA

9:15 **2419** Semiochemical-based trapping technologies for consumer markets. **Qing-He Zhang** (qing-he@ rescue.com), Sterling International, Inc., Spokane, WA

9:30 **2420** The use of attractants for western yellowjacket IPM. **Kathleen Campbell** (kathleen.campbell@ucr.edu), Univ. of California, Riverside, CA

9:45 **2421** A novel approach to insect trap design: Location of attractants. **Dangsheng Liang** (dliang@ apexbait.com), Apex Bait Technologies, Inc., Santa Clara, CA

10:00 **2422** Enhancing biological control of citrus pests with hydrogel baits for sustainable Argentine ant,

*Linepithema humile*, management. **Jia-Wei Tay** (jiawei@ucr.edu), Univ. of California, Riverside, CA

**10:15 BREAK**

10:30 **2423** RNAi and baiting: Novel techniques for Argentine ant control. **Kevin Welzel** (kwelz001@ucr. edu), Univ. of California, Riverside, CA

10:45 **2424** The trail pheromone, neurohormone, and application of RNAi to control the fire ant.

**Man-Yeon Choi** (mychoi@ars.usda.gov)1 and Robert Vander Meer2, 1USDA - ARS, Corvallis, OR, 2USDA - ARS, Gainesville, FL

11:00 **2425** Microbes as tools and targets for termite control. **Chinmay Tikhe** (cvtikhe@gmail.com)1, Chris Gissendanner2, and Claudia Husseneder3, 1Louisiana State Univ. AgCenter, Baton Rouge, LA, 2Univ. of Louisiana, Monroe, LA, 3Louisiana State Univ., Baton Rouge, LA

11:15 **2426** Dummy-egg carrying provides an effective pesticide delivery system for termite control.  
**Kenji Matsuura** (kenjijpn@kais.kyoto-u.ac.jp), Kyoto Univ., Kyoto, Japan

**Graduate Student Oral Competition: Biological Control and Insect Pathology: Biological Control**

***Room W240 A (Convention Center)***

**Moderators:** Lisia de Lima Matos1 and Anthony S. DiMeglio2, 1Chicago, IL, 2Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:15

9:30

**2427** Population dynamics, vertical distribution, and natural parasitism of eggs of *Chrysodeixis includens* by *Trichogramma* spp. in soybean. **Diego Fraga** (diegoffraga@gmail.com)1, Cesar Rodriguez-Saona2, Antonio Busoli1, Oniel Aguirre-Gil1, and Leandro Souza1, 1São Paulo State Univ., Jaboticabal, Brazil, 2Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

**2428** Storage strategies for a factitious host *Corcyra cephalonica* (Stainton) (Lepidoptera: Pyralidae). **Enakshi Ghosh** (enakshi.ghosh1@gmail.com) and Chandish Ballal, National Bureau of Agricultural Insect Resources, Bangalore, India

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9:45 **2429** The effects of a nutrient-rich diet on the fertility of the parasitic wasp *Tamarixia radiata* Waterston (Hymenoptera: Eulophidae). **Dani Ruais** (daniruais@ gmail.com), Anna Soper, and Valerie Mellano, California State Polytechnic Univ., Pomona, CA

10:00 **2430** Assessing the efficacy of hymenopteran parasitoids as biological control agents of cutworms (Lepidoptera: Noctuidae) in field crops in Canada.  
**R. W. M. Udari Wanigasekara** (udari\_madu@yahoo. com)1 and Barbara Sharanowski2, 1Univ. of Manitoba, Manitoba, MB, Canada, 2Univ. of Central Florida, Orlando, FL

**10:15 BREAK**

10:30 **2431** Agroecology of a salad crop pest in New Zealand. **Ryan Rayl** (ryan.rayl@lincolnuni.ac.nz), Lincoln Univ., Prebbleton, New Zealand

10:45 **2432** Evaluation of cool-season and warm-season intercrops for aphid biological control in organic pecan orchards. **Tzu-Chin Liu** (jean2036@uga.edu) and James Dutcher, Univ. of Georgia, Tifton, GA

11:00 **2433** Testing the intermediate landscape complexity hypothesis for augmentative biological control. **Ricardo Perez-Alvarez** (mrp245@cornell.edu)1,  
Brian A. Nault2, and Katja Poveda1, 1Cornell Univ., Ithaca, NY, 2Cornell Univ., Geneva, NY

11:15 **2434** Evaluation of the *Aphidius colemani*- *Rhopalosiphum padi* banker plant system in Oklahoma greenhouse production. **Tracey Payton Miller** (tracey. payton@okstate.edu)1, Eric Rebek1, Steven Frank2,

Kris Giles1, and Mike Schnelle1, 1Oklahoma State Univ., Stillwater, OK, 2North Carolina State Univ., Raleigh, NC

11:30 **2435** Effect of land-use intensity on aphid natural enemies in Paysandú, Uruguay. **Sara Emery** (semery@ berkeley.edu)1, Adela Ribeiro2, and Nicholas Mills1, 1Univ. of California, Berkeley, CA, 2Univ. of the Republic, Paysandú, Uruguay

11:45 **2436** The influence of landscape complexity and natural enemy movement on soybean aphid populations in Manitoba, Canada. **K. G. L. I. Samaranayake** (ishansamaranayake@yahoo.com) and Alejandro Costamagna, Univ. of Manitoba, Winnipeg, MB, Canada

**Graduate Student Oral Competition: Ecology and Population Dynamics: Ecology and Evolution**

***Room W240 C (Convention Center)***

**Moderators:** James Nieh1 and Jeremy Greene2, 1Univ. of California, San Diego, CA, 2Clemson Univ., Blackville, SC

9:15 **2437** Multitrophic interactions: The influence  
of *Arsenophonus* on *Toxoptera citricida* (Hemiptera: Aphididae). **Bianca Soares** (biancarbogim@yahoo.com. br) and Fernando Cônsoli, Univ. of São Paulo, Piracicaba, Brazil

9:30 **2438** Sex makes them sleepy: The impact of aphid sexuality on parasitoid diapause. **Kévin Tougeron** (kevin.tougeron@umontreal.ca)1,2, Jacques Brodeur1, Joan van Baaren2, and Cécile Le Lann2, 1Univ. of Montréal, Montréal, QC, Canada, 2Univ. of Rennes, Rennes, France

9:45 **2439** Microbial ecology of the bee brood cell. **Kristen Brochu** (kb532@cornell.edu) and Bryan N. Danforth, Cornell Univ., Ithaca, NY

10:00 **2440** Attack levels by internal and external parasitoids provide conflicting evidence for the direction of host shift in diverging populations of gall midges. **Noa Keidar** (noakeidar@gmail.com) and Netta Dorchin, Tel Aviv Univ., Tel Aviv, Israel

**10:15 BREAK**

10:30 **2441** Disentangling associational effects: Resource density and resource frequency affect insect search behavior in complex environments. **Thomas Verschut** (thomas.verschut@su.se)1, Paul Becher2, Peter Anderson2, and Peter Hambäck1, 1Stockholm Univ., Stockholm, Sweden, 2Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

10:45 **2442** Post-capture activity of wild-caught *Drosophila simulans* as a signature of age and activity in wild populations. **Sarah Silverman** (ssilverman@ucdavis.edu)1, Congwei Yu2, Ed Lewis1, and James R. Carey1, 1Univ. of California, Davis, CA, 2China Agricultural Univ., Beijing, China

11:00 **2443** Connections between the dung arthropod community and cattle management practices in eastern South Dakota. **Jacob Pecenka** (jacob.pecenka@gmail. com)1 and Jonathan Lundgren2, 1South Dakota State Univ., Brookings, SD, 2Ecdysis Foundation, Estelline, SD

11:15 **2444** Presentation withdrawn

11:30 **2445** Phage diversity and function in a tripartite symbiosis in pea aphids. **Jayce W. Brandt** (jayce@ uga.edu), Kerry M. Oliver, and Michael Strand, Univ. of Georgia, Athens, GA

11:45 **2446** Assessing morphological differentiation between host-associated populations of *Monelliospis pecanis* (Hemiptera: Aphididae). **Kyle Harrison** (kharrison@tamu.edu) and Raul F. Medina, Texas A&M Univ., College Station, TX

12:00 **2447** Presentation withdrawn  
**Graduate Student Oral Competition: Ecology and**



**Population Dynamics: Pollinators**

***Room W240 B (Convention Center)***

**Moderators:** Troy D. Anderson1 and Dayna Collett2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Oklahoma State Univ., Stillwater, OK

9:15 **2448** The ecology and identification of common parasitoids (Diptera: Conopidae: *Physocephala*) in central and mid-coast Maine and behavioral changes of the bumble bee hosts. **Kalyn Bickerman-Martens** (kalyn.bickerman@umit.maine.edu) and

Frank Drummond, Univ. of Maine, Orono, ME

9:30 **2449** *Bombus impatiens* in the pumpkin patch: A tale of population trends and pollination services featuring three years of molecular analysis and visitation rates. **R. Carley Miller** (rxm452@psu.edu)1, James Strange2, Shelby J. Fleischer1, Amber D. Tripodi2, and Dana Roberts1, 1Pennsylvania State Univ., University Park, PA, 2USDA - ARS, Logan, UT

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9:45 **2450** Effects of habitat enhancement on bumble bee (*Bombus* spp.) foraging preferences and common eastern bumble bee (*Bombus impatiens*) population density. **Knute Gundersen** (gundersenknute@gmail. com)1, James Strange2, and Rufus Isaacs1, 1Michigan State Univ., East Lansing, MI, 2USDA - ARS, Logan, UT

10:00 **2451** The relationship between pollen diversity and foraging effort in honey bees and bumble bees. **Danny Minahan** (dfminahan@wisc.edu)1 and Johanne Brunet2, 1Univ. of Wisconsin, Madison, WI, 2USDA - ARS, Madison, WI

**10:15 BREAK**

10:30 **2452** Pollinator habitat along highway rights-of- way: Preliminary results of a comparison of pollinator communities under different meadow management regimes and quantification of common roadside pollutants in floral resources of adjacent wildflowers. **Lisa Kuder** (lkuder@umd.edu), Univ. of Maryland, College Park, MD

10:45 **2453** How many flowers are enough? Increasing floral resources to maintain pollinator diversity (syrphid flies and halictid bees) in an urban landscape. **Maria-Carolina Simao** (simao@umich.edu),

Jill Matthijs, and Ivette Perfecto, Univ. of Michigan, Ann Arbor, MI

11:00 **2454** Palynological analysis of pollen collected by honey bees (*Apis mellifera*) in developed areas in four regions of the United States. Juliana Rangel1, **Pierre Lau** (plau0168@tamu.edu)2, Zachary Y. Huang3,

Vaughn Bryant1, Ana Cabrera4, Daniel Schmehl4, Joseph Sullivan5, and James D. Ellis6, 1Texas A&M Univ., College Station, TX, 2Texas A&M Univ., Bryan, TX, 3Michigan State Univ., East Lansing, MI, 4Bayer Crop- Science, Research Triangle Park, NC, 5Ardea Consulting, Woodland, CA, 6Univ. of Florida, Gainesville, FL

11:15 **2455** Who does it better? Diversity and contributions of wild sour cherry (*Prunus cerasus*) pollinators with comparisons to managed bees. **Charlie Bailey** (charliep. bailey@yahoo.ca)1 and Cory Sheffield2, 1Univ. of Regina, Regina, SK, Canada, 2Royal Saskatchewan Museum, Regina, SK, Canada

11:30 **2456** Pollination biology of two native orchid (Orchidaceae) species in south Florida. **Haleigh Ray** (hray12@ufl.edu) and Jennifer Gillett-Kaufman, Univ. of Florida, Gainesville, FL

11:45 **2457** Presentation withdrawn

**Graduate Student Oral Competition: Genetics and Evolutionary Entomology: Population Genetics**

***Room W232 B (Convention Center)***

**Moderators:** Nate Hardy1 and Stephen Losey2, 1Auburn Univ., Auburn, AL, 2Kansas State Univ., Manhattan, KS

9:15 **2458** Entomological time travel: Reconstructing the invasion history of the buckeye butterflies (genus *Junonia*) from Florida, USA. **Melanie Lalonde** (umlalonm@myumanitoba.ca) and Jeffrey Marcus, Univ. of Manitoba, Winnipeg, MB, Canada

9:30 **2459** Candidate genes for diapause induction in speckled wood (*Pararge aegeria*) population crosses. **Peter Pruisscher** (peter.pruisscher@zoologi.su.se), Sören Nylin, Karl Gotthard, and Christopher Wheat, Stockholm Univ., Stockholm, Sweden

9:45 **2460** Advances in finding Alba: The supergene affecting life history and color polymorphism in  
a *Colias* butterfly. **Alyssa Woronik** (alyssa.woronik@ zoologi.su.se)1, Constanti Stefanescu2, and Christopher Wheat1, 1Stockholm Univ., Stockholm, Sweden, 2Natural History Museum, Granollers, Spain

10:00 **2461** Macroevolutionary trade-offs in plant-feeding Hemiptera and Lepidoptera. **Daniel Peterson** (daniel.alex.peterson@gmail.com)1, Nate Hardy2, and Benjamin Normark1, 1Univ. of Massachusetts, Amherst, MA, 2Auburn Univ., Auburn, AL

**10:15 BREAK**

10:30 **2462** The ontogeny of intersexual communication in damselflies: Combining experimental and phylogenetic approaches. **Beatriz Willink** (beatriz.willink@biol.lu.se), Katie Duryea, and Erik Svensson, Lund Univ., Lund, Sweden

10:45 **2463** The role of gene expression evolution in scale insect host use adaptation. **Nicholas Christodoulides** (nzc0035@auburn.edu) and Nate Hardy, Auburn Univ., Auburn, AL

11:00 **2464** Population genetic structures of *Laodelphax striatellus* (Fallén) and *Sogatella furcifera* (Horváth) (Hemiptera: Delphacidae) in Asia. **Hwa Yeun Nam** (jessienam@snu.ac.kr), Byungin Sohn, and

Joon-Ho Lee, Seoul National Univ., Seoul, South Korea

11:15 **2465** Invasion pathways and population genetics of the coconut rhinoceros beetle (*Oryctes rhinoceros*). **Jonathan Bradley Reil** (jbreil@hawaii.edu),  
Michael San Jose, and Daniel Rubinoff, Univ. of Hawai’i, Honolulu, HI

11:30 **2466** Using next generation sequencing to uncover population structure and species boundaries in *Bactrocera dorsalis* and its sister species.  
**Michael San Jose** (mdsjose@hawaii.edu)1, Luc Leblanc2, Scott Geib3, Norman Barr4, and Daniel Rubinoff1,

1Univ. of Hawai’i, Honolulu, HI, 2Univ. of Idaho, Moscow, ID, 3USDA - ARS, Hilo, HI, 4USDA - APHIS, Edinburg, TX

11:45 **2467** Gene regulatory differences among monogyne and polygyne red imported fire ants (*Solenopsis invicta*). **Joan King** (joanie.mars@uga.edu)1, Sasha Kay2, Kenneth Ross1, and Brendan Hunt2, 1Univ. of Georgia, Athens, GA, 2Univ. of Georgia, Griffin, GA

12:00 **2468** Social pheromones: Mapping their effect on the insect brain. **Justin Croft** (jcroft3@uwo.ca), Alison Camiletti, and Graham Thompson, Univ. of Western Ontario, London, ON, Canada

12:15 **2469** What’s the buzz in *Drosophila* genome size evolution: A phylogenetic comparison of *Sophophora* and *Drosophila*. **Carl Hjelmen** (cehjelmen09@tamu. edu) and J. Spencer Johnston, Texas A&M Univ., College Station, TX

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**WEDNESDAY**

**Wednesday, September 28 • MORNING •**

**Graduate Student Oral Competition: Invasive and Exotic Entomology: Invasives**

***Room W240 D (Convention Center)***

**Moderators:** Chris J. Holderman1 and John Cho2, 1Univ. of Florida, Gainesville, FL, 2Arizona State Univ., Tempe, AZ

9:15 **2470** Distribution of the genus *Lissorhoptrus* (Coleoptera: Curculionidae) in the world and possibility of further invasions into China. **Chunyan Jiang** (jiangchunyan2006@163.com)1, Runzhi Zhang1, Muhammad Haseeb2, and Charles W. O’Brien3, 1Chinese Academy of Sciences, Beijing, China, 2Florida A&M Univ., Tallahassee, FL, 3Univ. of Arizona, Tucson, AZ

9:30 **2471** Presentation withdrawn

9:45 **2472** Knowledge of California residents on Asian citrus psyllid (*Diaphorina citri*) and citrus greening disease. **Ashley Van Vliet** (acvanvliet@cpp.edu), Anna Soper, and Valerie Mellano, California State Polytechnic Univ., Pomona, CA

10:00 **2473** First report of invasive populations of Asian longhorned beetle in Korea, with evidence of multiple invasions. **Seunghyun Lee** (chiyark@snu.ac.kr) and Seunghwan Lee, Seoul National Univ., Seoul, South Korea

**10:15 BREAK**

10:30 **2474** Determination of the distribution and factors predicting emerald ash borer (*Agrilus planipennis*) infestation in white fringetrees (*Chionanthus virginicus*). **Donnie Peterson** (peterson.143@wright.edu) and

Don Cipollini, Wright State Univ., Dayton, OH

10:45 **2475** Can clusters of treated ash trees protect neighboring untreated ash and maintain recruitment during the emerald ash borer invasion? **Erin M. O’Brien** (obrien.501@osu.edu) and Daniel Herms, The Ohio State Univ., Wooster, OH

11:00 **2476** Influence of temperature on the reproductive and developmental biology of *Ontsira mellipes* (Hymenoptera: Braconidae) when reared on the exotic host *Anoplophora glabripennis* (Coleoptera: Cerambycidae). **Julian Golec** (juliang@udel.edu)1, Jian Duan2, Judith A. Hough-Goldstein1, and

Ellen M. Aparicio2, 1Univ. of Delaware, Newark, DE, 2USDA - ARS, Newark, DE

11:15 **2477** Pheromone and general odorant detection  
by the Asian longhorned beetle (*Anoplophora glabripennis*) measured via single sensillum recording (SSR). **Loyal Hall** (lph1@psu.edu) and Thomas C. Baker, Pennsylvania State Univ., University Park, PA

11:30 **2478** Responses of parasitoid wasps to eggs and pheromones of cerambycid beetles in field bioassays. **Todd Johnson** (tdjohns2@illinois.edu)1 and  
Lawrence M. Hanks2, 1Univ. of Illinois, Champaign, IL, 2Univ. of Illinois, Urbana, IL

11:45 **2479** Contrasting the species diversity and value of urban forests in inner-city and suburban Cleveland, OH. **Christopher B. Riley** (riley.595@osu.edu)1,  
Daniel Herms2, and Mary Gardiner2, 1The Ohio State Univ., Columbus, OH, 2The Ohio State Univ., Wooster, OH

**Graduate Student Oral Competition: Physiology and Biochemistry: Abiotic/Biotic Effects**

***Room W232 C (Convention Center)***

**Moderators:** Elsa Youngsteadt1 and Alana Pindar2, 1North Carolina State Univ., Raleigh, NC, 2Univ. of Guelph, Guelph, ON, Canada

9:15 **2480** Desiccation resistance in tropical insects: Causes and mechanisms underlying variability in a Panama ant community. **Jelena Bujan** (jelena.bujan@ ou.edu)1, Stephen Yanoviak2, and Michael Kaspari1, 1Univ. of Oklahoma, Norman, OK, 2Univ. of Louisville, Louisville, KY

9:30 **2481** Higher upper lethal temperatures of winter insects compared to summer. **Henry Vu** (henry.vu.16@ nd.edu) and John Duman, Univ. of Notre Dame, South Bend, IN

9:45 **2482** Cold tolerance of the crape myrtle bark scale, *Eriococcus lagerstroemiae* Kuwana (Hemiptera: Eriococcidae), an exotic pest in the southeastern United States. **Zinan Wang** (zwang67@lsu.edu)1, Rodrigo Diaz1, and Yan Chen2, 1Louisiana State Univ., Baton Rouge, LA, 2Louisiana State Univ., Hammond, LA

10:00 **2483** Effects of cold acclimation on structure and transport function in insect ionoregulatory tissues (or, everything you always wanted to know about cricket rectums but were afraid to ask). **Lauren Des Marteaux** (ldesmart@uwo.ca) and Brent Sinclair, Univ. of Western Ontario, London, ON, Canada

**10:15 BREAK**

10:30 **2484** Sublethal effects of cold on emerald ash borer (Coleoptera: Buprestidae): Energy reserves and flight capacity. **Dylan Tussey** (tusse001@umn.edu)1, Brian Aukema1, and Robert Venette2, 1Univ. of Minnesota, St. Paul, MN, 2USDA - Forest Service, St. Paul, MN

10:45 **2485** Investigating the molecular basis of pyrethroid selectivity at acarine sodium channels. **Alix Blockley** (alix.blockley@rothamsted.ac.uk)1, Joel Gonzalez-Cabrera2, Melania Akkoese3, T. G. Emyr Davies1, B. A. Wallace4, Andreas Turberg3, Ian Mellor5, Lin Field1, and

Martin Williamson1, 1Rothamsted Research, Harpenden, United Kingdom, 2Univ. of Valencia, Valencia, Spain, 3Bayer CropScience, Monheim am Rhein, Germany, 4Univ. of London, London, United Kingdom, 5Univ. of Nottingham, Nottingham, United Kingdom

11:00 **2486** Using RNA-seq to understand the endocrine control of condition dependent weapons in the  
Asian rhinoceros beetle (*Trypoxylus dichotomus*). **Robert Zinna** (robert.zinna@wsu.edu)1, Laura C. Lavine1, Doug Emlen2, and Ian Dworkin3, 1Washington State Univ., Pullman, WA, 2Univ. of Montana, Missoula, MT, 3McMaster Univ., Hamilton, ON, Canada

11:15 **2487** Advances in western corn rootworm, *Diabrotica virgifera virgifera*, artificial diets. **Man Huynh** (mphd32@mail.missouri.edu)1,2, Thomas A. Coudron3, Lisa Meihls3, Stephen L. Lapointe4, Randall P. Niedz4, and Bruce Hibbard3, 1Univ. of Missouri, Columbia, MO, 2Can Tho Univ., Can Tho, Vietnam, 3USDA - ARS, Columbia, MO, 4USDA - ARS, Ft. Pierce, FL

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**WEDNESDAY**

**Wednesday, September 28 • MORNING •**

11:30 **2488** Metabolic differences between fast/slow  
life histories of damselflies (Odonata: Zygoptera). **Tanya Dann** (tanyadannartist@gmail.com)1,  
Laura Ferguson2, Ruth Jakobs3, Gerry Closs1, and Brent Sinclair2, 1Univ. of Otago, Dunedin, New Zealand, 2Univ. of Western Ontario, London, ON, Canada, 3Bielefeld Univ., Bielefeld, Germany

11:45 **2489** Control of vitellogenesis in *Bactericera cockerelli* (Sulc). **Freddy Ibanez** (fibanez@neo.tamu. edu) and Cecilia Tamborindeguy, Texas A&M Univ., College Station, TX

12:00 **2490** Gut symbionts of a hemipteran insect, *Riptortus pedestris*, play essential roles in juvenile hormone- mediated host development and reproduction.  
**Jun Beom Lee** (wind2000net@gmail.com)1, Kyoung-Eun Park1, Ho Am Jang1, Ho Jeong Eo1, Chan-Hee Kim1, Toyomi Kotaki2, Yoshitomo Kikuchi3, and Bok-Luel Lee1, 1Pusan National Univ., Busan, South Korea, 2National Institute of Agrobiological Sciences, Tsukuba, Japan, 3National Institute of Advanced Industrial Science and Technology, Sapporo, Japan

12:15 **2491** Cardiac regulation of viral infection in a model social insect. **Scott O’Neal** (onealst@vt.edu)1, Daniel R. Swale2, Jeffrey Bloomquist3, and Troy D. Anderson1, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Louisiana State Univ., Baton Rouge, LA, 3Univ. of Florida, Gainesville, FL

**Contributed Papers: Agricultural and Forest Entomology: Fruits, Vegetables, Cereals, and Grains**

***Room W231 C (Convention Center)***

**Moderators:** Michael J. Eskelson1 and Charmaine Theron2, 1Univ. of Nebraska, Ogallala, NE, 2Univ. of Pretoria, Pretoria,

South Africa

9:15 **2492** Exclusion nets for pest management in northeastern apple orchards: An entomological perspective. **Gerald Chouinard** (gerald.chouinard@irda.qc. ca), Jonathan Veilleux, Francine Pelletier, Daniel Cormier, and Alessandro Dieni, IRDA, St-Bruno, QC, Canada

9:30 **2493** The autecology of fruit flies (Tephritidae) and false codling moth on multicrop farms in the Western Cape region of South Africa. **Martin Gilbert** (mg@cri.co.za), Citrus Research International, Stellenbosch, South Africa

9:45 **2494** Management of *Erionota torus* Evans (Lepidoptera: Hesperiidae): A threatened pest on banana by using biorationals in South India. **Sharanabasappa Deshmukh** (sharanu.deshmukh@ gmail.com) and Kalleshwsara Swamy, Univ. of Agricultural and Horticultural Sciences, Shimoga, India

10:00 **2495** Biology of the barred fruit-tree tortrix, *Pandemis cerasana* (Hübner) (Lepidoptera: Tortricidae), causes damage in cherry orchards. **Ayse Ozdem** (aozdem1@hotmail.com), Plant Protection Central Research Institute, Ankara, Turkey

**10:15 BREAK**

10:30 **2496** Oviposition propensity of *Bactrocera dorsalis* (Hendel) (Diptera: Tephritidae) on citrus varieties in South Africa: Implications for export markets. **Charmaine Theron** (cdtheron@zoology.up.ac.za)1, Aruna Manrakhan2, and Christopher Weldon1, 1Univ. of Pretoria, Pretoria, South Africa, 2Citrus Research International, Nelspruit, South Africa

10:45 **2497** An ecoinformatics approach to citrus pest management in California. **Bodil Cass** (bncass@ucdavis. edu) and Jay Rosenheim, Univ. of California, Davis, CA

11:00 **2498** Auchenorrhyncha (Hemiptera: Homoptera) as potential pests in citrus, olive, and tomato crops in Greece. **Antonios Tsagkarakis** (atsagarakis@aua.gr)1, Argyro Ampatzi1, Dimitrios Afentoulis1, Aikaterini Chaldeou1, Argyro Kalaitzaki2, Evangelos Kontogiannis1,

Aikaterini Koutsogiannopoulou1, Zoi Thanou1, Konstantina Voulgaraki1, and Sakis Drosopoulos1, 1Agricultural Univ. of Athens, Athens, Greece,

2Institute of Olive Tree, Subtropical Crops & Viticulture, Chania, Greece

11:15 **2499** Biology of *Thrips tabaci* Lindeman on onion cultivars. **Mohammad Shafiq Ansari** (mohdsansari@ yahoo.com), Maher Moraiet, and Rabiya Basri, Aligarh Muslim Univ., Aligarh, India

11:30 **2500** Characterization of tadpole shrimp (*Triops longicaudatus*) injury to rice and its effect on rice seedling establishment. **Luis Espino** (laespino@ucanr.edu), Univ. of California Cooperative Extension, Colusa, CA

11:45 **2501** *Spodoptera frugiperda* damage potential and larval response during vegetative and reproductive stages of maize development. **Paulo da Silva** (paulor. silva@pioneer.com)1, Vinicius de Faria1, Taline das Neves2, and Josemar Foresti1, 1DuPont do Brasil S.A., Planaltina, Brazil, 2DuPont do Brasil S.A., Itumbiara, Brazil

12:00 **2502** Impact of cover cropping on the epigeal arthropod community in dryland Nebraska cornfields. **Michael J. Eskelson** (michael.eskelson@unl.edu)1, Charles A. Burr2, and Julie Peterson2, 1Univ. of Nebraska, Ogallala, NE, 2Univ. of Nebraska, North Platte, NE

12:15 **2503** Impact of perennial non-crop habitat at center- pivot irrigation corners on ecosystem services for adjacent maize fields. **Julie Peterson** (julie.peterson@ unl.edu) and Kayla A. Mollet, Univ. of Nebraska, North Platte, NE

12:30 **2504** Indian tropical root and tuber crops entomology: Challenges and strategies. **Palaniswami Mari** (palaniswamims@gmail.com), Indian Council of Agricultural Research, Trivandrum, India

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**WEDNESDAY**

**Wednesday, September 28 • MORNING •**

**Contributed Papers: Agricultural and Forest Entomology: Pesticide Efficacy and Resistance Management**

***Room W232 A (Convention Center)***

**Moderators:** Amanda Jacobson1 and Jocelyn Smith2, 1Dow AgroSciences, Greenville, MS, 2Univ. of Guelph, Ridgetown, ON, Canada

9:15 **2505** IsoclastTM Active broad spectrum sap-feeding insecticide: Global overview and updates. **Luis E. Gomez** (egomez2@dow.com)1, Michael Shaw1, Nick Simmons1, and Armando Casino2, 1Dow AgroSciences, Indianapolis, IN, 2Dow AgroSciences, Horgen, Switzerland

9:30 **2506** IsoclastTM Active broad spectrum sap-feeding insecticide: Understanding of the mode of action and implications for resistance management. **Michael Shaw** (mcshaw@dow.com), Luis E. Gomez, Gerald B. Watson, and Thomas C. Sparks, Dow AgroSciences, Indianapolis, IN

9:45 **2507** IsoclastTM Active for control of sap feeding insects in U.S. commodity crops. **Amanda Jacobson** (ajjacobson@dow.com)1, Melissa Willrich Siebert1, Kevin Johnson2, Mike Lovelace3, Patricia Prasifka4, Jesse M. Richardson5, Dave Ruen6, Larry Walton7, and Harvey A. Yoshida8, 1Dow AgroSciences, Greenville, MS, 2Dow AgroSciences, Danville, IL, 3Dow AgroSciences, Lubbock, TX, 4Dow AgroSciences, West Fargo, ND, 5Dow AgroSciences, Hesperia, CA, 6Dow AgroSciences, Lanesboro, MN, 7Dow AgroSciences, Tupelo, MS,

8Dow AgroSciences, Richland, WA

10:00 **2508** IsoclastTM Active: management of economically important insect pests in northern Latin America. **Leonel Aviles** (lavilesmorales@dow.com)1,  
Alejandro Cedeño2, Eswin Castañeda3, Efraín Becerra4, and Melissa Willrich Siebert5, 1Dow AgroSciences, Culiacan, Mexico, 2Dow AgroSciences, San José, Costa Rica, 3Dow AgroSciences, Mixco, Guatemala, 4Dow AgroSciences, Bogotä, Colombia, 5Dow AgroSciences, Greenville, MS

**10:15 BREAK**

10:30 **2509** HarvantaTM, a new diamide insecticide with  
the a.i. CyclaprynTM (Cyclaniliprole). **Sean Whipple** (whipples@iskbc.com)1, Masayuki Morita2,  
Taku Hamamoto3, and Tohru Koyanagi3, 1ISK Biosciences Corporation, Kearney, MO, 2Ishihara Sangyo Kaisha, Ltd., Osaka, Japan, 3Ishihara Sangyo Kaisha, Ltd., Kusatsu, Japan

10:45 **2510** Beneath the surface: A novel bifenthrin formulation with targeted mobility. **Caleigh Irwin** (cirwin@vivecrop.com), Matthew Coulter, Gary Poon, Danielle Norton, Kelly Greig, Jordan Dinglasan, and Darren Anderson, Vive Crop Protection, Toronto, ON, Canada

11:00 **2511** Comparative efficacy of granular and new chemistry insecticides against *Chilo partellus*  
Swinhoe and their effect against natural enemies in maize. **Muhammad Sufyan** (muhammad.sufyan@uaf. edu.pk), Ahmad Nawaz, Muhammad Jalal Arif, Muhammad Dildar Gogi, and Shahid Majeed, Univ. of Agriculture, Faisalabad, Pakistan

11:15 **2512** Efficacy of *Melia azedarach* L. extracts and selected products in management of the adult tomato leafminer, *Tuta absoluta* Povolny. **Efat Abou-Fakhr Hammad** (ima27@mail.aub.edu), Zeinab Haidar, and Josiane El Chemaly, Lebanese Univ., Beirut, Lebanon

11:30 **2513** Predicting the efficacy of biopesticides against *Locust migratoria manilensis* in China. **Hongmei Li** (h.li@cabi.org)1,2, Yinmin Liu2,3, Dave Moore4,  
Bethan Perkins5, and Arabella B. K. Taylor4, 1CABI, Beijing, China, 2Chinese Ministry of Agriculture, Beijing, China, 3Gansu Agricultural Univ., Lanzhou, China, 4CABI, Ascot, United Kingdom, 5Assimila Ltd., London, United Kingdom

11:45 **2514** Determination of time of insecticide application against *Phthorimaea operculella* in the field conditions. **Pervin Erdogan** (pervinerdogan@gmail.com), Plant Protection Central Research Institute, Ankara, Turkey

12:00 **2515** Testing *Beauveria bassiana* and chlorantraniliprole to control *Earias vitella* (Lepidoptera: Noctuidae). **Kashif Ali** (chkashif20@ gmail.com)1 and Waqas Wakil2, 1Government College Univ., Faisalabad, Pakistan, 2Univ. of Agriculture, Faisalabad, Pakistan

12:15 **2516** Evolution of spinosad resistance in Colorado potato beetle, *Leptinotarsa decemlineata,* in the eastern US: Variation, dominance, and cross-resistance. **Mitchell Baker** (mitchell.baker@qc.cuny.edu)1,

Kathleen Schnaars-Uvino2, Coby Klein1, David Mota- Sanchez3, and Andrei Alyokhin4, 1City Univ. of New York, Flushing, NY, 2Univ. of Jamestown, Jamestown, ND, 3Michigan State Univ., East Lansing, MI, 4Univ. of Maine, Orono, ME

12:30 **2517** Characterizing the development of *Helicoverpa zea* injury to different cotton tissue types and different Bt protein combinations for use in IRM modeling. **Mohammad-Amir Aghaee** (maghaee@ncsu.edu)1, Dominic Reisig2, Michael Caprio3, Don Cook4, J

eremy Greene5, Fred Musser3, and Francis Reay-Jones6, 1North Carolina State Univ., Raleigh, NC, 2North Carolina State Univ., Plymouth, NC, 3Mississippi State Univ., Mississippi State, MS, 4Mississippi State Univ., Stoneville, MS, 5Clemson Univ., Blackville, SC, 6Clemson Univ., Florence, SC

12:45 **2518** Assessment of the role of neonicotinoid seed treatments to manage early season corn pests.  
**Jocelyn Smith** (jocelyn.smith@uoguelph.ca)1,  
Tracey Baute2, and Arthur Schaafsma1, 1Univ. of Guelph, Ridgetown, ON, Canada, 2Ontario Ministry of Agriculture, Food and Rural Affairs, Ridgetown, ON, Canada

1:00 **2519** Mode of inheritance of insecticide resistance to imidacloprid in the brown planthopper, *Nilaparvata lugens*. **Sachiyo Sanada-Morimura** (sanadas@affrc. go.jp), Tomohisa Fujii, and Masaya Matsumura, NARO Kyushu Okinawa Agricultural Research Center, Kumamoto, Japan

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**WEDNESDAY**

**Wednesday, September 28 • MORNING •**

**Contributed Papers: Ecology and Population Dynamics: Community Services**

***Room W225 A (Convention Center)***

**Moderators:** Joshua Campbell1 and Colton Zirkle2, 1Univ. of Florida, Gainesville, FL, 2Univ. of Arkansas, Fayetteville, AR

9:15 **2520** Insect vs. wind pollination of the Ozark chinquapin, *Castanea ozarkensis*. **Colton Zirkle** (coltonzirkle@gmail.com) and Ashley P. G. Dowling, Univ. of Arkansas, Fayetteville, AR

9:30 **2521** European skipper butterfly (*Thymelicus lineola*) associated with reduced seed development of showy lady’s-slipper orchid (*Cypripedium reginae*).  
**Paul Mosquin** (mosquin@rti.org)1, Peter Hall2,

Paul Catling2, and Ted Mosquin3, 1RTI International, Chapel Hill, NC, 2Agriculture and Agri-Food Canada, Ottawa, ON, Canada, 3Mosquin Bio-Information Ltd., Balderson, ON, Canada

9:45 **2522** The evolution of symbiosis in firebugs (Hemiptera: Pyrrhocoridae). **Adam Martinez** (adam.martinez@uni-mainz.de) and Martin Kaltenpoth, Johannes Gutenberg Univ., Mainz, Germany

10:00 **2523** Crab spiders (Thomisidae) attract insect flower-visitors without UV signaling. **Ellen Welti** (elwelti@k-state.edu), Savannah Putnam, and Anthony Joern, Kansas State Univ., Manhattan, KS

**10:15 BREAK**

10:30 **2524** Increased pollinator habitat enhances fruit set in Australian cacao. **Samantha Forbes** (samantha. forbes@my.jcu.edu.au) and Tobin Northfield,  
James Cook Univ., Cairns, Australia

10:45 **2525** Landscape effects on mason bee fitness mediated by diet diversity and pesticide exposure. **Mary Centrella** (mlc344@cornell.edu), Katja Poveda, and Bryan N. Danforth, Cornell Univ., Ithaca, NY

11:00 **2526** Pollinators and other arthropod attraction to native wildflower plantings in Florida. **Joshua Campbell** (joshuacampbell@ufl.edu), James D. Ellis, Cory Stanley- Stahr, Jaret C. Daniels, and Cherice Smithers, Univ. of Florida, Gainesville, FL

11:15 **2527** Effects of lead contamination in sunflowers on pollinator behavior. **Frances S. Sivakoff** (sivakoff.3@ osu.edu) and Mary Gardiner, The Ohio State Univ., Wooster, OH

11:30 **2528** Burning love: The attraction of soil invertebrates occupying a burn chronosequence to macro and micronutrients. **Caitlin Maloney** (cemalon@bgsu.edu) and Shannon Pelini, Bowling Green State Univ., Bowling Green, OH

11:45 **2529** Effects of pine straw removal on arthropods in longleaf pine communities. **Samuel Buzuleciu** (sabuzule@ncsu.edu) and Clyde E. Sorenson, North Carolina State Univ., Raleigh, NC

12:00 **2530** The effects of elevational soil micronutrient variation on decomposer abundance and activity in a tropical forest. **Cari Ritzenthaler** (carir@bgsu.edu)1, Creighton Litton2, Christian Giardina3, and Shannon Pelini1, 1Bowling Green State Univ., Bowling Green, OH, 2Univ. of Hawai’i, Honolulu, HI, 3USDA - Forest Service, Hilo, HI

12:15 **2531** Use of color cues by bumble bees foraging for multiple floral rewards. **Daniel Papaj** (papaj@email. arizona.edu), Univ. of Arizona, Tucson, AZ

**Contributed Papers: Ecology and Population Dynamics: Interactions**

***Room W225 B (Convention Center)***

**Moderators:** K. Supriya1 and Sarah Bengston2, 1Univ. of Chicago, Chicago, IL, 2Univ. of Rochester, Rochester, NY

9:15 **2532** Competition between insectivorous ants and birds in eastern Himalayas. **K. Supriya** (ksupriya@ uchicago.edu), Univ. of Chicago, Chicago, IL

9:30 **2533** Mammalian “bad” breath is lifesaving for plant-dwelling insects. **Moshe Inbar** (minbar@research. haifa.ac.il), Univ. of Haifa, Haifa, Israel

9:45 **2534** Sexual conflict may hinder population growth through spatial sexual segregation due to counter- harassment behavior. **Kaori Tsurui** (tsuruikaori@gmail. com)1, Tsuyoshi Ohishi2, Norikuni Kumano3, Kiyohito Teruya2, Tetsuya Toyosato4, and Kazuki Tsuji1, 1Univ. of the Ryukyus, Nishihara, Japan, 2Okinawa Prefectural Plant Protection Center, Naha, Japan, 3Obihiro Univ. of Agriculture and Veterinary Medicine, Obihiro, Japan, 4Ryukyu-Sankei Co. Ltd., Tomigusuku, Japan

10:00 **2535** Biotic resistance to an invasive forest insect- fungus mutualism. Brian Thompson1, Jake Bodart2, and **Daniel S. Gruner** (dsgruner@umd.edu)3, 1Montana State Univ., Conrad, MT, 2Univ. of Arkansas, Fayetteville, AR, 3Univ. of Maryland, College Park, MD

**10:15 BREAK**

10:30 **2536** Predator-prey interactions among mites in open environment I: Learned oviposition site shift reduces offspring predation. **Hatsune Otsuki** (ootsuki. hatsune.44e@st.kyoto-u.ac.jp) and Shuichi Yano, Kyoto Univ., Kyoto, Japan

10:45 **2537** Predator-prey interactions among mites in open environment II: Further interactions between spider mite and predatory mite offspring. **Shuichi Yano** (yano@kais.kyoto-u.ac.jp) and Hatsune Otsuki, Kyoto Univ., Kyoto, Japan

11:00 **2538** Specificity and stability in an obligate, vertically transmitted symbiosis: An experimental analysis.  
**Jon Seal** (trachymyrmex@gmail.com), The Univ. of Texas, Tyler, TX

11:15 **2539** Patterns of floral resource use by the invasive Argentine ant, *Linepithema humile*, and a native ant, *Anoplolepis custodiens*, in a biodiversity hotspot. **Palesa Mothapo** (mothapo@sun.ac.za) and Theresa Wossler, Stellenbosch Univ., Stellenbosch, South Africa

11:30 **2540** Competition of the cotton bollworm (*Helicoverpa armigera*), corn earworm (*Helicoverpa zea*), and fall armyworm (*Spodoptera frugiperda*) on non-Bt corn. **José P. G. F. Silva** (jpgfdsilva@gmail.com)1, Edson Baldin1, Thomas Hunt2, and Silvana V. Paula-Moraes3, 1São Paulo State Univ., Botucatu, Brazil, 2Univ. of Nebraska, Concord, NE, 3Embrapa Cerrados, Planaltina, Brazil

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**WEDNESDAY**

**Wednesday, September 28 • MORNING •**

11:45 **2541** A new case of social parasitism in four western *Temnothorax* ant species and the implications for colony interactions. **Sarah Bengston** (sbengsto@gmail. com) and Christian Rabeling, Univ. of Rochester, Rochester, NY

12:00 **2542** Converging strategies in plant-manipulating insects: Insect-induced effects on plants and possible mechanisms used by leaf-miners to manipulate their host-plant. **David Giron** (david.giron@univ-tours.fr)1, Géraldine Dubreuil1, Mélanie Body2, Hui Zhang1, Franck Dedeine1, Graham Stone3, Carlos Lopez-Vaamonde4, and Elisabeth Huguet1, 1National Center for Scientific Research, Tours, France, 2Univ. of Missouri, Columbia, MO, 3Univ. of Edinburgh, Edinburgh, Scotland, 4INRA, Orléans, France

12:15 **2543** Trade-offs associated with investment in winged individuals by an *Aphis glycines* colony under strong predation. **Aldo Ríos Martínez** (aldorios@live. com) and Alejandro Costamagna, Univ. of Manitoba, Winnipeg, MB, Canada

12:30 **2544** Do native mites suppress invasive herbivores on eastern hemlock? **Elizabeth Whitney** (ewhitney@ uri.edu)1, Claire Wilson1, Robert Schaeffer2, and  
Evan L. Preisser1, 1Univ. of Rhode Island, Kingston, RI, 2Tufts Univ., Medford, MA

**Contributed Papers: Ecology of Pesticides, Re- sistance, Toxicology, and Genetically Modified Crops**

***West Hall F3 (WF3) (Convention Center)***

**Moderators:** Zunnu Akhtar1 and Jason Wulff2, 1Univ. of Agriculture, Faisalabad, Pakistan, 2Texas A&M Univ., College Station, TX

9:15 **2545** Optimum® LeptraTM insect protection and efficacy of its individual events in South America. **Herbert Eichenseer** (herb.eichenseer@pioneer.com)1, Paulo da Silva2, Vinicius de Faria2, Josemar Foresti2, Maria Celiz3, and Gerardo Rapetti4, 1DuPont Pioneer, Johnston, IA, 2DuPont do Brasil S.A., Planaltina, Brazil, 3DuPont Pioneer, Jesus Maria, Argentina, 4DuPont Pioneer, Pergamino, Argentina

9:30 **2546** Discovery of a two-component lepidopteran active protein family from plants. Jeffrey Sopa1, **Eric Schepers** (eric.j.schepers@cgr.dupont.com)2, Judson Flattum3, Kara Gredell3, Natalie Stoner3, Janet Rice3, Mark Nelson3, Nuria Jiménez Juárez3, Deborah Clark3, Jennifer Barry2, Keven Hayes2, James English4, Scott Diehn2, Nasser Yalpani2, and Lu Liu4, 1DuPont Crop Protection, Wilmington, DE, 2DuPont Pioneer, Johnston, IA, 3DuPont Pioneer, Wilmington, DE, 4DuPont Pioneer, Hayward, CA

9:45 **2547** Tier-based study of Bt rice revealed non-target effects on thrips. **Zunnu Akhtar** (zunnuraen@gmail. com), Univ. of Agriculture, Faisalabad, Pakistan

10:00 **2548** Elucidating the metabolic and target site mechanisms of phenylpyrazole resistance in the brown planthopper, *Nilaparvata lugens*. **William Garrood** (william.garrood@rothamsted.ac.uk)1, Christoph Zimmer2, Martin Williamson1, Ralf Nauen3, Chris Bass2, and

T. G. Emyr Davies1, 1Rothamsted Research, Harpenden,

United Kingdom, 2Univ. of Exeter, Penryn, United Kingdom, 3Bayer CropScience, Monheim, Germany

**10:15 BREAK**

10:30 **2549** Characterization of the TRP channel gene family in the brown planthopper (*Nilaparvata lugens*). **Cong-Fen Gao** (gaocongfen@njau.edu.cn), Shun-fan Wu, and Chun-Dong Niu, Nanjing Agricultural Univ., Nanjing, China

10:45 **2550** Genomic identification of variation and novel insecticide resistance genes in the field population of the brown planthopper, *Nilaparvata lugens*. **Rui Pang** (pr839@163.com), Sun Yat-sen Univ., Guangzhou, China

11:00 **2551** Direct effects of insecticides on plants: Soybean transcriptome responses to neonicotinoids and spider mites. **Jason Wulff** (j\_wulff@tamu.edu)1, Ada Szczepaniec2, Ricardo Ramirez3,  
Cecilia Tamborindeguy1, and Micky Eubanks1, 1Texas A&M Univ., College Station, TX, 2Texas A&M Univ., Amarillo, TX, 3Utah State Univ., Logan, UT

11:15 **2552** Effects of different seed treatment formulations on the drift generated through Heubach meter from the seeds of cotton. **Hayder Abdelgader** (abdelgaderh@ yahoo.com), Agricultural Research Corporation,

Wad Madani, Sudan

11:30 **2553** Documenting reductions in pesticide risk: Two decades of change in lettuce pest management. **Al Fournier** (founier@cals.arizona.edu)1, Paul Jepson2, Michael Guzy2, Wayne Dixon1, John Palumbo3, and Peter Ellsworth1, 1Univ. of Arizona, Maricopa, AZ, 2Oregon State Univ., Corvallis, OR, 3Univ. of Arizona, Yuma, AZ

11:45 **2554** Sublethal effects of some insecticides on life table parameters of *Tuta absoluta* (Lepidoptera: Gelechiidae). **Mir Jalil Hejazi** (mjhejazi@tabrizu.ac.ir), Zahra Nozad-Bonab, and Shahzad Iranipour, Univ. of Tabriz, Tabriz, Iran

12:00 **2555** Insecticide resistance and resistance monitoring with the American serpentine leafminer, *Liriomyza trifolii* (Diptera: Agromyzidae).  
**J. Scott Ferguson** (scott@atoconsult.com), Atlantic Turf & Ornamental Consulting, Vero Beach, FL

12:15 **2556** Resistance to six insecticides in populations of diamondback moth, *Plutella xylostella* (Lepidoptera: Plutellidae), in Thailand. **Suprada Sukonthabhirom na Pattalung** (bsuprada@gmail.com) and

Somsak Siripontangmun, Plant Protection Research and Development Office, Bangkok, Thailand

**Contributed Papers: Insect Chemical Ecology: Attractants**

***Room W314 B (Convention Center)***

**Moderators:** Aijun Zhang1 and Juan Cibrian2, 1USDA - ARS, Beltsville, MD, 2Colegio de Postgraduados, Montecillo, Mexico

9:15 **2557** The advantages of semiochemical-based attract and kill techniques in insect pest management. **Kavita Sharma** (kavita.sharma@iscatech.com)1, Marcos Botton2, Rafael Borges3, Ruben Machota Jr.4, Jesse Saroli1, Jonathan Rico1, Rodrigo Oliveira da Silva1,

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**WEDNESDAY**

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Carmem Bernardi1, William Urrutia1, Leandro Ernesto Jost Mafra5, and Agenor Mafra-Neto1, 1ISCA Technologies, Inc., Riverside, CA, 2Embrapa Grape and Wine,  
Bento Goncalves, Brazil, 3ISCA Technologies Ltda., Ijui, Brazil, 4Federal Univ. of Pelotas, Pelotas, Brazil, 5ISCA Technologies Ltda., Vacaria, Brazil

9:30 **2558** The advantages of semiochemical-based attract and kill techniques in insect pest management: agricultural case studies. Rodrigo Oliveira da Silva1, **William Urrutia** (william.urrutia@iscatech.com)1,  
Josh Ponce1, Carmem Bernardi1, Marcos Botton2,  
Rafael Borges3, Ruben Machota Jr4, Jonathan Rico1, Jesse Saroli1, Kavita Sharma1, Leandro Ernesto Jost Mafra5,

and Agenor Mafra-Neto1, 1ISCA Technologies, Inc., Riverside, CA, 2Embrapa Grape and Wine, Bento Goncalves, Brazil, 3ISCA Technologies Ltda., Ijui, Brazil, 4Federal Univ. of Pelotas, Pelotas, Brazil, 5ISCA Technologies Ltda., Vacaria, Brazil

9:45 **2559** Pyrophilous insects attracted by infrared  
traps. **Thi Phuong Hoang** (phuongnfs@gmail.com) and Stefan Schütz, Georg August Univ., Göttingen, Germany

10:00 **2560** Attraction of the common bed bug (*Cimex lectularius*) to their defensive secretions.  
**Mark F. Feldlaufer** (mark.feldlaufer@ars.usda.gov)1, Kevin Ulrich2, and Matthew Kramer1, 1USDA - ARS, Beltsville, MD, 2Univ. of Maryland, College Park, MD

**10:15 BREAK**

10:30 **2561** Evaluation of food attractants and methyl eugenol for mass trapping of *Bactrocera invadens* on bush mango in Ibadan, southwest Nigeria. **Juliana Ugwu** (amakajul01@yahoo.com)1, Adebayo Omoloye2, and Akindele Ogunfunmilayo3, 1Forestry Research Institute of Nigeria, Ibadan, Nigeria, 2Univ. of Ibadan, Ibadan, Nigeria, 3Nigeria Agricultural Quarantine Services, Ibadan, Nigeria

10:45 **2562** Olfactory responses of African rice gall midge (*Orseolaia oryzivora*) Harris and Gagné (Diptera: Cecidomyiiae) females to host plant volatiles. **Emmanuel Ogah** (emmamarg2005@yahoo.com)1,2, Toby Bruce2, Lesley Smart2, Christine Woodcock2,  
John Caulfield2, Michael Birkett2, John Pickett2, and Francis Nwilene3, 1Ebonyi State Univ., Abakaliki, Nigeria, 2Rothamsted Research, Harpenden, United Kingdom, 3African Rice Center, Ibadan, Nigeria

11:00 **2563** Isolation and identification of sexual pheromone of *Hypsipyla grandella* (Lepidoptera: Pyralidae). **Juan Cibrian** (jcibrian@colpos.mx) and Jose Pineda, Graduate College, Montecillo, Mexico

11:15 **2564** Attractive blend for spotted wing drosophila, *Drosophila suzukii* (Matsumura). **Aijun Zhang** (aijun. zhang@ars.usda.gov), Yan Feng, Robert Bruton, and Alexis Park, USDA - ARS, Beltsville, MD

11:30 **2565** Synergistic / additive interactions among components of food-based baits underlie female attraction in three invasive fruit fly species.  
**Jaime Pinero** (pineroj@lincolnu.edu)1, Steven Souder2, Trevor Smith3, Abbie Fox4, and Roger Vargas2, 1Lincoln Univ., Jefferson City, MO, 2USDA - ARS, Hilo, HI, 3Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, 4USDA - APHIS, Palmetto, FL

11:45 **2566** Presentation withdrawn

12:00 **2567** Identification and field evaluation of peach  
and pear volatiles attractive to the Oriental fruit moth, *Grapholita molesta.* **Pengfei Lu** (lpengfei224@126. com)1, Haili Qiao2,3, and You-Qing Luo1, 1Beijing Forestry Univ., Beijing, China, 2Chinese Academy of Medical Sciences, Beijing, China, 3Peking Union Medical College, Beijing, China

12:15 **2568** SPME sampling studies on date palm (*Phoenix dactylifera*) and red palm weevil (*Rhynchophorus ferrugineus*). **Paraj Shukla** (parajshukla@gmail.com)1, Asma Al-Nujiban2,  
M. M. Abdel-Azim1, Ahmed Badjah-Hadj-Ahmed1, and Saleh A. Aldosari1, 1King Saud Univ., Riyadh, Saudi Arabia, 2Qassim Univ., Qassim, Saudi Arabia

12:30 **2569** Host orientation of *Trissolcus japonicus* (Hymenoptera: Scelionidae) by using the volatile chemicals emitted from *Halymorpha halys* (Stål) (Hemiptera: Pentatomidae). **Jinping Zhang** (j.zhang@ cabi.org)1, Yongzhi Zhong2, Guo-Hua Chen2, Tim Haye3, and Feng Zhang4, 1CABI, Beijing, China, 2Yunnan Agricultural Univ., Kunming, China, 3CABI, Delémont, Switzerland, 4Chinese Academy of Agricultural Sciences, Beijing, China

**Contributed Papers: Integrated Pest Management and Sustainable Agriculture: Biological Pest Management**

***Room W231 B (Convention Center)***

**Moderators:** Abiola Oke1 and Sean Coyle2, 1National Horticultural Research Institute, Ibadan, Nigeria, 2Texas A&M AgriLife Research, Lubbock, TX

9:15 **2570** Evaluation of insecticidal properties of some bio-extracts and a bio-agent performance on aphid (*Sitobion avenae* F.) (Hemiptera: Aphididae) incidence on wheat (*Triticum aestivum* L.) crop. **Muhammad Ali** (ali.klasra@gmail.com)1, Muhammad Ashfaq1, Naureen Rana2, Syed Muhammad Zakria1, and Azhar-uddin- Bahtti1, 1Univ. of the Punjab, Lahore, Pakistan, 2Univ. of Agriculture, Faisalabad, Pakistan

9:30 **2571** Economic and ecological benefits of botanical pesticides for control of insect pests on common beans (*Phaseolus vulgaris* L.). **Prisila Mkenda** (mayoprisca@ gmail.com)1, Patrick Ndakidemi2, Philip Stevenson3, and Steven Belmain3, 1Sokoine Univ. of Agriculture, Arusha, Tanzania, 2Nelson Mandela African Institution of Science and Technology, Arusha, Tanzania, 3Univ. of Greenwich, Chatham, United Kingdom

9:45 **2572** Efficacy of *Moringa oleifera* root oil extract as a seed protectant against *Callosobruchus maculatus* (F.) (Coleoptera: Chrysomelidae) on cowpea. **Mary Adewole** (modupeadewole75@gmail.com)1, Olajumoke Alabi1, and Oluwafemi Pitan2, 1Univ. of Ibadan, Ibadan, Nigeria, 2Federal Univ. of Agriculture, Abeokuta, Nigeria

10:00 **2573** Value of lady beetles in sugarcane aphid management on Texas High Plains sorghum.  
**Sean Coyle** (sean.coyle@ag.tamu.edu), Abdul Hakeem, and Megha Parajulee, Texas A&M AgriLife Research, Lubbock, TX

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**WEDNESDAY**

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**10:15 BREAK**

10:30 **2574** Effects of natural enemies and alate  
immigration on soybean aphid population dynamics. **Alejandro Costamagna** (ale.costamagna@umanitoba.ca)1, Jordan Bannerman1, Nicola Koper1, Brian McCornack2, and David W. Ragsdale3, 1Univ. of Manitoba, Winnipeg, MB, Canada, 2Kansas State Univ., Manhattan, KS, 3Texas A&M Univ., College Station, TX

10:45 **2575** Host plant effects: Parasitism success of *Peristenus digoneutis* on lygus bugs in canola and alfalfa. **Diana Fernández** (dianac0994@gmail.com)1, Héctor A. Cárcamo2, and Robert Laird1, 1Univ. of Lethbridge, Lethbridge, AB, Canada, 2Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

11:00 **2576** Effect of haying regime on beneficial arthropods in prairie hay. **Wayne Ohnesorg** (wohnesorg2@unl.edu)1, Robert Wright2, and Thomas Hunt3, 1Univ. of Nebraska, Norfolk, NE, 2Univ. of Nebraska, Lincoln, NE, 3Univ. of Nebraska, Concord, NE

11:15 **2577** Using *Typha angustifolia* pollen to build a standing army of the zoophytophagous predatory mite *Euseius gallicus* in protected ornamentals. **Juliette Pijnakker** (juliette.pijnakker@biobestgroup. com)1, Amandine De Souza2, Diana Overgaag1,

Yves Arijs3, and Felix Wackers3, 1Biobest, De Lier, Netherlands, 2Biobest, Orange, France, 3Biobest, Westerlo, Belgium

11:30 **2578** Detection of *Apanteles* spp. (Hymenoptera: Braconidae) larval parasitoid of tomato leafminer,  
*Tuta absoluta* (Lepidoptera: Gelechiidae), on greenhouse tomato in Abeokuta, Ogun State, Nigeria. **Abiola Oke** (oke2abiola@yahoo.com)1, Rauf Kolawole2, Oladapo Ogunremi3, Olufemi Akinsola3, and Solape Awe3, 1National Horticultural Research Institute, Ibadan, Nigeria, 2Dizengoff Nigeria Limited, Lagos, Nigeria, 3Ogun State Agricultural Development Program, Abeokuta, Nigeria

11:45 **2579** Evaluation of *Sl*NPV as an effective tool in management of *Spodoptera litura* (Fab.) in cabbage crop. **Tulsi Bhardwaj** (tbhardwaj2003@yahoo.com), Indian Agricultural Research Institute, New Delhi, India

12:00 **2580** Consequences of bacterial inoculation on the ovipositional behavior and development of Japanese beetle (*Popillia japonica*) in bermudagrass. **R. Murphey Coy** (rmc0023@tigermail.auburn.edu), David Held, and Joseph Kloepper, Auburn Univ., Auburn, AL

12:15 **2581** An assessment of juvenomimic activity of *Catharanthus roseus* on growth and development of *Dysdercus koenigii*. **Sunil Kayesth** (kayesth@yahoo. co.in) and Kamal Gupta, Univ. of Delhi, New Delhi, India

**Contributed Papers: Invasive and Exotic Entomology: Geography and Biology**

***Room W223 B (Convention Center)***

**Moderators:** Stephen Taerum1 and Rebecca Hallett2, 1Forestry and Agricultural Biotechnology Institute, Pretoria, South Africa, 2Univ. of Guelph, Guelph, ON, Canada

9:15 **2582** Risk of introduction, establishment, and spread of exotic insect and mite pests on imported apples in Nepal. **Samudra Joshi** (samudralaljoshi@hotmail.com), Lalitpur, Nepal

9:30 **2583** New exotic insect pests on California ficus trees. **Gevork Arakelian** (garakelian@acwm.lacounty. gov), Los Angeles County Dept. of Agricultural Commissioner/Weights & Measures, South Gate, CA

9:45 **2584** Cotton mealybug, *Phenacoccus solenopsis* Tinsley: An emerging threat to cotton production in the Sudan. **Hassan Kannan** (hkannan\_4@hotmail.com), Agricultural Research Corporation, Wad Madani, Sudan

10:00 **2585** Global risk of the invasive soybean aphid, *Aphis glycines*. **Rebecca Hallett** (rhallett@uoguelph. ca)1, Ross Weiss2, Owen Olfert2, and Darren Kriticos3, 1Univ. of Guelph, Guelph, ON, Canada, 2Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, 3CSIRO, Canberra, Australia

**10:15 BREAK**

10:30 **2586** Invasion of *Bactrocera dorsalis* (Hendel) (Diptera: Tephritidae): Population structure and invasion routes for southern Africa. **Minette Karsten** (minettek@sun.ac.za)1, Pia Addison1, and Aruna Manrakhan2, 1Stellenbosch Univ., Stellenbosch, South Africa, 2Citrus Research International, Nelspruit, South Africa

10:45 **2587** Assessment of the population of invader fly *Bactrocera invadens* Drew, Tsuruta and White (Diptera: Tephritidae) on mango and guava using methyl eugenol as an attractant. **Elechi Asawalam** (elechiasw@yahoo. com), Henry Ezenna, and Angelica Umunnakwe, Michael Okpara Univ. of Agriculture, Umuahia, Nigeria

11:00 **2588** Range overlap between highly invasive, cosmopolitan ant species: Identifying regions at risk. **Matthew Boot** (matthewrboot@gmail.com) and Corrie Moreau, The Field Museum of Natural History, Chicago, IL

11:15 **2589** Why is the invasive brown spruce longhorn beetle (*Tetropium fuscum*) spreading so slowly in North America? **Stephen Heard** (stephen.heard@unb. ca)1, Jennifer Anderson1, Kenneth Dearborn1,

Allyson Heustis1, Deepa S. Pureswaran2, and Jon Sweeney3, 1Univ. of New Brunswick, Fredericton, NB, Canada, 2Natural Resources Canada, Québec City, QC, Canada, 3Natural Resources Canada, Fredericton, NB, Canada

11:30 **2590** Untangling the movement patterns of the red turpentine beetle (*Dendroctonus valens*) and its fungal symbiont, *Leptographium procerum*. **Stephen Taerum** (stephen.taerum@fabi.up.ac.za)1, Z. de Beer1, and Michael Wingfield2, 1Forestry and Agricultural Biotechnology Institute, Pretoria, South Africa, 2Univ. of Pretoria, Pretoria, South Africa

**2591** Biology of *Palmelampius heinrichi* O’Brien, 2000 (Curculionidae), a new invasive species of the humid tropics of Colombia causing fruit-fall of peach palm, *Bactris gasipaes*. **Heinrich Lehmann-Danzinger** (hlehman@uni-goettingen.de)1, María Elena Burbano Torres2, and Rainer Daxl1, 1Univ. of Göttingen, Göttingen, Germany, 2Univ. of Valle, Cali, Colombia

12:00 **2592** Vertical transfer of nematodes associated with alates of *Coptotermes formosanus* and *Coptotermes gestroi* (Isoptera: Rhinotermitidae). Nan-Yao Su1, and **Jeremiah Foley** (folejr@ufl.edu)1,2, 1Univ. of Florida, Davie, FL, 2USDA - ARS, Ft. Lauderdale, FL

**Contributed Papers: Medical and Veterinary Entomology: Flies of Veterinary Importance**

***West Hall F4 (WF4) (Convention Center)***

**Moderators:** Sonja L. Swiger1, Tatiana Torres2, and Thomas Spranghers3, 1Texas A&M Univ., Stephenville, TX, 2Univ. of São Paulo, São Paulo, Brazil, 3Ghent Univ., Ghent, Belgium

9:15 **2593** Efficacy of PT® Alpine® Pressurized Fly Bait (BASF) on house flies. **Sonja L. Swiger** (slswiger@ ag.tamu.edu)1, Samantha Hays2, and Ashley Mata3, 1Texas A&M Univ., Stephenville, TX, 2Texas A&M Univ., College Station, TX, 3Tarleton State Univ., Stephenville, TX

9:30 **2594** Presentation withdrawn

9:45 **2595** Evolution of feeding preferences in Oestroidea (Diptera: Calyptratae). **Tatiana Torres** (tttorres@ib.usp. br), Gisele Cardoso, Raquel Monfardini, and  
Marina Deszo, Univ. of São Paulo, São Paulo, Brazil

10:00 **2596** The potential for biting flies to mechanically transmit blood-borne viruses causing livestock disease. **Jo Stoner** (jo.stoner@pirbright.ac.uk), Laura Tugwell, Jennifer Eyre, and Anthony Wilson, The Pirbright Institute, Woking, United Kingdom

**10:15 BREAK**

10:30 **2597** Antennal lobe morphology of the stable fly (*Stomoxys calcitrans*) and the horn fly (*Haematobia irritans*). **Pia Olafson** (pia.olafson@ars.usda.gov)1 and Lígia Borges2, 1USDA - ARS, Kerrville, TX, 2Federal Univ. of Goias, Goiânia, Brazil

10:45 **2598** Modelling with Impact: developing insect population models to improve control in partnership with industry and policy. **Anthony Wilson** (anthony. wilson@pirbright.ac.uk)1, Neil Morrison2, David Windsor3, Paulo Cancado4, and Tim Lysyk5, 1The Pirbright Institute, Woking, United Kingdom, 2Oxitec Ltd., Abingdon, United Kingdom, 3Dept. of Agriculture and Food, Bunbury, Australia, 4Embrapa Beef Cattle, Campo Grande, Brazil, 5Lethbridge, AB, Canada

11:00 **2599** Insect protein fractionation. **Catriona Lakemond** (catriona.lakemond@wur.nl), Wageningen Univ. and Research Centre, Wageningen, Netherlands

11:15 **2600** Black soldier fly (*Hermetia illucens*) prepupae as a potential feedstuff for piglets. **Thomas Spranghers** (thomas.spranghers@ugent.be), Joris Michiels, Mia Eeckhout, Patrick De Clercq, and Stefaan De Smet, Ghent Univ., Ghent, Belgium

11:30 **2601** Horizontal and vertical distribution of face fly larvae (*Musca autumnalis*) in response to temperature and moisture gradients in dung pats. **Fallon Fowler** (fefowler@ncsu.edu), Morgan Malone, and Wes Watson, North Carolina State Univ., Raleigh, NC

11:45 **2602** Comparison of geometric morphometric markers between South Africa, southern Mozambique, and Swaziland tsetse populations. **Chantel de Beer** (debeerc@arc.agric.za)1, Gert Venter1, and  
Marc J.B. Vreysen2, 1Agricultural Research Council, Onderstepoort, South Africa, 2International Atomic Energy Agency, Vienna, Austria

12:00 **2603** Insects, a sustainable source of animal protein? **Dennis Oonincx** (dennisoonincx@gmail.com) and Arnold van Huis, Wageningen Univ. and Research Centre, Wageningen, Netherlands

12:15 **2604** Evaluation of insecticidal properties of plant essential oils against *Musca domestica* L. **Rashmi Morey** (moreyrashmi@gmail.com), Arts, Commerce and Science College, Pune, India

**Contributed Papers: Medical and Veterinary Entomology: Ticks I**

***West Hall F1 (WF1) (Convention Center)***

**Moderators:** Lance Durden1, Dmitry Apanaskevich1, and Kirby Stafford III2, 1Georgia Southern Univ., Statesboro, GA, 2Connecticut Agricultural Experiment Station, New Haven, CT

9:15 **2605** Systematics of the *Dermacentor* ticks (Acari: Ixodidae). **Dmitry Apanaskevich** (dapanaskevich@ georgiasouthern.edu) and Maria Apanaskevich, Georgia Southern Univ., Statesboro, GA

9:30 **2606** Temporal and spatial variation in abundance  
of *Dermacentor andersoni* and *Dermacentor variabilis* in western Canada. **Shaun Dergousoff** (shaun.dergousoff@ agr.gc.ca)1, Neil Chilton2, Kateryn Rochon3, and

Tim Lysyk4, 1Lethbridge Research and Development Centre, Lethbridge, AB, Canada, 2Univ. of Saskatchewan, Saskatoon, SK, Canada, 3Univ. of Manitoba, Winnipeg, MB, Canada, 4Lethbridge, AB, Canada

9:45 **2607** Phenology and ecology of tick species parasitic on cattle and wildlife in Oklahoma. **Trisha Dubie** (trishd@okstate.edu), Bruce Noden, and Justin Talley, Oklahoma State Univ., Stillwater, OK

10:00 **2608** Ticks (Acari: Ixodidae) parasitizing dogs, cats, humans, and some wild vertebrates in Alaska: Invasion potential. **Lance Durden** (ldurden@georgiasouthern. edu)1, Kimberlee Beckmen2, and Robert Gerlach3, 1Georgia Southern Univ., Statesboro, GA, 2Alaska Dept. of Fish and Game, Fairbanks, AK, 3Alaska Dept. of Environmental Conservation, Anchorage, AK

**10:15 BREAK**

10:30 **2609** The infection landscape captured in nymphal ticks from a coastal county in the US northeast. **Andrea Egizi** (andrea.egizi@co.monmouth.nj.us) and Robert Jordan, Monmouth County Mosquito Control Division, Tinton Falls, NJ

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**WEDNESDAY**

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10:45 **2610** Biotic and abiotic factors affecting blacklegged tick (*Ixodes scapularis*) distribution and tick-borne disease prevalence in Onondaga County, New York. **Nicholas Piedmonte** (nppiedmo@syr.edu)1,

Melissa Prusinski2, H. Brian Underwood1, Stephen Shaw1, and Melissa K. Fierke1, 1State Univ. of New York, Syracuse, NY, 2New York State Dept. of Health, Albany, NY

11:00 **2611** *Ixodes* ticks, birds, and tick-borne diseases: The European terrestrial cycle. **Dieter Heylen** (dieter.heylen@ uantwerpen.be), Univ. of Antwerpen, Antwerpen, Belgium

11:15 **2612** Biology of the tropical and temperate lineages of *Rhipicephalus sanguineus* sensu lato (Acari: Ixodidae) under different laboratory conditions. **Marcelo Labruna** (labruna@usp.br), Monize Gerardi, Felipe Krawczak, and Jonas Moraes-Filho, Univ. of São Paulo, São Paulo, Brazil

11:30 **2613** Integrated tick management of the blacklegged tick to reduce the risk of Lyme disease. **Kirby C. Stafford III** (kirby.stafford@ct.gov), Scott Williams, and  
Goudarz Molaei, Connecticut Agricultural Experiment Station, New Haven, CT

11:45 **2614** *Theileria equi* detection in *Hyalomma anatolicum anatolicum* along with ticks identifying features by scanning electron microscopy from  
Punjab province, India. **Deepak Sumbria** (deepak\_ sumbria@yahoo.com), L. Singla, and Amrita Sharma, Guru Angad Dev Veterinary and Animal Sciences Univ., Ludhiana, India

12:00 **2615** Current insights into hemoglobin digestion in blood feeding ticks using *Ixodes ricinus* as a model organism. **Daniel Sojka** (sojkadan@gmail.com), Czech Academy of Sciences, České Budějovice, Czech Republic

12:15 **2616** Risk of encountering ticks and tick-borne pathogens within a rapidly growing metropolitan area in the United States southern Great Plains. **Bruce Noden** (bruce.noden@okstate.edu), Scott Loss, Courtney Maichak, and Faithful Williams, Oklahoma State Univ., Stillwater, OK

**Contributed Papers: Physiology and Biochemistry: Fundamental**

***Room W315 A (Convention Center)***

**Moderators:** S. Priya Rajarapu1 and Lacy D. Chick2, 1Purdue Univ., West Lafayette, IN, 2Univ. of Tennessee, Knoxville, TN

9:15 **2617** Field evaluation of 5% EGX-101 in spray formulation (Bio-D: Bedbug Control) to control tropical bed bug, *Cimex hemipterus*, infestation. **Saiful Azlan Nordin** (saifulazlan87@gmail.com) and Hidayatulfathi Othman, National Univ. of Malaysia, Kuala Lumpur, Malaysia

9:30 **2618** Cuticular proteins in *Anopheles gambiae*: Their deployment in different structures and involvement in chitin-binding and sclerotization. **Judy Willis** (jhwillis@uga.edu), Laura Vannini, Yihong Zhou, Majors Badgett, John Bowen, and Ron Orlando, Univ. of Georgia, Athens, GA

9:45 **2619** Effect of sub-sterilizing ionizing radiation on oxidative stress and DNA damage in irradiated tropical pest *Spodoptera litura* (Fabr.) and its F1 progeny. **Zubeda Khan** (zubeda729@yahoo.in) and Rakesh Kumar Seth, Univ. of Delhi, New Delhi, India

10:00 **2620** Can the silkworm (*Bombyx mori*) be used as a human disease model? **Hiroko Tabunoki** (h\_tabuno@ cc.tuat.ac.jp)1, Katsuhiko Ito1, Hidemasa Bono2, and Takeshi Yokoyama1, 1Tokyo Univ. of Agriculture and Technology, Fuchu, Japan, 2Research Organization of Information and Systems, Shizuoka, Japan

**10:15 BREAK**

10:30 **2621** Photo-enzymatic repair of CPD and potential effect of nucleotide excision repair for 6-4PP decreasing in the twospotted mite, *Tetranychus urticae*. **Yasumasa Murata** (murata.yasumasa.22e@ st.kyoto-u.ac.jp) and Masahiro Osakabe, Kyoto Univ., Kyoto, Japan

10:45 **2622** Ecology and evolutionary history shape the thermal niche. **Lacy D. Chick** (lacy.chick@case.edu)1, Andrew Nguyen2, Clint Penick3, Rob R. Dunn3, Nathan J. Sanders4, and Sarah Diamond1, 1Case Western Reserve Univ., Cleveland, OH, 2Univ. of Vermont, Burlington, VT, 3North Carolina State Univ., Raleigh, NC, 4Univ. of Copenhagen, Copenhagen, Denmark

11:00 **2623** Fine structure of the hoverfly, *Episyrphus balteatus* De Geer (Diptera: Syrphidae). Sheng-Jie Zhang, Fan Fan, Xiaofan Yang, and **Guoshu Wei** (weiguoshu03@ aliyun.com), Agricultural Univ. of Hebei, Baoding, China

11:15 **2624** Recombinant expression, purification, and chitin binding specificity of different CPAP3s from *Bombyx mori*. **Mingbo Qu** (mingboqu@dlut.edu.cn), Yuezhou Ren, and Qing Yang, Dalian Univ. of Technology, Dalian, China

11:30 **2625** Crystal structure and inhibitor discovery of insect group I chitinase from *Ostrinia furnacalis*. **Tian Liu** (tianliu@dlut.edu.cn), Lei Chen, Yong Zhou, and Qing Yang, Dalian Univ. of Technology, Dalian, China

11:45 **2626** Structural characterization of type-II farnesyl diphosphate synthase from the spruce budworm, *Choristoneura fumiferana*. **Marie-Ève Picard** (marie-eve.picard.8@ulaval.ca)1,2, Aline Barbar1, Audrey Nisole3, Catherine Béliveau3, Stephanie Sen4, Rong Shi1,2, and Michel Cusson1,3, 1Univ. Laval, Québec City, QC, Canada, 2PROTEO et IBIS, Quebec City, QC, Canada, 3Natural Resources Canada, Québec City, QC, Canada, 4The College of New Jersey, Ewing, NJ

12:00 **2627** Vibration enhances vision-dependent antennal response against approaching conspecifics in the Japanese pine sawyer beetle, *Monochamus alternatus* (Coleoptera: Cerambycidae). **Midori Fukaya** (viridisetviridis@gmail.com)1 and Takuma Takanashi2, 1Nihon Univ., Fujisawa, Japan, 2Forestry and Forest Products Research Institute, Tsukuba, Japan

12:15 **2628** Exploiting the termite digestome for biofuel production. **S. Priya Rajarapu** (prajarapu@purdue.edu), Peter Dunn, and Michael Scharf, Purdue Univ., West Lafayette, IN

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**WEDNESDAY**

**Wednesday, September 28 • MORNING •**

12:30 **2629** Effects of caloric restriction on immune responses against *Staphylocuccus aureus* in silkworm, *Bombyx mori*. **Peng Lyu** (lvpeng\_zj@hotmail.com),  
Ye Pan, and Keping Chen, Jiangsu Univ., Zhenjiang, China

**Contributed Papers: Physiology and Biochemistry: Molecular, Genetics, and Genomics**

***Room W315 B (Convention Center)***

**Moderators:** Sima Jonusaite1 and Lili Huang2, 1York Univ., Toronto, ON, Canada, 2Jiangxi Entry-Exit Inspection and Quarantine Bureau, Nanchang, China

9:15 **2630** Inheritance of critical daylength among different geographic population in the Asian corn borer, *Ostrinia furnacalis*. **Lili Huang** (121120328@ qq.com)1, Chao Chen2, and Fangsen Xue2, 1Jiangxi Entry-Exit Inspection and Quarantine Bureau, Nanchang, China, 2Jiangxi Agricultural Univ., Nanchang, China

9:30 **2631** Real-time PCR assay for the identification of *Thrips palmi* Karny in Thailand. **Charuwat Taekul** (charuwatt@gmail.com), Ittipon Bannakan,  
Rungnapha Thongkreng, and Nuttima Kositcharoenkul, Dept. of Agriculture, Bangkok, Thailand

9:45 **2632** Putative ammonia transporter expression in anal papillae of *Aedes aegypti* and response to high environmental ammonia. **Andrew Donini** (adonini@ yorku.ca), Helen Chasiotis, Lidiya Misyura, Phuong Bui, and Adrian Ionescu, York Univ., Toronto, ON, Canada

10:00 **2633** Characterization of the role of occluding septate junctions in the maintenance of salt and water balance in larval mosquito (*Aedes aegypti*). **Sima Jonusaite** (artks@yorku.ca), Scott P. Kelly, and Andrew Donini, York Univ., Toronto, ON, Canada

**10:15 BREAK**

10:30 **2634** Physiological constraints of coping with energetic stress in the eusocial honey bee. **Christopher Mayack** (cmayack@gmail.com)1,2,  
Frank Hirche2, Ying Wang3, Gabriele I. Stangl2, and  
Gro V. Amdam3, 1Swarthmore College, Swarthmore, PA, 2Martin Luther Univ., Halle, Germany, 3Arizona State Univ., Tempe, AZ

10:45 **2635** Transcriptional patterns underlying nutrition- stress interactions in the polyphagous agricultural pest *Helicoverpa zea*: How can diet modulate responses to Bt toxin and the entomopathenogenic fungus *Beauveria bassiana*? **Carrie Deans** (cadeans@tamu. edu)1, Spencer T. Behmer2, Patricia Tamez Guerra3, Heiko Vogel4, and Gregory Sword2, 1Univ. of Minnesota, St. Paul, MN, 2Texas A&M Univ., College Station, TX, 3Autonomous Univ. of Nuevo León, Nuevo Leon, Mexico, 4Max Planck Institute for Chemical Ecology, Jena, Germany

11:00 **2636** Function and crystal structure of a *Bombyx mori* Omega-class glutathione transferase.  
**Kohji Yamamoto** (yamamok@agr.kyushu-u.ac.jp), Kyushu Univ., Fukuoka, Japan

11:15 **2637** Phytosterol metabolism in the generalist caterpillar *Helicoverpa armigera*. **Xiangfeng Jing** (jxf\_zb@sina.cn) and Jincheng Zheng, Northwest A&F Univ., Yangling, China

11:30 **2638** Identification of the main venom proteins of cotton mealybug parasitoid *Aenasius bambawalei* Hayat by RNA-Seq analysis. **Hoor Shaina** (shaina1463@gmail.com)1, Zain Ul Abdin1, Bruce Webb2, and Atif Manzoor1, 1Univ. of Agriculture, Faisalabad, Pakistan, 2Univ. of Kentucky, Lexington, KY

11:45 **2639** Identification and expression profiles of sex-specific *doublesex* transcripts in the non- holometabolous scale insects (Hemiptera: Coccomorpha). **Isabelle M. Vea** (isabelle.vea@gmail.com)1,

Sumika Yonei1, Takahiro Shiotsuki2, Akiya Joraku2, Teruyuki Niimi3, and Chieka Minakuchi1, 1Nagoya Univ., Nagoya, Japan, 2National Institute of Agrobiological Sciences, Tsukuba, Japan, 3National Institute for Basic Biology, Okazaki, Japan

12:00 **2640** Molecular and physiological studies of the host regulation factor of endoparasitoid *Aenasius bambawalei* Hayat (Hymenoptera: Encyrtidae).  
**Zain Ul Abdin** (zainunibas@gmail.com), Hoor Shaina, Saqi Kosar Abbas, and Atif Manzoor, Univ. of Agriculture, Faisalabad, Pakistan

12:15 **2641** Biochemical profiling of recombinantly expressed cytochrome P450 ́s of *Apis mellifera* (Hymenoptera: Apidae). **Marion Zaworra** (marion.zaworra@ bayer.com)1,2, Bettina Lueke2, and Ralf Nauen2, 1Univ. of Bonn, Bonn, Germany, 2Bayer CropScience, Monheim, Germany

12:30 **2642** Transcriptome-based proteome analysis to identify peptides and proteins involved in immunity and reproduction from male accessory glands and ejaculatory duct of *Bactrocera dorsalis*. **Dong Wei** (dong\_wei1988@yahoo.com)1, Hui-Min Li1,  
Chuan-Bei Tian1, Guy Smagghe2, Fu-Xian Jia1, Wei Dou1, and Jin-Jun Wang1, 1Southwest Univ., Chongqing, China, 2Ghent Univ., Ghent, Belgium

12:45 **2643** Identification of a strong promoter in cultured cells of *Polypedilum vanderplanki* as a tool to reveal molecular background underlying anhydrobiosis. **Yoichiro Sogame** (sogame@affrc.go.jp)1, Jun Okada1, Shingo Kikuta2, Ruslan Deviatiiarov3, Richard Cornette1, Oleg Gusev4, and Takahiro Kikawada1, 1National Institute of Agrobiological Sciences, Tsukuba, Japan, 2Tokyo Univ. of Agriculture and Technology, Koganei, Japan, 3Kazan Federal Univ., Kazan, Russia, 4RIKEN, Yokohama, Japan

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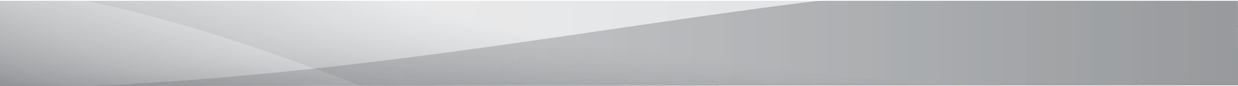


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**WEDNESDAY**

**Wednesday, September 28 • MORNING •**

**Contributed Papers: Stored Products Entomology: Fumigants and Hypoxia**

***West Hall F2 (WF2) (Convention Center)***

**Moderators:** Vaclav Stejskal1, Muhammad Afzal2, and  
Ellen Thoms3, 1Crop Research Institute, Prague, Czech Republic, 2Quaid-i-Azam Univ., Islamabad, Pakistan, 3Douglas Products, Gainesville, FL

9:15 **2644** Commercial fumigant fitness and bio-pesticide potential against resistant strains of quarantine insect pests. **Muhammad Afzal** (chafzal64@yahoo.com)1, Abdul Khaliq1, Muhammad Irfan Ullah1, Muhammad Ahmad1, Muhammad Saqib1, and Akhlaq Ahmad2, 1Univ. of Sargodha, Sargodha, Pakistan, 2Pakistan Agricultural Research Council, Karachi, Pakistan

9:30 **2645** Chemical composition of *Phyllantus fraternus* from Nigeria: A potential source of biofumigants. **Jacobs Mobolade Adesina** (mobolade72@gmail.com)1, Yallappa Rajashekar2, Tonsing Nghailun3, and Anjanappa Raghavendra4, 1Rufus Giwa Polytechnic, Owo, Nigeria, 2Institute of Bioresources & Sustainable Development, Imphal, India, 3Institute of Bioresources & Sustainable Development, Manipur, India, 4National Bureau of Agricultural Insect Resources, Karnataka, India

9:45 **2646** Global uses for sulfuryl fluoride (ProFume® gas fumigant) for post-harvest pest control. **Ellen Thoms** (ellen.thoms@douglasproducts.com)1 and Barb Nead- Nylander2, 1Douglas Products, Gainesville, FL,

2Douglas Products, Rancho Santa Margarita, CA

10:00 **2647** Co-fumigation with phosphine (PH3) and sulfuryl fluoride (SO2F2) for the management of strongly phosphine-resistant insect pests of stored grain. **Rajeswaran Jagadeesan** (raj.jagadeesan@daf. qld.gov.au)1,2, Manoj Nayak1, Hervoika Pavic1, Virginetenshia Singarayan1, and Paul Ebert2, 1Queensland Dept. of Agriculture and Fisheries, Brisbane, Australia, 2Univ. of Queensland, Brisbane, Australia

**10:15 BREAK**

10:30

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**2648** ECO2FUME® for control of western flower thrips, *Frankliniella occidentalis* (Pergande), on tomatoes and green pepper at low temperature storage conditions. **Sait Erturk** (saiterturk@gmail.com)1,

Murat Olculu2, Mustafa Alkan1, Rifat Goztas3, and  
Arda Taner4, 1Plant Protection Central Research Institute, Ankara, Turkey, 2Biological Control Research Institute, Adana, Turkey, 3Agrifa Agriculture Products Trade Ltd., Mersin, Turkey, 4Cytec Industry, Inc., Adana, Turkey

**2649** Advances in developing alternative treatment for postharvest pest control. **Yong-Biao Liu** (yongbiao. liu@ars.usda.gov), USDA - ARS, Salinas, CA

**2650** Nitric oxide fumigation for control of certain quarantine pests on imported fresh commodities. **Xikui Wei** (xikui.wei@aphis.usda.gov)1, Woodward Bailey1, and Yong-Biao Liu2, 1USDA - APHIS, Miami, FL, 2USDA - ARS, Salinas, CA

**2651** Flour-mill fumigation using hydrogen cyanide and phosphine insecticide gases. **Vaclav Stejskal** (stejskal@vurv.cz), Crop Research Institute, Prague, Czech Republic

**2652** Efficacy of ozone fumigation against phosphine susceptible and resistant strains of *Rhyzopertha dominica.* **Xinyi E.** (xinyi608@gmail.com), Bhadriraju Subramanyam, and Beibei Li, Kansas State Univ., Manhattan, KS

**2653** Influence of hypoxia on cowpea weevil egg-laying behavior and progeny development. **Kabita Kharel** (kkharel@purdue.edu), Dieudonne Baributsa, Scott Williams, and Linda J. Mason, Purdue Univ., West Lafayette, IN

**2654** Cumulative oxygen consumption during development of two post-harvest pests (*Callosobruchus maculatus* Fabricius and *Plodia interpunctella* Huebner). **Hannah Quellhorst** (hquellho@purdue.edu)1, Dieudonne Baributsa2,  
Scott Williams2, and Larry Murdock2, 1Purdue Improved Crop Storage Lab, West Lafayette, IN, 2Purdue Univ., West Lafayette, IN

**Poster Session 3: Entomophagy and Entomology in Popular Culture**

***West Hall C (Convention Center)***

* **D3507**Research on the yearlong rearing of rice grasshopper (*Oxya chinensis sinuosa* Mishchenko). **Sungju Kang** (kang4695@korea.kr), Seongon Kim, Hyunjin Kim, Jungeun Kim, and Huiyeon Koo, Jeollanamdo Agricultural Research and Extension Services, Jangseong, South Korea
* **D3508**Production of black soldier fly larvae (*Hermetia illucens*) as a commodity: Effects of various biological factors. **John Schneider** (jcs1@msstate.edu), Mississippi State Univ., Mississippi State, MS
* **D3509**Influence of the liquid fraction on *Hermetia illucens* (L.) reared on vegetables. **Costanza Jucker** (costanza. jucker@unimi.it), Maria Giovanna Leonardi,  
  Marco Palamara Mesiano, Daniela Lupi, and   
  Sara Savoldelli, Univ. of Milan, Milan, Italy
* **D3510**Teaching with insects as food and feed: Incorporating entomophagy into sustainable agriculture curricula at the university and community level. **Donald Sudbrink** (sudbrinkd@apsu.edu) and Amy Wright, Austin Peay State Univ., Clarksville, TN

**Poster Session 3: Genetics and Evolutionary Entomology**

***West Hall C (Convention Center)***

**D3511** Sixteen novel microsatellite loci for *Megachile rotundata* (Hymenoptera: Megachilidae) and related taxa. **James Strange** (james.strange@ars.usda.gov)1, Deborah A. Delaney2, David Tarpy3, and Rosalind James4, 1USDA - ARS, Logan, UT, 2Univ. of Delaware, Newark, DE, 3North Carolina State Univ., Raleigh, NC, 4USDA - ARS, Beltsville, MD

**D3512** Environmental influences on gene flow in cave crickets (Orthoptera: Rhaphidophoridae) inhabiting abandoned mines. **Kristin Dunn** (kristin.dunn.11@cnu.edu), Christopher Newport Univ., Newport News, VA

**D3513** Genetic diversity and population structure of *Anastrepha striata* (Diptera: Tephritidae) in three natural regions of southwestern Colombia using mitochondrial sequences. Jenny Gallo, **Sandra Velasco- Cuervo** (sandra.velasco@correounivalle.edu.co),

Elkin Aguirre, Nancy Carrejo, Ranulfo González, and Nelson Toro-Perea, Univ. of Valle, Cali, Colombia

**D3514** Populational microgeographical study of the new world screwworm fly, *Cochliomyia hominivorax* (Diptera: Calliphoridae). Luana Bergamo1, Pablo Fresia2, and  
**Ana Azeredo-Espin** (azeredo@unicamp.br)1, 1Univ. of Campinas, Campinas, Brazil, 2Pasteur Institute, Montevideo, Uruguay

**D3515** Impact of the 2010 Deepwater Horizon oil spill on population size and genetic structure of horse flies, *Tabanus nigrovittatus*, in Louisiana marshes.  
**Lane Foil** (lfoil@agcenter.lsu.edu) and Claudia Husseneder, Louisiana State Univ., Baton Rouge, LA

**D3516** Analysis of genetic variability of *Aedes albopictus* in an area of growing urbanization. **Rosangela Barbosa** (barbosar@cpqam.fiocruz.br)1, Suzane Santos1, and Marcelo Paiva2, 1Oswaldo Cruz Foundation, Recife, Brazil, 2Federal Univ. of Pernambuco, Caruaru, Brazil

**D3517** Genetic structure of *Hylesia metabus* (Lepidoptera: Saturniidae): Moths responsible for lepidopteran outbreaks in French Guiana and Venezuela.  
**Marina Ciminera** (marina.ciminera@ecofog.gf)1,  
Alain Roques2, Niklas Tysklind3, and Marie-Anne Auger- Rozenberg2, 1National Center for Scientific Research, Kourou, French Guiana, 2INRA, Orléans, France, 3INRA, Kourou, French Guiana

**D3518** Estimation of genetic neighborhood size of western corn rootworm, *Diabrotica virgifera virgifera*, using genotyping by sequencing. **Kyung Seok Kim** (kkssky@gmail.com)1, Brad S. Coates2, John D. Nason1, and Thomas Sappington2, 1Iowa State Univ., Ames, IA, 2USDA - ARS, Ames, IA

**D3519** Population genetic structure and *Wolbachia* infection in an endangered butterfly, *Zizina emelina* (Lepidoptera: Lycaenidae). **Norio Hirai** (n\_hirai@envi.osakafu-u. ac.jp)1, Yoshiko Sakamoto2, Masaya Yago3, Minoru Ishii1, and Cheol Min Lee4, 1Osaka Prefecture Univ., Sakai, Japan, 2National Institute for Environmental Studies, Tsukuba, Japan, 3The Univ. Museum, The Univ. of Tokyo, Tokyo, Japan, 4Korea Forest Research Institute, Seoul, South Korea

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**THURSDAY**

**Thursday, September 29 • MORNING •**

* **D3520**Endosymbiotic bacterial fauna of sunn pest. **Nurper Guz** (nurperguz@agri.ankara.edu.tr)1 and Serap Aksoy2, 1Ankara Univ., Ankara, Turkey, 2Yale Univ., New Haven, CT
* **D3521**Diversity and phylogenetic analysis of bacterial endosymbionts from Colombian *Bemisia tabaci* (Hemiptera: Aleyrodidae). **Vanessa Muñoz** (vanem28@gmail.com), Mailyn Bedoya Saldarriaga, and James Montoya Lerma, Univ. of Valle, Cali, Colombia
* **D3522**Effects of inter-body environmental variation of host insects on the morphogenesis of endoparasitoid wasps: Estimation through genome-wide association analysis on wasp morphology and host genetic variation. **Tomohiro Takigahira** (takigahira@s.okayama-u.ac.jp) and Kazuo Takahashi, Okayama Univ., Okayama, Japan
* **D3523**Phylogenetic relationships of the groundnut leafminer, *Aproaerema simplexella* (Walker), and *A. modicella* (Deventer) (Lepidoptera: Gelechiidae) populations collected from Africa, Australia, and India based on mitochondrial and nuclear DNA gene sequences. **Makhosi Buthelezi** (buthelezim@mut.ac.za)1, Desmond Conlong2,3, and Godfrey Zharare4, 1Mangosuthu Univ.   
  of Technology, Durban, South Africa, 2SASRI, Durban, South Africa, 3Univ. of KwaZulu-Natal, Pietermaritzburg, South Africa, 4Univ. of Zululand, Empangeni, South Africa
* **D3524**Ovipositor transcriptomes reveal an evolutionary conserved mechanism of oviposition substrate choice in *Drosophila*. **Cristina Crava** (maria.crava@fmach.it), Valerio Stacconi, Omar Rota Stabelli, and  
  Gianfranco Anfora, Edmund Mach Foundation,  
  San Michele all’Adige, Italy
* **D3525**A new report of orange color type *Nezara viridula* (Heteroptera: Pentatomidae) from Washington County, Mississippi from a cultured population.  
  **M. Guadalupe Rojas** (guadalupe.rojas@ars.usda.gov) and Juan Morales-Ramos, USDA - ARS, Stoneville, MS
* **D3526**Hind legs used as a “risky decoy” in the leaf-footed bug, *Leptoglossus phyllopus*. **Paige Carlson** (pcarlson7@ufl. edu), Zachary Emberts, and Christine W. Miller, Univ. of Florida, Gainesville, FL
* **D3527**The hidden costs of sexually selected weapons in the heliconia bug, *Leptoscelis tricolor* (Hemiptera: Coreidae). **Ummat Somjee** (ummat.s@gmail.com), Univ. of Florida, Gainesville, FL
* **D3528**Male lifetime mating success in relation to body size in *Diabrotica barberi*. **Bryan French** (wade.french@ars. usda.gov)1 and Leslie Hammack2, 1USDA - ARS, Brookings, SD, 2USDA - ARS, Keystone, SD
* **D3529**Genetic relationship between development time and body mass at different temperatures and sexes in *Tribolium castaneum*. **Paulina Kramarz** (paulina.kramarz@ uj.edu.pl) and Szymon Drobniak, Jagiellonian Univ., Krakow, Poland
* **D3530**HSP90: A capacitor for evolution in the red flour beetle *Tribolium castaneum*? **Rasha Aboelsoud** (r\_aboe01@ uni-muenster.de) and Joachim Kurtz, Univ. of Münster, Münster, Germany

**D3531** Circadian clock, photoperiodic timer and genes in *Pyrrhocoris apterus* from different latitudes.  
**Bulah Chia-hsiang Wu** (bulah@entu.cas.cz)1,2,  
Lenka Pivarciova1,2, Jan Provaznik1,2, Joanna Kotwica- Rolinska2, and David Dolezel1,2, 1Univ. of South Bohemia, České Budějovice, Czech Republic, 2Czech Academy of Sciences, České Budějovice, Czech Republic

**D3532** Genetic mapping of a red-eye mutant in the brown planthopper*, Nilaparvata lugens*. **Jirapong Jairin** (jjairin@yahoo.com)1, Phikul Leelagud1, and Ketsara Suwannapukdee2, 1Ubon Ratchathani Rice Research Center, Ubon Ratchathani, Thailand, 2Mahasarakham Univ., Maha Sarakham, Thailand

**D3533** Using environmental association to decode adaptation: Insecticide resistance in Colorado potato beetle. **Michael Crossley** (mcrossley@wisc.edu), Univ. of Wisconsin, Madison, WI

**D3534** Anti-bat adaptations in tiger beetles (Cicindelidae). **Harlan Gough** (goughh@ufl.edu), Univ. of Florida, Gainesville, FL

**Poster Session 3: Insect Chemical Ecology**

***West Hall C (Convention Center)***

**D3535** Is codling moth sprayable pheromone safe for natural enemies? The case of adult *Coccinella septempunctata* under laboratory conditions. **Bilgi Pehlevan** (bpehlevan@uludag.edu.tr) and Orkun Baris Kovanci, Uludag Univ., Bursa, Turkey

**D3536** Effect of nitrogen on rice insects pest and their natural enemies. **Jean Willy Nduwimana** (jeanwillynduwimana@ yahoo.fr), Huazhong Agricultural Univ., Wuhan, China

**D3537** Behavioral responses to dimethyl disulfide of two staphylinid parasitoids of the cabbage maggot,  
*Delia radicum*. Jing Du and **Neil Holliday** (neil\_holliday@ umanitoba.ca), Univ. of Manitoba, Winnipeg, MB, Canada

**D3538** Response of wasp parasitoid *Ibalia leucospoides* to volatiles from fungal symbiont (*Amylostereum areolatum)* of *Sirex noctilio.* **Hajar Faal Mohammad Ali** (hajar.faal@gmail.com), Dong Cha, and Stephen Teale, State Univ. of New York, Syracuse, NY

**D3539** Mechanisms of parasitism by the thermophilic ant *Melophorus anderseni*. **Sara Hu** (shu6@toromail. csudh.edu)1, Benjamin D. Hoffmann2, Adrian A. Smith3, Andrew Suarez4, and Terrence P. McGlynn1, 1California State Univ., Carson, CA, 2CSIRO, Winnellie, Australia, 3North Carolina Museum of Natural Sciences, Raleigh, NC, 4Univ. of Illinois, Champaign, IL

**D3540** Symbiotic bacteria in oral secretion of *Spodoptera litura* orchestrate host plant defense in *Arabidopsis*. **Yukiyo Yamasaki** (yamasaki.y@rs.tus.ac.jp)1,  
Hiroka Sumioka1, Ivan Galis2, and Gen-ichiro Arimura1, 1Tokyo Univ. of Science, Tokyo, Japan, 2Okayama Univ., Kurashiki, Japan

**D3541** Chemically-mediated host colonization of black cherry trees, *Prunus serotina*, by the peach bark beetle, *Phloeotribus liminaris* (Coleoptera: Scolytinae). **Matthew Ethington** (methingt@purdue.edu),

Gabriel Hughes, and Matthew Ginzel, Purdue Univ., West Lafayette, IN

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**THURSDAY**

**Thursday, September 29 • MORNING •**

* **D3542**Repellent factors and host recognition cues for western corn rootworm (*Diabrotica virgifera virgifera*).  
  **Elisa Bernklau** (bernklau@colostate.edu)1,  
  Bruce Hibbard2, and Louis Bjostad1, 1Colorado State Univ., Fort Collins, CO, 2USDA - ARS, Columbia, MO
* **D3543**Presentation withdrawn
* **D3544**Adaptation strategy of bird cherry-oat aphid to its host-plants. **Bogumil Leszczynski** (leszczb@uph.edu.pl), Cezary Sempruch, Marta Chwedczuk, Marcin Becher, Grzegorz Chrzanowski, and Hubert Sytykiewicz, Univ. of Life Sciences and Humanities, Siedlce, Poland
* **D3545**Activity evaluation of spotted wing drosophila attractant. **Yan Feng** (yan.feng@ars.usda.gov),  
  Aijun Zhang, Robert Bruton, and Alexis Park, USDA - ARS, Beltsville, MD
* **D3546**D-Pinitol involved in host recognition by common grass yellow, *Eurema mandarina*, toward leguminous plants. **Hisashi Ômura** (homura@hiroshima-u.ac.jp),  
  Shin-ya Mukae, Yuika Matsumoto, and Toshiki Ohashi, Hiroshima Univ., Higashihiroshima, Japan
* **D3547**Induced resistance in soybeans against southern armyworm herbivory. **Bruno Sardinha de Souza** (souzabhs@gmail.com)1, Arlindo Boiça Junior1, Michael Stout2, Durvalina Mathias dos Santos1, Moacir Rossi Forim3, Antonio Pizolato Neto1, and Bruno Perlatti3, 1São Paulo State Univ., Jaboticabal, Brazil, 2Louisiana State Univ. AgCenter, Baton Rouge, LA, 3Federal Univ. of São Carlos, São Carlos, Brazil
* **D3548**Phytochemical co-evolution between insects and plants through plant diterpenes and insect juvenile hormone receptors. **Hyun-Woo Oh** (hwoh@kribb.re.kr)1, Chan-Seok Yun1, Jun Hyoung Jeon1, Alexander Raikhel2, and Sang Woon Shin2, 1Korea Research Institute of Bioscience and Biotechnology, Daejeon, South Korea, 2Univ. of California, Riverside, CA
* **D3549**Host plants for *Galerucella grisescens* is determined from flavonoids in the leaves. **Makoto Abe** (abeman@ akita-pu.ac.jp), Yuuki Tomioka, Koji Noge, and Shigaru Tamogami, Akita Prefectural Univ., Akita, Japan
* **D3550**The discrimination between host plants and nonhost plants by tarsi in Chrysomelidae. **Shun Yosano** (shun.yosano.r6@dc.tohoku.ac.jp), Minami Akatsu, Yasuhiko Kutsuwada, Shuhei Masuta, Rei Kakazu, Naoshi Masuoka, Kazuhiro Matsuda, and Masatoshi Hori, Tohoku Univ., Sendai, Japan
* **D3551**Response of adult *Anoplophora glabripennis* (Coleoptera: Cerambycidae) to host-derived isothiocyanates. **Scott Gula** (gulas@xavier.edu)1, Vanessa Lopez2, Leslie Kuhn3, Joseph Francese4, Damon Crook4, Matthew Ginzel1, and Ann M. Ray2, 1Purdue Univ., West Lafayette, IN, 2Xavier Univ., Cincinnati, OH, 3Michigan State Univ., East Lansing, MI, 4USDA - APHIS, Buzzards Bay, MA
* **D3552**Representation of human scent in the mosquito antennal lobe. **Genevieve Tauxe** (gtauxe1@jhu.edu) and Conor McMeniman, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD
* **D3553**Location of a carbon dioxide source by *Anopheles coluzzii* in a wind tunnel. **Emerson Lacey** (eslacey@ucr. edu) and Ring T. Cardé, Univ. of California, Riverside, CA

**D3554** Alarming, but true: The chemical ecology of phorid flies attracted to injured ants. **Katherine Noble** (k.g.noble@ utah.edu), Univ. of Utah, Salt Lake City, UT

**D3555** Geographic variation in sex pheromone of tea geometrid: *Ectropis grisescens* and *Ectropis obliqua*, China. **Tao Ma** (matao@scau.edu.cn)1, Xiujun Wen1, Qiang Xiao2, and Cai Wang1, 1South China Agricultural Univ., Guangzhou, China, 2Chinese Academy of Agricultural Sciences, Hangzhou, China

**D3556** Identification of male-produced attractants of *Anoplophora glabripennis* and their effect on behavior. Damon Crook and **Joseph Francese** (joe.francese@ aphis.usda.gov), USDA - APHIS, Buzzards Bay, MA

**D3557** Pheromonotropic activity of a synthetic pheromone biosynthesis-activating neuropeptide and its expression in *Maruca vitrata*. Wook Hyun Cha,  
Yoon Jung Hwang, and **Dae-weon Lee** (daeweonlee@ ks.ac.kr), Kyungsung Univ., Busan, South Korea

**D3558** Improved syntheses of 1-bisabolen-3-ol aggregation pheromones. **Ashot Khrimian** (ashot.khrimian@ars. usda.gov), Shyam Shirali, and Filadelfo Guzman, USDA - ARS, Beltsville, MD

**D3559** Comparative evolution of pheromone communication in heliothine moths. **Kirk Hillier** (kirk.hillier@acadiau.ca), Colin Mackay, and Ana Rizzato, Acadia Univ., Wolfville, NS, Canada

**D3560** Efficacy of current lures for detection of redbay ambrosia beetle, *Xyleborus glabratus* (Coleoptera: Curculionidae: Scolytinae). **Paul E. Kendra** (paul. kendra@ars.usda.gov)1, Wayne S. Montgomery1, Jerome Niogret2, Elena Q. Schnell1, Mark A. Deyrup3, and Nancy D. Epsky1, 1USDA - ARS, Miami, FL, 2Niogret Ecology Consulting LLC, Miami, FL, 3Archbold Biological Station, Lake Placid, FL

**D3561** Evidence for a male-produced aggregation pheromone in *Diocalandra frumenti* Fabricius (Coleoptera: Curculionidae). **Sandra Vacas** (sanvagon@ceqa.upv. es)1, Ismael Navarro2, Elena Seris3, Estrella Hernández4, Jaime Primo1, and Vicente Navarro-Llopis1, 1Polytechnic Univ. of València, València, Spain, 2Ecology and Agricultural Protection SL, Carlet, Spain, 3Directorate- General for Agriculture and Rural Development,

Santa Cruz de Tenerife, Spain, 4Canary Institute of Agricultural Research, Tenerife, Spain

**D3562** Do the cuticular hydrocarbons profiles in a highly eusocial bee queens reflect reproductive status? **Denise Alves** (daalves@usp.br)1, Maria Juliana Ferreira- Caliman2, Fabio Nascimento2, José Mauricio Bento1, and Stefan Jarau3, 1São Paulo State Univ., Piracicaba, Brazil, 2São Paulo State Univ., Ribeirão Preto, Brazil, 3Univ. of Ulm, Ulm, Germany

**D3563** Morphology and ultrastructure of the functional sensilla on antenna, ovipositor, maxillary and labial palps of *Monochamus alternatus* (Coleoptera: Cerambycidae). **Lili Ren** (lily\_ren@bjfu.edu.cn), Juan Shi, and You-Qing Luo, Beijing Forestry Univ., Beijing, China

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**D3564** (Z)-9-tetradecenyl acetate, shows stronger *in silico* binding to the pheromone-binding protein of *Lobesia botrana* than the major sex pheromone component. **Ana Mutis** (ana.mutis@ufrontera.cl)1, Herbert Venthur1, Darío Mercado1, David Castro2, Susana Izquierdo2, and Andrés Quiroz1, 1Univ. of La Frontera, Temuco, Chile, 2Fruit Development Foundation, Santiago, Chile

**Poster Session 3: Insect Neurobiology**

***West Hall C (Convention Center)***

* **D3565**Neurobiology of alarm pheromone perception in Africanized honey bees, *Apis mellifera*.   
  **Bahram Kheradmand** (bkheradm@ucsd.edu)1,  
  James C. Nieh1, and Kenta Asahina2, 1Univ. of California, La Jolla, CA, 2Salk Institute, La Jolla, CA
* **D3566**Memory formation and nutritional value of reward sugars in the honey bee, *Apis mellifera*. **Julie Mustard** (julie.mustard@utrgv.edu)1, Valerie Alvarez1,  
  Alexander Stoker2, and Kashif Malik2, 1The Univ. of Texas, Brownsville, TX, 2Arizona State Univ., Tempe, AZ
* **D3567**Assocation of behavioral variation and sucrose sensitivity in *Temnothorax rugatulus.* **Colin Lynch** (colinlynch@email.arizona.edu), Anna Dornhaus, and Nicole Fischer, Univ. of Arizona, Tucson, AZ
* **D3568**Taste specialization in *Drosophila sechellia*.  
  **Carolina Reisenman** (creisenman@berkeley.edu) and Kristin Scott, Univ. of California, Berkeley, CA
* **D3569**Tyrosine hydroxylase in the central nervous system  
  of Apidae and Triatominae. **Beatriz Settembrini** (settembrini@macn.gov.ar)1,2, Gerónimo Galvani1, Jimena Leyria3, Susana Nowicki4, and Lilián Canavoso3, 1Argentina Museum of Natural Sciences, Buenos Aires, Argentina, 2Univ. of Austral, Derqui, Argentina, 3National Univ. of Córdoba, Córdoba, Argentina, 4CONICET, Buenos Aires, Argentina
* **D3570**Electrophysiological characterization of insect TRPV channels. Katherine Lelito, Lynn Stam and  
  **Vincent Salgado** (vincent.salgado@basf.com), BASF, Research Triangle Park, NC
* **D3571**An electrical wild silkmoth antenna and single food leaf nutrition. **Maki Kosuge** (kosuge3580012@nifty.com), Ex Oki Electric Company, Iruma, Japan
* **D3572**Activity level in *Temnothorax rugatulus* ants.  
  **Varuska Patni** (varuskapatni@email.arizona.edu), Nicole Fischer, Kerrah Cutter, and Anna Dornhaus, Univ. of Arizona, Tucson, AZ
* **D3573**Comparative analysis of the circadian clock in selected Diptera species. **Enrico Bertolini** (enrico.bertolini@ uni-wuerzburg.de), Pamela Menegazzi, and  
  Charlotte Förster, Univ. of Würzburg, Würzburg, Germany
* **D3574**Control of crop function of the agricultural pest,  
  *Delia radicum*. **Petra Pribylova** (bspp@leeds.ac.uk)1,2, June Matthews2, Neil Audsley2, and Elwyn Isaac1, 1Univ. of Leeds, Leeds, United Kingdom, 2Fera Science, Ltd., York, United Kingdom

**Poster Session 3: Integrated Pest Management and Sustainable Agriculture**

***West Hall C (Convention Center)***

**D3575** Integrated pest management education program in Nevada, USA. **Joy Paterson** (patersonj@unce.unr. edu)1, Jay Davison2, Heidi Kratsch3, Melody Hefner3, and Kevin Burls3, 1Univ. of Nevada Cooperative Extension, Yerington, NV, 2Univ. of Nevada Cooperative Extension, Fallon, NV, 3Univ. of Nevada Cooperative Extension, Reno, NV

**D3576** Entomology extension learning methods: Competency differences between video and slideshow presentations. **Jason Thomas** (jasonfalc@gmail.com)1, Robert Bowling2,3, and Michael Brewer3, 1Texas A&M Univ., College Station, TX, 2Texas A&M Univ., Corpus Christi, TX, 3Texas A&M AgriLife Research, Corpus Christi, TX

**D3577** Integrated pest management in dry bean production in California. **Rachael Long** (rflong@ucanr.edu)1 and Larry Godfrey2, 1Univ. of California, Woodland, CA, 2Univ. of California, Davis, CA

**D3578** Show me the money: NIFA funding opportunities for pest management. **Robert Nowierski** (rnowierski@nifa. usda.gov), USDA - NIFA, Washington, DC

**D3579** Mainbiosys project to enhance the agriculture sustainable practices in sub-Saharan Africa. **Andrea Sciarretta** (sciarretta@unimol.it) and Pasquale Trematerra, Univ. of Molise, Campobasso, Italy

**D3580** A push-pull IPM strategy for invasive ambrosia beetles in ornamental nurseries. **Chris Werle** (chris.werle@ ars.usda.gov)1, John Adamczyk1, Jason B. Oliver2, Christopher Ranger3, Michael Reding3, Blair Sampson1, and Peter B. Schultz4, 1USDA - ARS, Poplarville, MS, 2Tennessee State Univ., McMinnville, TN, 3USDA - ARS, Wooster, OH, 4Virginia Polytechnic Institute and State Univ., Virginia Beach, VA

**D3581** Farmer application of post-harvest management strategies in Tahoua and Maradi regions of Niger, West Africa. Hame Abdou Kadi Kadi1, **Bonnie Pendleton** (bpendleton@wtamu.edu)1, and Kadri Aboubacar2, 1West Texas A&M Univ., Canyon, TX, 2Univ. Abdou Moumouni, Niamey, Niger

**D3582** Insect diversity in agro-ecological cotton in Brazilian semiarid region. **Fábio Albuquerque** (fabio.albuquerque@ embrapa.br)1, Regina Wanessa Cavalcanti2, and  
Gildo Araújo3, 1Embrapa Cotton, Campina Grande, Brazil, 2Paraíba State University, Campina Grande, Brazil, 3Embrapa Cotton, Barbalha, Brazil

**D3583** Interspecific cross between *Helicoverpa armigera*  
and *H. zea* in Brazil: Implications in IPM programs. Dayana Sousa, Mariana Durigan, Natália Leite,  
Rogério Pereira, Celso Omoto, and **Alberto Correa** (ascorrea@usp.br), Univ. of São Paulo, Piracicaba, Brazil

**D3584** Monitoring Hessian fly, *Mayetiola destructor*, flight: Management applications and limitations of pheromone traps. **Allen Knutson** (a-knutson@tamu. edu)1, Kris Giles2, Tom Royer2, Nathan Bradford2, and Carlos Campos3, 1Texas A&M Univ., Dallas, TX, 2Oklahoma State Univ., Stillwater, OK, 3Texas A&M AgriLife Research, Dallas, TX

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* **D3585**Addressing the issue of pesticides in surface waters of the middle Rogue watershed: The Pesticide Stewardship Partnership approach. **Richard Hilton** (richard.hilton@ oregonstate.edu)1, Mary Halbleib2, Paul Jepson2, and Kevin Masterson3, 1Oregon State Univ., Central Point, OR, 2Oregon State Univ., Corvallis, OR, 3Oregon Dept. of Environmental Quality, Bend, OR
* **D3586**Early season arthropod community structure on vegetable crops in high tunnels and open fields in northern Minnesota. **Lindsey Christianson** (chri1203@ umn.edu)1 and Christopher R. Philips2, 1Univ. of Minnesota, Grand Rapids, MN, 2Univ. of Minnesota,   
  St. Paul, MN
* **D3587**Cabbage maggot, *Delia radicum*, in vegetable brassicas: Are we any closer to finding a solution? **Carolyn Parsons** (carolyn.parsons@agr.gc.ca)1, Peggy Dixon1, Josée Owen2, and Todd Power1, 1Agriculture and Agri-Food Canada, St. John’s, NF, Canada, 2Agriculture and Agri-Food Canada, Fredericton, NB, Canada
* **D3588**Impact of soil management on soil food web health in long-term organic and transitioning farming systems. **Harit K. Bal** (bal.9@osu.edu)1, Khandakar Rafiq Islam2, Edward McCoy1, Subbu Kumarappan3, Alan Sundermeier4, and Parwinder Grewal5, 1The Ohio State Univ., Wooster, OH, 2The Ohio State Univ., Piketon, OH, 3Agricultural Technical Institute, Wooster, OH, 4The Ohio State Univ., Bowling Green, OH, 5The Univ. of Texas, Edinberg, TX
* **D3589**What is the most cost-effective management strategy for foliage-feeding lepidopterans in Alabama soybeans? **Tim Reed** (reedtim@aces.edu), Alabama CES, Madison, AL
* **D3590**Corn rootworm best management practices: Convergence or divergence of crop, pest, and resistance management? **Ken Ostlie** (ostli001@umn.edu),  
  Trisha Leaf, and Edwin Benkert III, Univ. of Minnesota, St. Paul, MN
* **D3591**Pest-damage relationships for Old World bollworm, *Helicoverpa armigera* (Lepidoptera: Noctuidae), on vegetative soybean. Joao Zanardi Júnior, **Roberto Silva** (rds.feis@gmail.com), Geraldo Papa, Matheus Castro, and Marcelo Ferraz Jr, São Paulo State Univ., Ilha Solteira, Brazil
* **D3592**The impact of Extension IPM efforts on limited resource farmers in Alabama: A case study of farmers supplying Walmart with southern peas, watermelons, and collard greens. **Franklin Quarcoo** (franklynquarcoo@gmail. com) and Conrad Bonsi, Tuskegee Univ., Tuskegee, AL
* **D3593**Daily temperature and precipitation can be used to forecast North American grasshopper populations. **Larry E. Jech** (larry.e.jech@aphis.usda.gov), USDA - APHIS, Phoenix, AZ
* **D3594**Effects of adult density, stages of plant development, and genotype of soybeans on *Helicoverpa armigera* oviposition. **Arlindo Boiça Junior** (aboicajr@fcav.unesp. br), Renato Moraes, and Wellington Eduardo, São Paulo State Univ., Jaboticabal, Brazil

**D3595** Effect of faba bean – cereals intercropping and nitrogen fertilization on infestation by the leafminer *Liriomyza trifolii* on faba bean, *Vicia faba*. Amero Emeran, El-Kazafy Taha, and **Dalia Shawer** (dalia\_shamel@ yahoo.com), Kafrelsheikh Univ., Kafr el-Sheikh, Egypt

**D3596** Surveying the abundance of corn rooworm, *Diabrotica* spp., using transects in eastern South Dakota.  
Billy Fuller and **Bradley McManus** (bradley.mcmanus@ sdstate.edu), South Dakota State Univ., Brookings, SD

**D3597** Damage of *Bemisia tabaci* biotype B in transgenic common bean resistant to the *Bean golden mosaic virus*. **Marcus Vinícius Santana** (mvsantana@outlook. com)1, Eliane Quintela1, José Alexandre Barrigossi1, and Tássia Tuane Santos2, 1Embrapa Rice and Beans, Santo António de Goiás, Brazil, 2Federal Univ. of Goiás, Goiânia, Brazil

**D3598** Antibiosis in soybean cultivars against *Heliothis virescens* (Lepidoptera: Noctuidae). **André Cirilo Almeida** (andre\_cirillo@hotmail.com), Cinthia Silva, Lígia Paiva, Franciele da Silva, Jean Almeida, and Flávio Jesus, Federal Institute of Goiano, Urutaí, Brazil

**D3599** Resistance of soybean genotypes to *Aphis glycines* (Hemiptera: Aphididae). **Flávio Jesus** (flavio.jesus@ ifgoiano.edu.br)1, Lia Marchi-Werle2, Hillary Fischer2, and Tiffany Heng-Moss2, 1Federal Institute of Goiano, Urutaí, Brazil, 2Univ. of Nebraska, Lincoln, NE

**D3600** Characterizing cotton resistance to *Aphis gossypii* (Hemiptera: Aphididae). **Rafaela Morando** (rafaela\_morando@hotmail.com)1, Edson Baldin1, Ivana Silva1, Camila Souza1, and André Lourenção2, 1São Paulo State Univ., Botucatu, Brazil, 2Agronomic Institute of Campinas, Campinas, Brazil

**D3601** Evaluation of different organic sweetpotato varieties against insect damage. **Tahir Rashid** (trashid@alcorn. edu)1, Paul J. McLeod2, Victor Njiti3, Randall Luttrell4, and Larry Adams4, 1Alcorn State Univ., Mound Bayou, MS, 2Univ. of Arkansas, Fayetteville, AR, 3Alcorn State Univ., Lorman, MS, 4USDA - ARS, Stoneville, MS

**D3602** Spotted wing drosophila range expansion and establishment in Atlantic Canada. **Peggy Dixon** (peggy. dixon@agr.gc.ca)1, Debra Moreau2, and Christine Noronha3, 1Agriculture and Agri-Food Canada, St. John’s, NF, Canada, 2Agriculture and Agri-Food Canada, Kentville, NS, Canada, 3Agriculture and Agri-Food Canada, Charlottetown, PEI, Canada

**D3603** Antixenosis of soybean genotypes to *Dichelops melacanthus* (Hemiptera: Pentatomidae).  
**Vinícius Canassa** (vfcanassa@hotmail.com)1,  
Edson Baldin1, José P. G. F. Silva1, Luiz Pannuti2, and André Lourenção3, 1São Paulo State Univ.,, Botucatu, Brazil, 2São Paulo State Univ., Campinas, Brazil, 3Agronomic Institute of Campinas, Campinas, Brazil

**D3604** Feeding behavior of *Aphis glycines* (Hemiptera: Aphididae) on soybeans exhibiting antibiosis and tolerance. **Edson Baldin** (elbaldin@fca.unesp.br)1, Mitchell Stamm2, José P. G. F. Silva1, Kyle G. Koch2, Tiffany Heng-Moss2, and Thomas Hunt3, 1São Paulo State Univ., Botucatu, Brazil, 2Univ. of Nebraska, Lincoln, NE, 3Univ. of Nebraska, Concord, NE

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* **D3605**Developing a research based sampling protocol for sugarcane aphid, *Melanaphis sacchari*, in sorghum. **Jessica Pavlu** (jpavlu@ostatemail.okstate.edu)1,  
  Kris Giles2, Ali Zarrabi2, Norman Elliott3, and Tom Royer2, 1Oklahoma State Univ., Perkins, OK, 2Oklahoma State Univ., Stillwater, OK, 3USDA - ARS, Stillwater, OK
* **D3606**Compensation to pest injuries by replacing floral structures by cotton plants. **José Miranda** (jose-ednilson. miranda@embrapa.br), Embrapa, Santo António de Goiás, Brazil
* **D3607**Western corn rootworm product performance inquiry populations exhibit moderate variation in susceptibility to DvSnf7 dsRNA and no cross resistance to Cry3Bb1. **Chitvan Khajuria** (chitvan.khajuria@monsanto.com)1, William Moar2, Oliver Ilagan1, Michael Pleau1, Mao Chen3, Brian McNulty1, Thomas Clark1, AnilKumar Gowda1, Paula A. Price2, and Graham P. Head2, 1Monsanto Company, Chesterfield, MO, 2Monsanto Company, St. Louis, MO, 3Monsanto Company, Singapore, Singapore
* **D3608**Host plant resistance in soybean for pest management of *Megacopta cribraria* (Hemiptera: Plataspidae). **Sriyanka Lahiri** (slahiri@ncsu.edu)1, Dominic Reisig2, Francis Reay-Jones3, Thomas Carter4, M. A. Rouf Mian4, Ben Fallen3, and Jeremy Greene5, 1North Carolina State Univ., Raleigh, NC, 2North Carolina State Univ., Plymouth, NC, 3Clemson Univ., Florence, SC, 4USDA - ARS, Raleigh, NC, 5Clemson Univ., Blackville, SC
* **D3609***Cnaphalocrocis medinalis* resistant/tolerant rice varieties in Taiwan. Tzu-Wei Guo1, Kun-Yu Tu1, Yi Li1, Jie-Ming Lin1, Chung-Ta Liao2, and **Wen-Po Chuang** (wenpo@ntu.edu.tw)1, 1National Taiwan Univ., Taipei, Taiwan, 2Taichung District Agricultural Research and Extension Station, Changhua, Taiwan
* **D3610**Use of silicon as resistance inducer to *Helicoverpa armigera* (Lepidoptera: Noctuidae) in soybean. **Mariane Coelho** (c.mahh@yahoo.com.br)1, Jair Moraes2, Roberta Alvarenga2, and Edson Baldin1, 1São Paulo State Univ., Botucatu, Brazil, 2Federal Univ. of Lavras, Lavras, Brazil
* **D3611**Evaluation of indigenous plant extract against the aphid, *Schizaphis graminum*, under laboratory conditions. **Shahbaz Ahmad** (shahbaz.iags@pu.edu. pk), ESA, Lahore, Pakistan
* **D3612**Efficacy of biopesticides for pest control in cotton. **Lawrence Malinga** (lawrencem@arc.agric.za), Agricultural Research Council, Rustenburg, South Africa
* **D3613**Evaluation of a novel insecticide, sulfoxaflor 12%, for management of mustard aphid, *Lipaphis erysimi.* **Gautam Chakraborty** (entogautam@gmail.com), Bidhan Chandra Krishi Viswavidyalaya, Kalyani, India
* **D3614**Efficacy of pyrethroid insecticide applied as barrier treatments for managing *Aedes albopictus* populations. **Isik Unlu** (iunlu@mercercounty.org)1,2, Devi Suman1,  
  Yi Wang1, Kim Klingler2, Nick Indelicato2, Ary Faraji3, Scott Crans1, Greg Williams4, and Randy Gaugler1, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2Mercer County Mosquito Control, West Trenton, NJ, 3Salt Lake City Mosquito Abatement District,   
  Salt Lake City, UT, 4Hudson County Mosquito Control, Jersey City, NJ

**D3615** Effectiveness of microbial and chemical insecticides for controlling heliothines on Bt cotton. **Nathan Little** (nathan.little@ars.usda.gov), Randall Luttrell,  
Michelle Mullen, K. Clint Allen, and Omaththage P. Perera, USDA - ARS, Stoneville, MS

**D3616** Susceptibility of *Hypera postica* developmental stages to biologically derived insecticides with reference to the effect of infection on adult oviposition. **Govinda Shrestha** (govinda.shrestha@montana.edu)1 and Gadi V. P. Reddy2, 1Montana State Univ., Conrad, MT, 2Univ. of Guam, Mangilao, Guam

**D3617** Field demonstration of different insecticide strategies for management of soybean aphids, *Aphis glycines*. **Janet Knodel** (janet.knodel@ndsu.edu) and Patrick Beauzay, North Dakota State Univ., Fargo, ND

**D3618** Cytotoxic effects of neem oil in the midgut of the predator *Ceraeochrysa claveri* (Neuroptera: Chrysopidae). **Daniela Santos** (daniela@ibb.unesp.br), Elton Scudeler, Ana Silvia Garcia, Carlos Padovani, and Patricia Pinheiro, São Paulo State Univ., Botucatu, Brazil

**D3619** The residual activity of imidacloprid and thiamethoxam seed treatments on sugar beet pests: What are the real benefits of seed treatment? Helena Viric Gasparic, Zrinka Drmic, Darija Lemic, Maja Cacija, and

**Renata Bazok** (rbazok@agr.hr), Univ. of Zagreb, Zagreb, Croatia

**D3620** Potentiality of botanical natural products in supporting sustainable agriculture with special reference to floras of Sudan. **Abdalla Satti** (satisattisat@yahoo.com) and Maria Elnasikh, National Centre for Research, Khartoum, Sudan

**D3621** Insecticidal activity of cinnamon essential oils, constituents, and (*E*)-cinnamaldehyde analogues against *Metcalfa pruinosa* (Hemiptera: Flatidae) nymphs and adults. **Jun-Ran Kim** (jr2004@korea.kr)1, In-Hong Jeong1, and Sang-Guei Lee2, 1National Institute of Agricultural Sciences, Wanju, South Korea,

2National Institute of Agricultural Sciences, Wansasn, South Korea

**D3622** Toxicity and sublethal effect of the main insecticides used in soybean to *Trichogramma pretiosum* (Hymenoptera: Trichogrammatidae). **Ana Clara Paiva** (anaclara-r@hotmail.com), Vitor Beloti, Gustavo Alves, and Pedro Yamamoto, Univ. of São Paulo, Piracicaba, Brazil

**D3623** The effects of the juvenile hormone analogues on diapausing *Halyomorpha halys*, *Megacopta cribraria* and *Nezara viridula* and associated hymenopteran egg parasitoids. **Cory Penca** (cpenca@ufl.edu) and Amanda C. Hodges, Univ. of Florida, Gainesville, FL

**D3624** Short-term activity of some insecticides on *Halyomorpha halys*: Open field trials in Italy in 2015. Edison Pasqualini1, Laura Depalo1, Massimo Scannavini2, Michele Preti2, and **Antonio Masetti** (antonio.masetti@unibo.it)1,

1Univ. of Bologna, Bologna, Italy, 2Astra Innovation and Development, Faenza, Italy

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* **D3625**Activity of insecticides used in sugar cane on the parasitoid *Cotesia flavipes*. **Fernando Celoto** (fjceloto@ agr.feis.unesp.br), Roberto Silva, João Zanardi Júnior, Matheus Castro, and Geraldo Papa, São Paulo State Univ., Ilha Solteira, Brazil
* **D3626**CertadorTM: A new BASF insecticide for control of key pests in vegetable crops. **Teresia Nyoike** (teresia.nyoike@ basf.com), Joe Stout, Rebecca Willis, Tommy Wofford, Steve Broscious, Daniel O’Byrne, and Ralph Paulini, BASF, Research Triangle Park, NC
* **D3627**Efficacy of nootka oil as a biopesticide for management of imported fire ants. Karla Addesso, Jason B. Oliver, **Paul O’Neal** (poneal@tnstate.edu), and Nadeer Youssef, Tennessee State Univ., McMinnville, TN
* **D3628**Strategies to detect the botanical pesticides cedrelone and flavonoids coordinate to Mg (II) in larvae of *Spodoptera frugiperda* using LC-MS/MS. **Waleria Rabelo** (wallrabelo@hotmail.com)1, Samya Danielle De Freitas1, Angelina M Giongo2, Maria Fatima Da Silva1, Paulo Vieira1, Moacir Forim1, João Fernandes1, and Jose Vendramim2, 1São Carlos Federal Univ., São Carlos, Brazil, 2Univ.   
  of São Paulo, Piracicaba, Brazil
* **D3629**Characterization of a novel bacterial lipopeptide and examination of its potential as a new biological mosquito larvae control agent. **Il-Hwan Kim** (il-hwan. kim@nih.gov)1, Jerald Ensign2, and Walter Goodman2, 1National Institute of Allergy and Infectious Diseases, Rockville, MD, 2Univ. of Wisconsin, Madison, WI
* **D3630**Evaluation of grubGONE!®, a new Bt-based product that protects turf from Japanese beetle, green  
  June beetle and annual bluegrass weevil larvae. **David Matthews** (davematthews@phyllom.com), Phyllom BioProducts Corp., Oakland, CA
* **D3631**Mode of intoxication of the neotropical brown stink bug, *Euschistus heros*, in soybeans treated with insecticides. Geraldo Papa, **Joao Zanardi Júnior** (joao91186@aluno.feis.unesp.br), Marcelo Ferraz Jr., Matheus Castro, and Roberto Silva, São Paulo State Univ., Ilha Solteira, Brazil
* **D3632**Semiochemical attractants for fruit flies of agricultural importance. **Rodrigo Oliveira da Silva** (rodrigo.silva@ iscatech.com)1, William Urrutia1, Josh Ponce1,  
  Carmem Bernardi1, Marcos Botton2, Rafael Borges3, Ruben Machota Jr4, Jonathan Rico1, Kavita Sharma1, Leandro Ernesto Jost Mafra5, and Agenor Mafra-Neto1, 1ISCA Technologies, Inc., Riverside, CA, 2Embrapa Grape and Wine, Bento Goncalves, Brazil, 3ISCA Technologies, Ltda., Ijui, Brazil, 4Federal Univ. of Pelotas, Pelotas, Brazil, 5ISCA Technologies, Ltda., Vacaria, Brazil
* **D3633**Efficacy and side effects of the insect proof nets against spotted-wing drosophila, *Drosophila suzukii*, on cherry and soft fruits in Italy. **Nicola Mori** (nicola. mori@unipd.it)1, Stefano Caruso2, Lorenzo Tonina1, Angela Gottardello3, Giacomo Vaccari2, and Alberto Grassi3, 1Univ. of Padova, Legnaro, Italy, 2Plant Protection Consortium Province of Modena, Modena, Italy, 3Edmund Mach Foundation, San Michele all’Adige, Italy
* **D3634**Optimizing a mass trapping system design for organic management of Japanese beetles. **Austen Dudenhoeffer** (austen.dudenhoeffer657@my.lincolnu.edu), Jason Miller, and Jaime Pinero, Lincoln Univ., Jefferson City, MO

**D3635** Mating behavior disruption: A new technology of  
pest management by courtship signal suppression  
with non-toxic chemicals, acetylated glyceride (BEMIDETACHTMEC) and flonicamid, against  
B*emisia tabaci* and rice planthoppers. **Kenkichi Kanmiya** (k-kanmiya@iskweb.co.jp)1, Takayuki Kashima1, Kiyomitsu Yoshida1, and Yutaka Arimoto2, 1Ishihara Sangyo Kaisha, Ltd., Kusatsu, Japan, 2RIKEN Institute, Wako, Japan

**D3636** Evaluation of potentially attractive compounds for wood-boring beetle management in Tennessee and Connecticut. **Alicia Bray** (brayalic@gmail.com)1, Karla Addesso2, Jason B. Oliver2, and Paul O’Neal2, 1Central Connecticut State Univ., New Britain, CT, 2Tennessee State Univ., McMinnville, TN

**D3637** Efficacy of a linear particle accelerator for the sterilization of American serpentine leafminer, *Liriomyza trifolii*, in a sterile insect techique-based management program. **Cynthia Scott-Dupree** (cscottdu@uoguelph.ca)1, Maryam Sultan1, Graeme Murphy2, and Rose Buitenhuis3, 1Univ. of Guelph, Guelph, ON, Canada, 2Biological Control Solutions, Welland, ON, Canada, 3Vineland Research and Innovation Centre, Vineland Station, ON, Canada

**D3638** Presentation withdrawn

**D3639** Occurrence of a neogregarine-like protozoan, *Farinocystis* sp., in an artificial diet mass-rearing system in the West Indian sweet potato weevil, *Euscepes postfasciatus*. **Tsuyoshi Ohishi** (ooishits@ pref.okinawa.lg.jp)1, Kaori Tsurui2, Kiyohito Teruya1, and Atsushi Honma3, 1Okinawa Prefectural Plant Protection Center, Naha, Japan, 2Univ. of the Ryukyus, Nishihara, Japan, 3Univ. of the Ryukyus, Okinawa, Japan

**D3640** Quantity or quality?: Reproductive development of mass-reared west Indian sweet potato weevil, *Euscepes postfasciatus*, under high yield conditions for eradication using sterile insect technique.  
**Kiyohito Teruya** (teruyki@pref.okinawa.lg.jp)1, Tsuyoshi Ohishi1, Norikuni Kumano2, and Kaori Tsurui3, 1Okinawa Prefectural Plant Protection Center, Naha, Japan, 2Obihiro Univ. of Agriculture and Veterinary Medicine, Obihiro, Japan, 3Univ. of the Ryukyus, Nishihara, Japan

**D3641** Study on control effectiveness of huanglongbing based on eradication of Asian citrus psyllid, *Diaphorina citri,* surrounding citrus orchard. **Runqian Mao** 102438816@qq.com), Guangdong Academy of Agricultural Sciences, Guangzhou, China

**D3642** Nymphal development of *Dicyphus errans* under different levels of food availability. Nikos Kordas, Konstantina Arvaniti, Argyro Fantinou, and **Dionyssios Perdikis** (dperdikis@aua.gr), Agricultural Univ. of Athens, Athens, Greece

**D3643** Companion and refuge plants to control insect pests. **Jesusa C. Legaspi** (jesusa.legaspi@ars.usda.gov)1,  
Neil Miller1, Muhammad Haseeb2, and Lambert Kanga2, 1USDA - ARS, Tallahassee, FL, 2Florida A&M Univ., Tallahassee, FL

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* **D3644**Stress signal reduction as a tool for managing ambrosia beetles in ornamental nursery stock. **Karla Addesso** (kaddesso@tnstate.edu)1, Jason B. Oliver1, Paul A. O’Neal1, and Matthew Brown2, 1Tennessee State Univ., McMinnville, TN, 2Tennessee State Univ., Nashville, TN
* **D3645**Pollinators but not pollination services vary across urban agricultural sites. **Ashley Bennett** (bennettashleyb@ gmail.com) and Sarah Lovell, Univ. of Illinois, Champaign, IL
* **D3646**Environmental influences impacting leg coloration of *Chrysodeixis includens* (Lepidoptera: Noctuidae) larvae. **K. Clint Allen** (clint.allen@ars.usda.gov), Nathan Little, and Lou Andrews, USDA - ARS, Stoneville, MS
* **D3647**Dispersal of codling moth adults within typical agro-ecosystems of central Chile: Relevance of source unmanaged host-plant infestation. Constanza Fritz1, **Marcela Rodríguez** (marcerodriguez@udec.cl)2,   
  Blas Lavandero1, Esteban Basoalto3, Wilson Barros- Parada1, Alan L. Knight4, and Eduardo Fuentes-Contreras1, 1Univ. of Talca, Talca, Chile, 2Univ. of Concepción, Concepción, Chile, 3Austral Univ., Valdivia, Chile, 4USDA - ARS, Wapato, WA
* **D3648**Cultivated plant diversity controls arthropod communities and *Helicoverpa armigera* regulation in tomato cropping systems. **Anicet Dassou** (dassoua@ yahoo.fr), Polytechnic Univ. of Abomey, Dassa-zoumè, Benin
* **D3649**Determine efficacy of pesticides for management of armored scale in potted plants. **Yingfang Xiao** (yfxiao@ufl.edu)1, Runqian Mao2, and Steven P. Arthurs1, 1Univ. of Florida, Apopka, FL, 2Guangdong Academy of Agricultural Sciences, Guangzhou, China
* **D3650**SCOPE: Using *anti*-conservation biology for new approaches in urban IPM. **Sabrina Hymel** (hyme0003@umn.edu) and Stephen Kells, Univ. of Minnesota, St. Paul, MN
* **D3651**Using Termidor® SC (fipronil 0.06%) and an additive for Formosan subterranean termite, *Coptotermes formosanus*, management in Lake Charles, Louisiana. **Dennis R. Ring** (dring@agctr.lsu.edu)1 and Robert Davis2, 1Louisiana State Univ., Baton Rouge, LA, 2BASF, Pflugerville, TX
* **D3652**Laboratory bioassay for evaluating perimeter mulch treatments for management of outdoor species. **Patricia Zungoli** (pzngl@clemson.edu)1, Eric Benson1, Brittany C. Russ1, Jinbo Song1, and Kerem Öter2, 1Clemson Univ., Clemson, SC, 2Istanbul Univ., Istanbul, Turkey

**Poster Session 3: Invasive and Exotic Entomology**

***West Hall C (Convention Center)***

**D3653** How many is too many? Risk assessment of giant African snail (*Achatina fulica*). **Shweta Sharma** (shweta.sharma@freshfromflorida.com), Katrina Dickens, Amy Howe, and Shannen Leahy, Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

**D3654** Results from the regional identification center of the United States Department of Agriculture, Animal Plant Health Inspection Service (Raleigh hub) for the 2015- 2016 wood-boring beetle surveys, including new state and county records. Richard Brown1, **Jennifer Seltzer** (jls30@entomology.msstate.edu)2, and Terence Schiefer2, 1Mississippi Entomological Museum, Mississippi State, MS, 2Mississippi State Univ., Mississippi State, MS

**D3655** Development of a multiplex PCR assay for the identification of coconut rhinoceros beetle (*Oryctes rhinoceros* L.). **Shizu Watanabe** (shizuw@hawaii.edu) and Michael Melzer, Univ. of Hawai’i, Honolulu, HI

**D3656** Biogeochemical interactions between an invasive scarab (Japanese beetle, *Popillia japonica* Newman) and its subterranean environment. Brittany Peterson, Michael Scharf, Matthew Ginzel, Douglas Richmond, and **Garrett Price** (price41@purdue.edu), Purdue Univ., West Lafayette, IN

**D3657** Biological and behavioral studies on *Ophraella communa* LeSage (Chrysomelidae: Galerucinae), potential biocontrol candidate agent of common ragweed *(Ambrosia artemisiifolia* L.) in Europe. **Alessandro Giuliani** (ale.giuliani90@libero.it)1, Gianfranco Anfora2, Silvia Arnone3, and  
Massimo Cristofaro3, 1Biotechnology and Biological Control Agency, Rome, Italy, 2Edmund Mach Foundation, San Michele all’Adige, Italy, 3ENEA, Rome, Italy

**D3658** The spread and management of the South American tomato leafminer, *Tuta absoluta*. **Amer Fayad** (afayad@vt.edu) and Rangaswamy Muniappan, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

**D3659** Temporal and spatial distribution of sweet potato weevils, *Cylas formicarius*, in the North Carolina sweet potato weevil quarantine area. **Alonso Suazo** (alonso. suazo@ncagr.gov), North Carolina Dept. of Agriculture and Consumer Services, Raleigh, NC

**D3660** Monitoring of brown marmorated stink bug in the northern San Joaquin Valley. **Jhalendra Rijal** (jrijal@ ucdavis.edu) and Roger Duncan, Univ. of California Cooperative Extension, Modesto, CA

**D3661** A comparison of nectar sources of the invasive hoverfly *Merodon equestris* and a native congener *M. kawamu- rae* (Diptera: Syrphidae) in Japan. **Mitsuaki Sutou** (mi.sutou@r8.dion.ne.jp), The Univ. of Tokyo, Tokyo, Japan

**D3662** Presentation withdrawn

**D3663** Survey on gamma irradiation doses to induce sterility on spotted wing drosophila (*Drosophila suzukii*). **Vicente Navarro-Llopis** (vinallo@ceqa.upv.es), Sandra Vacas, and Jaime Primo, Polytechnic Univ. of València, València, Spain

**D3664** The impact of spotted wing drosophila *(Drosophila suzukii)* on pesticide use in New Jersey highbush blueberries. **Dean Polk** (polk@aesop.rutgers.edu), Rutgers, The State Univ. of New Jersey, Chatsworth, NJ

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* **D3665**Control of invasive pests on nursery stock using hot water treatments. **Bryan Vander Mey** (bvandermey@ ucdavis.edu)1, James A. Bethke2, Cheryl A. Wilen3, Ramiro Lobo2, and Arnold Hara4, 1Univ. of California, San Marcos, CA, 2Univ. of California Cooperative Extension, San Diego, CA, 3Univ. of California Statewide IPM Program, San Diego, CA, 4Univ. of Hawai’i, Hilo, HI
* **D3666**Establishment risk of important insect pests in Ningxia natural grassland. **Shuhua Wei** (weishuhua666@163. com)1,2, Ming Lei1, Liyuan Gao2, Rong Zhang2, and Zhihong Li1, 1China Agricultural Univ., Beijing, China, 2Ningxia Academy of Agriculture and Forestry Sciences, Yinchuan, China
* **D3667**Objective prioritization of exotic arthropods: Development and validation of a new model. **Ernie Hain** (ernie.hain@aphis.usda.gov)1, Alison Neeley2,  
  Leslie Newton2, ByeongJoon Kim1, Godshen Pallipparambil1, Jarrod Morrice1, and Betsy Randall-Schadel2, 1NSF Center for Integrated Pest Management, Raleigh, NC, 2USDA - APHIS, Raleigh, NC
* **D3668**Agriculture quarantine inspection data: a tool for discovering new country records for insect taxa. **Jason Botz** (jason.t.botz@aphis.usda.gov), USDA - APHIS, Nogales, AZ
* **D3669**Scents and sensibility: Florida’s eradication efforts  
  and long-term plans for giant African snail (*Achatina fulica*). **Amy Howe** (amy.howe@freshfromflorida.com), Florida Dept. of Agriculture and Consumer Services, Gainesville, FL
* **D3670**Presentation withdrawn
* **D3671**Nutrient profiles of the brown marmorated stink bug. **Victoria Skillman** (skillmav@onid.orst.edu)1,  
  Nik G. Wiman2, and Jana Lee3, 1Oregon State Univ., Corvallis, OR, 2Oregon State Univ., Aurora, OR, 3USDA - ARS, Corvallis, OR
* **D3672**Optimizing natural biological control to manage the invasive crape myrtle bark scale (*Eriococcus lagerstroemiae* Kuwana) on crape myrtle in the landscape. **Frank Hale** (fahale@utk.edu), Univ. of Tennessee, Nashville, TN
* **D3673**Presentation withdrawn
* **D3674**Monitoring and risk analysis of the new invasive species *Metcalfa pruinosa* Say, 1830 (Homoptera: Flatidae) in the natural and agricultural area of Romania. **Manole Traian** (traian.manole@gmail.com)1, Petrescu Eugenia2, and Ionescu-Malancus Irina3, 1Research - Development Institute for Plant Protection, Bucharest, Romania, 2Carol Davila Sanitary School, Bucharest, Romania, 3S. C. Marine Research S. R. L., Bucharest, Romania
* **D3675**Resistance of three different tomato cultivars to tomato leafminer (*Tuta absoluta*) induced by jasmonic and salicylic acid. **Babak Zahiri** (bzahiri@gmail.com), Mohammad Khanjani, and Azim Nemati, Bu-Ali Sina Univ., Hamedan, Iran
* **D3676**Introduced and potentially invasive bees (Hymenoptera: Apoidea: Anthophila) in the United States.  
  **Allan Smith-Pardo** (allan.h.smith-pardo@aphis.usda. gov), USDA - APHIS, San Francisco, CA

**D3677** Exotic ants (Hymenoptera: Formicidae) of Mississippi. **Joe A. MacGown** (jmacgown@entomology.msstate. edu)1, JoVonn Hill2, Richard Brown1, and Ryan Whitehouse2, 1Mississippi Entomological Museum, Mississippi State, MS, 2Mississippi State Univ., Mississippi State, MS

**D3678** Thelytokous parthenogenesis of queens in *Strumigenys rogeri* Emery (Hymenoptera: Formicidae). **Ca-Sin Lam** (matsu.ryuhei@gmail.com), Chung-Chi Lin, and Shu-Fen Hsu, National Changhua Univ. of Education, Changhua, Taiwan

**D3679** Molecular identification of the ghost ant, *Tapinoma melanocephalum* (Fabricius): A preliminary study. **Christopher Scocco** (chris.scocco@ufl.edu) and  
Rudolf Scheffrahn, Univ. of Florida, Fort Lauderdale, FL

**D3680** A comprehensive genetic assay for United States native and imported fire ant species (Formicidae: *Solenopsis*). **David Cross** (dcross@entomology. msstate.edu) and Michael Caprio, Mississippi State Univ., Mississippi State, MS

**D3681** Incipient colony growth in the red imported fire ant (*Solenopsis invicta*). **Hester Dingle** (hester.dingle@ gmail.com) and Joshua R. King, Univ. of Central Florida, Orlando, FL

**D3682** Population genetics and colony structure of the invasive tawny crazy ant (*Nylanderia fulva)*.  
**Bryant McDowell** (bryant868@tamu.edu),  
Robert Puckett, and Edward Vargo, Texas A&M Univ., College Station, TX

**D3683** Molecular evidence for different migration patterns  
of *Helicoverpa armigera* in Brazil. **Rogério Gonçalves** (rogeriomg20@yahoo.com.br)1, Thiago Mastrangelo2, and Ana Maria L. Azeredo-Espin3, 1Center of Molecular Biology and Genetic Engineering, Campinas, Brazil, 2Univ. of São Paulo, Piracicaba, Brazil, 3State Univ. of Campinas, Campinas, Brazil

**D3684** Identifying intercepted *Helicoverpa* larvae and their relatives at United States ports: Techniques and challenges. **Alexander Cunningham** (alexander.cunningham@ aphis.usda.gov)1 and James Young2, 1USDA - APHIS, Miami, FL, 2USDA - APHIS, Baltimore, MD

**D3685** Orthoptera interceptions at United States ports of entry: Frequency and pathway analysis. **Stephen T. Young** (stephen.t.young@aphis.usda.gov), USDA - APHIS, Blaine, WA

**D3686** Coming in from the cold: Refrigeration kills non-native American cockroaches but not native species.  
**David Bradt** (dave.bradt@okstate.edu), W. Wyatt Hoback, and Tanner Jenkins, Oklahoma State Univ., Stillwater, OK

**D3687** The effect of bioswale characteristics on arthropod diversity. **Samantha Kaiser** (srkaiser@ncsu.edu), Kelly Harris, Sarah Parsons, and Steven D. Frank, North Carolina State Univ., Raleigh, NC

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**Poster Session 3: Physiology and Biochemistry**

***West Hall C (Convention Center)***

* **D3688**Characterization of AMPK in female *Aedes aegypti* and *Georgecraigius atropalpus* mosquitoes in relation to low and adequate food intake. **Aparna Telang** (atelang@usf.edu)1, Aminda Abdul Qayum2, and  
  Zeina E. Jouni3, 1Univ. of South Florida, Sarasota, FL, 2Univ. of Richmond, Richmond, VA, 3Kellogg Company, Battle Creek, MI
* **D3689**Analogues of sex pheromone component in the pheromone gland of *Bombyx mori*. **Takeshi Fujii** (takeshi.f0405@gmail.com)1,2, Hidefumi Mitsuno2, Shigeru Matsuyama3, Takuya Nirazawa2, Katsuhiko Ito1, Takeshi Yokoyama1, Takaaki Nishioka4, Ryohei Kanzaki2, and Yukio Ishikawa2, 1Tokyo Univ. of Agriculture and Technology, Fuchu, Japan, 2The Univ. of Tokyo, Tokyo, Japan, 3Univ. of Tsukuba, Tsukuba, Japan, 4Nara Institute of Science and Technology, Ikoma, Japan

**D3697**

**D3698**

**D3699**

**D3700**

**D3701**

**D3702**

**D3703**

Christopher Leininger1, Mark Nelson1, J. Lindsey Flexner1, Nasser Yalpani2, Dan Altier2, Lu Liu3, and Gusui Wu2, 1DuPont Pioneer, Wilmington, DE, 2DuPont Pioneer, Johnston, IA, 3DuPont Pioneer, Hayward, CA

Biochemical, bioinformatic, and biophysical approaches for understanding the role of -ATPase as a lipophorin receptor in *Panstrongylus megistus,* a hematophagous vector of Chagas ́ disease (Hemiptera: Reduviidae). Leonardo Fruttero1, Jimena Leyria1, Rodrigo Ligabue- Braun2, Pedro Clop1, Maria Perillo1, Celia Carlini3,

Estela L. Arrese4, José Soulages4, and **Lilián Canavoso** (lcanavo@fcq.unc.edu.ar)1, 1National Univ. of Córdoba, Córdoba, Argentina, 2Federal Univ. of Rio Grande, Porto Alegre, Brazil, 3Pontifical Catholic Univ. , Porto Alegre, Brazil, 4Oklahoma State Univ., Oklahoma City, OK

Insect mitochondrial adenine nucleotide translocases and their functions. Ryohei Sugahara1, Akiya Jouraku1, Takenori Yamamoto2, Yasuo Shinohara2, Toyomi Kotaki1, Hideto Miyoshi3, and **Takahiro Shiotsuki** (shiotsuk@ affrc.go.jp)1, 1National Institute of Agrobiological Sciences, Tsukuba, Japan, 2Tokushima Univ., Tokushima, Japan, 3Kyoto Univ., Kyoto, Japan

An evolutionarily-unique heterodimeric voltage-gated cation channel in aphids. **T. G. Emyr Davies** (emyr. davies@rothamsted.ac.uk)1, Joanna Amey1, Andrias O’Reilly2, Mark Burton3, Mirel Puinean1, Ian Mellor4,

Ian Duce4, Lin Field1, B. Wallace5, and Martin Williamson1, 1Rothamsted Research, Harpenden, United Kingdom, 2Liverpool John Moores Univ., Liverpool, United Kingdom, 3Univ. of Leicester, Leicester, United Kingdom, 4Univ.

of Nottingham, Nottingham, United Kingdom, 5Univ. of London, London, United Kingdom

20-hydroxyecdysone induces fatty acid synthesis and triacylglycerol storage in the fat body of *Rhodnius prolixus*. Pamela Nascimento1, Gustavo Tavares-Silva2, Alessa Macedo-Silva2, Cristina Motinha2, Priscila Ausina2, Mauro Sola-Penna2, and **David Majerowicz** (majerowicz@ pharma.ufrj.br)2, 1Federal Institute of Science and Technology, Rio de Janeiro, Brazil, 2Federal Univ. of

Rio de Janeiro, Rio de Janeiro, Brazil

Regulatory elements of the adult molt in the western tarnished plant bug (*Lygus hesperus*). **Colin Brent** (colin.brent@ars.usda.gov)1, Meixian Wang2, Yun-Gen Miao2, and Joe Hull1, 1USDA - ARS, Maricopa, AZ, 2Zhejiang Univ., Hangzhou, China

Molecular mechanism of cardol, isolated from *Trigona incisa* stingless bee propolis, on apoptosis of SW620 human colorectal cancer cell line. **Chanpen Chanchao** (chanpen@sc.chula.ac.th)1, Paula Kustiawan1, Kriengsak Lirdprapamongkol2, Tanapat Palaga1, Songchan Puthong1, Preecha Phuwapraisirisan1, and Jisnuson Svasti2, 1Chulalongkorn Univ., Bangkok, Thailand, 2Chulabhorn Research Institute, Bangkok, Thailand

Molecular structural study on silkworm silk and spider silk. **Mitsuhiro Miyazawa** (miyazawa@affrc.go.jp), National Institute of Agrobiological Sciences, Tsukuba, Japan



* **D3690**Pheromone biosynthesis in moths. **Russell Jurenka** (rjurenka@iastate.edu), Iowa State Univ., Ames, IA
* **D3691**Wild type and mutated odorant binding protein from *Anopheles funestu*s differ in binding properties. **Jiankun Yi** (jkyi@ucdavis.edu)1, Wei Xu1,2,  
  David Wilson1, and Walter S. Leal1, 1Univ. of California, Davis, CA, 2Murdoch Univ., Murdoch, Australia
* **D3692**Cloning and characterization of the pheromone biosynthesis activating neuropeptide receptor (PBANR) from *Mamestra brassicae* (Lepidoptera: Noctuidae). József Fodor1, Joe Hull2, Gabriella Köblös1, Emmanuelle Jacquin-Joly3, Tamás Szlanka4, and **Adrien Fónagy** (fonagy.adrien@agrar.mta.hu)1, 1Hungarian Academy of Sciences, Budapest, Hungary, 2USDA - ARS, Maricopa, AZ, 3INRA, Versailles, France, 4Hungarian Academy of Sciences, Szeged, Hungary
* **D3693**Effects of neuropeptide F on growth of internal organs in grasshoppers (*Romalea guttata*). Matthew Heck, Davis Beard, and **John Hatle** (jhatle@unf.edu), Univ. of North Florida, Jacksonville, FL
* **D3694**BmPCD and BmDHPR: Two BH4 synthesis enzymes are activated in the *Bombyx mori* mutant *lem*. **Junshan Gao** (gaojsh@ahau.edu.cn), Wentian Li, Daobo Zhang, Lanlan Wu, and Yan Meng, Anhui Agricultural Univ., Hefei, China
* **D3695**DmCatD, a cathepsin D-like peptidase of the hematophagous insect vector *Dipetalogaster maxima* (Hemiptera: Reduviidae): Bioinformatic analysis and internalization pathway in developing oocytes.   
  **Jimena Leyria** (jleyria@fcq.unc.edu.ar)1, Leonardo Fruttero1,2, Fabián Ramos1, Rodrigo Ligabue-Braun3, Celia Carlini2, Beatriz Settembrini4, and Lilián Canavoso1, 1National Univ. of Córdoba, Córdoba, Argentina, 2Pontifical Catholic Univ. , Porto Alegre, Brazil, 3Federal Univ.   
  of Rio Grande, Porto Alegre, Brazil, 4Univ. of Austral, Derqui, Argentina
* **D3696**Binding of a novel binary corn rootworm active in midgut tissue from susceptible and Cry34/35-selected *Diabrotica virgifera virgifera* (LeConte). **Claudia Pérez- Ortega** (claudia.perezortega@pioneer.com)1,

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* **D3704**Increased oxidative stress induced by alkaloids derived from Girgensohnine on mitochondria isolated from larvae of *Aedes aegypti* (Diptera: Culicidae).  
  Mayra Borrero, Aurora Carreño, Vladimir Kouznetsov, and **Stelia Mendez** (scmendez@uis.edu.co), Industral Univ. of Santander, Piedecuesta, Colombia
* **D3705**Toxicological effects of ethephon on the model organism *Galleria mellonella* L. (Lepidoptera: Pyralidae). **Hulya Altuntas** (hyalcitas@anadolu.edu.tr),  
  Emine Duman, and Sumeyra Sanal Demirci, Anadolu Univ., Eskisehir, Turkey
* **D3706**Peritrophins in Arachnida species: Evolution an expression of proteins involved in peritrophic membrane constitution. **Adriana Lopes** (adriana.lopes@butantan. gov.br)1, Jose Patane2, and Felipe Fuzita2, 1Butantan Institute, São Paulo, Brazil, 2Univ. of São Paulo,   
  São Paulo, Brazil
* **D3707**Expression profiles of the vitellogenin receptor gene from sunn pest *Eurygaster maura* playing a key role for oocyte development. Asli Dageri and **Nurper Guz** (nurperguz@agri.ankara.edu.tr), Ankara Univ., Ankara, Turkey
* **D3708**Role of Wnt pathway in the regulation of TOR signaling- mediated egg production in the mosquito *Aedes aegypti*. **Shin-Hong Shiao** (shshiao@ntu.edu.tw), National Taiwan Univ., Taipei, Taiwan
* **D3709**Development of highly active enzymes produced by microbes from insects. **Ho-Yong Park** (hypark@kribb. re.kr), Korea Research Institute of Bioscience and Biotechnology, Daejeon, South Korea
* **D3710**Photoperiodism of diapause induction in the moth *Thyrassia penangae*: Measuring day length rather than night length. **Haimin He** (hehaimin1984@163.com), Haijun Xiao, and Fangsen Xue, Jiangxi Agricultural Univ., Nanchang, China
* **D3711**A soluble pyrophosphatase is essential to oogenesis in the red flour beetle (*Tribolium castaneum*).  
  **Eldo Campos** (eldocampos@yahoo.com.br),  
  Klebea Carvalho, and Rodrigo Fonseca, Federal Univ. of Rio de Janeiro, Macaé, Brazil
* **D3712**Correlation between body color and ovarian development in the stink bug, *Glaucias subpunctatus*. Tomohiro Honda and **Kyo Itoyama** (itoyama@meiji. ac.jp), Meiji Univ., Kanagawa, Japan
* **D3713**Unravelling mechanotransduction in the locust ear. **Ben Warren** (bw120@le.ac.uk) and Tom Matheson, Univ. of Leicester, Leicester, United Kingdom
* **D3714**Physiological modification induced by nicotine in the German cockroach (*Blattella germanica*). **Vincenzo Di Ilio** (vincenzo.diilio@rothamsted.ac.uk), Michael Birkett, and John Pickett, Rothamsted Research, Harpenden, United Kingdom
* **D3715**Roll of ice crystal growth suppression in the freeze tolerance of the rice stem borer, *Chilo suppressalis*. **Yohei Izumi** (yohei@life.shimane-u.ac.jp)1,  
  Kanari Murakami1, and Yoshinori Furukawa2, 1Shimane Univ., Matsue, Japan, 2Hokkaido Univ., Sapporo, Japan

**D3716** *Aedes aegypti* Rexville D strain show diminished fecundity when infected with Dengue virus serotype 2, isolated from 2010 epidemic in Brazil. **Rafaella Ioshino** (myxelia@gmail.com), André Costa-da-Silva,

Danilo Carvalho, and Margareth Capurro, Univ. of São Paulo, São Paulo, Brazil

**D3717** Seasonal plasticity of the small copper butterfly *Lycaena phlaeas daimio* Seitz. **Akira Yamanaka** (yamanaka@yamaguchi-u.ac.jp)1, Yuki Masumoto1, Narumi Abe1, Masanori Ochiai2, and Chisato Kitazawa1, 1Yamaguchi Univ., Yamaguchi, Japan, 2Hokkaido Univ., Sapporo, Japan

**D3718** Effect of temperature and photoperiod on the morphological trait of the butterfly *Narathura japonica*. **Hibiki Yamamoto** (v002uh@yamaguchi-u.ac.jp), Yusuke Isamura, Chisato Kitazawa, and Akira Yamanaka, Yamaguchi Univ., Yamaguchi, Japan

**D3719** Behavioral differences of a bean bug, *Riptortus pedestris*, with and without microbial symbiont, *Burkholderia* sp. **Hong Geun Kim** (hgkim408@gachon. ac.kr), Minhyung Jung, Soowan Kim, and Doo-Hyung Lee, Gachon Univ., Seongnam, South Korea

**D3720** Compensatory feeding may produce suboptimal performance in the grasshopper *Melanoplus differentialis*. **Jerry Howard** (jjhoward@uno.edu), The Univ. of New Orleans, New Orleans, LA

**D3721** Presentation withdrawn

**D3722** Evidence for the presence of biogenic magnetic particles in the migratory brown planthopper and its potential significance. **Weidong Pan** (panwd@mail.iee. ac.cn), Chinese Academy of Sciences, Beijing, China

**D3723** Renal function in the pest insect *Drosophila suzukii*. **Joseph Yeoh** (joseph.yeoh@glasgow.ac.uk)1, Richard Marley1, Elwyn Isaac2, Julian Dow1, and Shireen Davies1, 1Univ. of Glasgow, Glasgow, United Kingdom, 2Univ. of Leeds, Leeds, United Kingdom

**D3724** Vitellogenin transport is mediated by membrane receptors in the follicular cells of Hymenoptera.  
**José Eduardo Serrão** (jeserrao@ufv.br) and  
Virginia Dohanik, Federal Univ. of Viçosa, Viçosa, Brazil

**Poster Session 3: RNAi and Gene Expression Control in Insects**

***West Hall C (Convention Center)***

**D3725** Absence of piRNA pathway in the house dust mite. **Md. Mosharrof Hossain Mondal** (mdmosharrofhossain. mondal@eagles.usm.edu) and Alex Flynt, Univ. of Southern Mississippi, Hattiesburg, MS

**D3726** cDNA library construction and gene screening of *Harmonia axyridis* (Coleoptera: Coccinellidae) for gene functional analysis. **Sang-Eun Park** (tkddms2622@ naver.com), Young-Nam Youn, Yong-Man Yu, and Jung-Kyu Kim, Chungnam National Univ., Daejeon, South Korea

**D3727** RNA interference of an esterase gene results in reduced acaricide resistance in *Tetranychus cinnabarinus* (Boisduval). **Qiang Xu** (qxx07a@acu.edu)1, Li Shi2,  
and Lin He2, 1Abilene Christian Univ., Abilene, TX, 2Southwest Univ., Chongqing, China

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**D3728** Peritrophic membrane genes from *Diabrotica virgifera* **VP13** *virgifera* and their potential application as target in  
pest management in future. **Newton Carneiro** (newtonc800@gmail.com)1, Haichuan Wang2,

Ana Vélez2, and Blair Siegfried3, 1Embrapa Maize and Sorghum, Sete Lagoas, Brazil, 2Univ. of Nebraska, Lincoln, NE, 3Univ. of Florida, Gainesville, FL

**D3729** Nanoparticles and nucleic acids: Binding, dissociation, and RNAi. **Emily Nadeau** (eana226@g.uky.edu), Bruce Webb, Barbara Knutson, Stephen Rankin, and M. Arif Khan, Univ. of Kentucky, Lexington, KY

Risk assessments for the potential spread of the Afri- can sweet potato weevil, *Cylas puncticollis*, due to global warming. **Joshua Okonya** (j.okonya@cgiar.org)1, Norma Mujica2, Pablo Carhuapoma2, and Jürgen Kroschel2,

1International Potato Center, Kampala, Uganda, 2International Potato Center, Lima, Peru

**VP14** Bioclimatic envelope-based risk mapping of the bark beetle-vectored blue stain fungus, *Ceratocystis polonica*. **Kishan Sambaraju** (kishan.sambaraju@ canada.ca), Rémi Saint-Amant, and Chantal Côté, Natural Resources Canada, Québec City, QC, Canada

* **D3730***Schizaphis graminum* and *Rhopalosiphum maidis* control **VP15** in maize by RNAi. **Andrea Carneiro** (andrea.carneiro@   
  embrapa.br)1, Haichuan Wang2, Ana Laura Verdolin1, Beatriz Barros1, and Newton Carneiro1, 1Embrapa Maize and Sorghum, Sete Lagoas, Brazil, 2Univ. of Nebraska, Lincoln, NE
* **D3731**Oral delivery of dsRNA lipoplexes to German **VP16** cockroach, *Blattella germanica*, protects dsRNA from degradation. **How-Jing Lee** (m480@ntu.edu.tw),  
  National Taiwan Univ., Taipei, Taiwan
* **D3732**Developing RNA interference-based approaches for  
  managing the German cockroach, *Blattella germanica*.  
  **Zhiping Xu** (zhiping@ksu.edu)1,2, Peiying Hao1,3, and **VP17** Kun Yan Zhu1, 1Kansas State Univ., Manhattan, KS,  
  2East China Univ. of Science and Technology, Shanghai,  
  China, 3China Jiliang Univ., Hangzhou, China
* **D3733**Development of insecticidal gene silencing for control  
  of kudzu bug, *Megacopta cribraria*. **Lucas Hietala** (lhietal1@vols.utk.edu), Jerreme J. Jackson, **VP18** Margaret Staton, Rahul Banerjee, C. Neal Stewart,   
  and Juan Luis Jurat-Fuentes, Univ. of Tennessee, Knoxville, TN
* **D3734**Knocking down laccase 2 gene in *Aedes aegypti*:  
  Effects on egg chorion. **Caroline Louise** (cgmlouise@ **VP19** gmail.com)1,2 and Lincoln Suesdek1,2, 1Univ. of São Paulo,  
  São Paulo, Brazil, 2Instituto Butantan, São Paulo, Brazil
* **D3735**cDNA library construction of 28-spotted potato ladybird, *Henosepilachna vigintioctomaculata*, for RNA interference application. **Jeong Hee Kim** (wjdgml133@ naver.com), Chungnam National Univ., Daejeon, South Korea
* **D3736**Effects of RNAi transgenic tomato on mortality of  
  *Tuta absoluta* (Lepidoptera: Gelechiidae). **Flavia Bento** (flaviammbento@usp.br)1, Roberto Camargo2, and Antonio Figueira1, 1Univ. of São Paulo, Piracicaba, Brazil, 2Nuclear Energy and Agriculture Center, Piracicaba, Brazil
* **D3737**Presentation withdrawn

**Virtual Poster Session**

***West Hall C (Convention Center)***

**VP12** Red wood ants, *Formica rufa*-group, and tectonic processes interact and contribute to climatic change. **Gabriele Berberich** (gabriele.berberich@uni-due.de)1, Aaron M. Ellison2, and Christian Wöhler3, 1Univ. of Duisburg-Essen, Essen, Germany, 2Harvard Univ., Petersham, MA, 3Technical Univ. of Dortmund, Dortmund, Germany

Habitat associations of a Jerusalem cricket, *Stenopelmatus monahansensis,* at the Monahans  
sand dunes in western Texas. **Roberto Miranda** (roberto.miranda@est.zamorano.com)1, Wilber Gutierrez1, Samuel Discua2, and Scott Longing2, 1Zamorano Univ., Tegucigalpa, Honduras, 2Texas Tech Univ., Lubbock, TX

Spatial distribution of cavity-nesting solitary bees (Hymenoptera: Apidae) from mangroves to forests in the southern São Paulo, Brazil. **Patricia dos Santos Vilhena** (patricia.vilhena@outlook.com) and

Carlos Alberto Garófalo, Univ. of São Paulo, Ribeirão Preto, Brazil

An annotated checklist and catalogue of the native  
bee species occurring on the Southern High Plains in western Texas. **Wilber Gutierrez** (wilber.gutierrez@est. zamorano.edu)1, Roberto Miranda1, Samuel Discua2, and Scott Longing2, 1Zamorano Univ., Tegucigalpa, Honduras, 2Texas Tech Univ., Lubbock, TX

Phylogeny of euthyplociid mayflies (Insecta: Ephemeroptera: Euthyplociidae). **Inês C. Gonçalves** (inescg.bio@gmail.com), Jorge Luiz Nessimian, and Daniela M. Takiya, Federal Univ. Federal of Rio de Janeiro, Rio de Janeiro, Brazil

Three new species of *Oobius* Trjapitzin (Hymenoptera: Encyrtidae) that parasitize eggs of *Agrilus* spp. (Coleoptera: Buprestidae) infesting ash and poplar trees from China. **Yan-Xia Yao** (yanxia.yao1@gmail.com)1, Jian Duan2, Xiao-Yi Wang1, Zhong-qi Yang1, Kai Zang1, and Leah S. Bauer3, 1Chinese Academy of Forestry, Beijing, China, 2USDA - ARS, Newark, DE, 3USDA - Forest Service, Lansing, MI

* **VP20**Infestations and management of the cassava mealybug, *Phenacoccus manihoti* (Hemiptera: Pseudococcidae), a newly invasive pest in Indonesia. **Aunu Rauf** (aunu@ indo.net.id)1, Nila Wardani2, Kris Wyckhuys3, and   
  Merle Shepard4, 1Bogor Agricultural Univ., Bogor, Indonesia, 2Assessment Institute for Agricultural Technology, Bandar Lampung, Indonesia, 3International Center for Tropical Agriculture, Hanoi, Vietnam, 4Clemson Univ., Charleston, SC
* **VP21**Study on the control of soybean pod borer, *Leguminivora glycinivorella*, with sex pheromone combining *Trichogramma* and chemical insecticide. **Kuijun Zhao** (kjzhao@neau.edu.cn)1, Yuan Cheng1, Lanlan Han1, Hong Wang1, and Keqin Wang2, 1Northeast Agricultural Univ., Harbin, China, 2Heilongjiang Academy of Agricultural Sciences, Harbin, China

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* **VP22**The mirid *Engytatus varians* reduces the populations **VP31** of *Bactericera cockerelli* under greenhouse conditions.  
  **Daniel A. Perez Aguilar** (dan\_a\_p\_a@hotmail.com)1,  
  Ana M. Martinez1, Jose I. Figueroa1, Benjamin Gomez2,   
  and Samuel Pineda1, 1Michoacan Univ. of Saint Nicholas of Hidalgo, Tarimbaro, Mexico, 2Michoacan Univ. of Saint Nicholas of Hidalgo, Morelia, Mexico
* **VP23**Electron microscopic examination for fungal growth  
  in isolated red flour beetle, *Tribolium castaneum*. **VP32 Hanan Bosly** (dr\_2009\_bosly@hotmail.com), Jazan  
  Univ., Jazan, Saudi Arabia
* **VP24**Biological activity and occlusion body production of  
  three *Spodoptera frugiperda* multiple nucleopolyhe- **VP33** drovirus. **Diana V. Garcia** (diana\_v\_eli@hotmail.com)1,  
  Jose I. Figueroa1, Samuel Pineda1, Fernando Tamayo2,  
  Rodrigo Lasa3, Jose Corrales4, Juan Cisneros5, and  
  Ana M. Martinez1, 1Michoacana Univ. of Saint Nicholas  
  of Hidalgo, Tarimbaro, Mexico, 2Secretariat of  
  Agricultural/Food Development and Rural Celaya,  
  Celaya, Mexico, 3Institute of Ecology, Xalapa, Mexico, 4Autonomous Univ. Univ. of Sinaloa, Culiacan, Mexico,  
  5College of the Southern Border, Tapachula, Mexico
* **VP25**Aphicidal activity of *Solanum panduriforme* (Mey) **VP34** extracts against the cabbage aphid *Brevicoryne*  
  *brassicae* (Linnaeus) on brassicas. **Mary Mhazo** (marymhere@yahoo.com)1, Edna Kunjeku1,

Behavioral and electrophysiological response to  
*Citrus limon and Citrus sinensis* in the medfly, *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae).  
Giorgia Sarais1, Giacomo Petretto2, Carla Lai1, Francesco Loy3, Paolo Solari3, Roberto Crnjar3, and **Carla Masala** (cmasala@unica.it)3, 1Univ. of Cagliari, Cagliari, Italy, 2Univ. of Sassari, Sassari, Italy, 3Univ. of Cagliari, Monserrato, Italy

Nitrogen manipulation on strawberry and its nutritional outcomes on two-spotted mite performance.  
**Mojtaba Hosseini** (m.hosseini@um.ac.ir), Ferdowsi Univ., Mashhad, Iran

*Bactrocera dorsalis* Hendel and *Bactrocera zonata* (Saunders) population fluctuations as influenced by various abiotic factors, at two different locations of North West Plain Zone of India. **Reena Sinha** (bkreena12@ gmail.com)1, Amandeep Kaur2, Bhav Sinha3, Pradeep Rai3, Anil Sharma1, Brinder Singh1, and Sonika Jamwal1, 1Sher-e-Kashmir Univ. of Agricultural Sciences and Technology, Bari Brahmana, India, 2Punjab Agriculture Univ., Patiala, India, 3Sher-e-Kashmir Univ. of Agricultural Sciences and Technology, Jammu, India

Differential gene expression profiling induced by blood feeding in the biting midge vector *Culicoides imicola*. **Wilma Fick** (wilma.fick@up.ac.za)1, Gert Venter2,  
Fidan Karatas1, and Erik Visser1, 1Univ. of Pretoria, Hatfield, South Africa, 2Agricultural Research Council, Onderstepoort, South Africa

Abe Addo-Bediako2, Thabile Ndlovu3, and Barry Blair4, 1Univ. of Venda, Thoyoyandou, South Africa, 2Univ. of Limpopo, Polokwane, South Africa, 3Univ. of Swaziland, Matsapa, Swaziland, 4Univ. of Pretoria, Pretoria,

South Africa

* **VP26**SporxyTM 360SC: A novel combination of spinetoram and methoxyfenozide for the control of rice stem borers and leafroller in China and Taiwan. **Peng Wang** (gavinwang@dow.com)1, Liang Chen1, Catherine Ren1, Ta-i Huang2, George Guan-Hua Lin3, and Jim X. Huang4, 1Dow AgroSciences, Shanghai, China, 2Dow AgroSciences, Taipei, Taiwan, 3Dow AgroSciences, PingTung, Taiwan, 4Dow AgroSciences, Indianapolis, IN
* **VP27**Developing management recommendations for the use of fungicide and insecticide seed treatments for soybeans in South Dakota. **Mike W. Dunbar** (dunbar@ iastate.edu), Febina Mathew, Jonathan Kleinjan, and Adam Varenhorst, South Dakota State Univ., Brookings, SD
* **VP28**Ultrastructure changes to AmE-711 honey bee, *Apis mellifera*, cells infected with viruses. **Michael Goblirsch** (goblirmj@umn.edu) and Anibal Armien, Univ. of Minnesota, St. Paul, MN
* **VP29**Insecticide mortality, *in vitro* detoxifying enzymes kinetics, and inhibition in two honey bee species,  
  *Apis mellifera* and *A. florea*. Amal Berjawi1, **Mohammad Ali Al-Deeb** (m\_aldeeb@uaeu.ac.ae)1, Syed Ashraf1, and Ahmed Rajab2, 1United Arab Emirates Univ., Al-Ain, United Arab Emirates, 2Abu Dhabi Food Control Authority, Al-Ain, United Arab Emirates
* **VP30**Why several insects feeding on toxicants decrease their food intake? Pilar Muñoz1, Marian Moralejo1, Meritxell Pérez-Hedo2, Matilde Eizaguirre1, and **Carmen Lopez** (carmen.lopez@udl.cat)1, 1Univ. of Lleida, Lleida, Spain, 2Univ. Jaume I, Castelló de la Plana, Spain
* **VP35**Mapping insecticide resistance in malaria vectors: Latest updates from IR Mapper. **Melinda Hadi** (meh@ vestergaard.com)1, Duncan Athinya1, and  
  Helen Pates Jamet2, 1Vestergaard, Nairobi, Kenya, 2Vestergaard, Washington, DC
* **VP36**The relationship between genetic variation and vector of *Pediculus humanus capitis* (Phthiraptera: Pediculidae). **Fadime Eroglu** (eroglufadime@hotmail. com)1, Mustafa Tanrıverdi2, Eda Icbay Daglı2, and Ismail Soner Koltas3, 1Zirve Univ., Gaziantep, Turkey, 2Gaziantep Publich Health Directorate, Gaziantep, Turkey, 3Cukurova Univ., Adana, Turkey
* **VP37**Measuring the ‘health’ of beneficial insects: Linking pest control services and sustainable crop production. **Mona Moradi-Vajargah** (mona.moradivajargah@ csiro.au) and Nancy Schellhorn, CSIRO, Dutton Park, Australia

**Symposium: Advances in Acarology**

***Room W314 B (Convention Center)***

**Moderators and Organizers:** Jose Carlos V. Rodrigues1,  
Monica A. Farfan2, Daniel Carrillo3, and Raul T. Villanueva4,  
1Univ. of Puerto Rico, San Juan, PR, 2Univ. of Illinois, Chicago, IL, 3Univ. of Florida, Homestead, FL, 4Texas A&M Univ., Weslaco, TX

9:15 **2659** Surface active mites in the northern Chihuahuan Desert, USA. **Cal Welbourn** (Warren.Welbourn@ freshfromflorida.com), Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

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9:30 **2660** Variation in the structure of mite communities in forest soils across a metropolitan landscape.  
**Monica A. Farfan** (mfarfa2@uic.edu), Amanda Henderson, Kristen A. Ross, and David H. Wise, Univ. of Illinois, Chicago, IL

9:45 **2661** Synergistic effects of acaricides used to control the ectoparasitic mite *Varroa destructor* on the reproductive health of honey bee (*Apis mellifera*) queens. **Elizabeth Walsh** (walshe@tamu.edu) and Juliana Rangel, Texas A&M Univ., College Station, TX

10:00 **2662** Acarine fauna associated with *Carica papaya* in Florida. **Leonardo Alvarez Rios** (leonardoalvarez@ufl. edu), Sabyan Honey, Rita Duncan, and Daniel Carrillo, Univ. of Florida, Homestead, FL

**10:15 BREAK**

10:30 **2663** Mycobiome and bacteriome diversity of *Brevipalpus yothersi* populations. **Oscar Ospina** (oscar.ospina@upr.edu) and José Carlos V. Rodrigues, Univ. of Puerto Rico, San Juan, PR

10:45 **2664** Nasal mites of the brood parasite brown-headed cowbird (*Molothrus ater*). **Alexis Hilario-Pérez** (ahilario@email.uark.edu) and Ashley P. G. Dowling, Univ. of Arkansas, Fayetteville, AR

11:00 **2665** Untangling a water mite genus: The North American *Monatractides* (Parasitengona: Torrenticolidae) story. **Whitney A. Nelson** (whitneyanelson@gmail.com), Ray Fisher, Danielle Fisher, and Ashley P. G. Dowling, Univ. of Arkansas, Fayetteville, AR

11:15 **2666** Diving in with torrent mites (Torrenticolidae: *Torrenticola*): Describing diversity in North America. **Ray Fisher** (jrfisher@uark.edu), Danielle Fisher, Whitney A. Nelson, and Ashley P. G. Dowling, Univ. of Arkansas, Fayetteville, AR

11:30 **2667** Bayesian species delimitation of the genus *Tyrophagus* (Acari: Acaridae). **Pamela Murillo** (pammr@umich.edu), Pavel B. Klimov, and  
Barry O’Connor, Univ. of Michigan, Ann Arbor, MI

11:45 **2668** A new hypothesis on the origin of the  
stylet sheath of the Eriophyoidea. **Samuel Bolton** (bolton.69@osu.edu)1, Gary R. Bauchan2, Ronald Ochoa2, and Hans Klompen1, 1The Ohio State Univ., Columbus, OH, 2USDA - ARS, Beltsville, MD

**Symposium: Advances in Tick and Mite Biology, Animal Disease Transmission, and Control**

***Room W414 C (Convention Center)***

**Moderators and Organizers:** R. Michael Roe1, Daniel Sonenshine2, C. S. Apperson1, and Catherine Hill3, 1North Carolina State Univ., Raleigh, NC, 2Old Dominion Univ., Norfolk, VA, 3Purdue Univ., West Lafayette, IN

9:15 **2669** Combating tick-borne diseases on a global scale: New paradigms for protecting public health and biosecurity. **Catherine Hill** (hillca@purdue.edu), Purdue Univ., West Lafayette, IN

9:45 **2670** Does the tick microbiome modulate vector competence for Rickettsiales? **Loganathan Ponnusamy** (loganathan\_ponnusamy@ncsu.edu)1, R. Michael Roe1, Charles Apperson1, and Steven Meshnick2, 1North

Carolina State Univ., Raleigh, NC, 2Univ. of North Carolina, Chapel Hill, NC

10:00 **2671** Immune response regulation in *Dermacentor variabilis*. Victoria Verhoeven and **Kevin Macaluso** (kmacaluso@vetmed.lsu.edu), Louisiana State Univ., Baton Rouge, LA

**10:15 BREAK**

10:30 **2672** Mevalonate-farnesal biosynthesis and neuroendocrine regulation of blood feeding and reproduction in ticks. **Jiwei Zhu** (jzhu4@ncsu.edu), North Carolina State Univ., Raleigh, NC

10:45 **2673** Tick feeding physiology complexity: A proteomics view. **Albert Mulenga** (amulenga@cvm. tamu.edu), Texas A&M Univ., College Station, TX

11:00 **2674** Modern advances in sustainable tick control. **Robert J. Miller** (robert.miller@ars.usda.gov)1,  
Felix Guerrero2, and Adalberto Perez de Leon2, 1USDA - ARS, Edinburg, TX, 2USDA - ARS, Kerrville, TX

11:15 **2675** Control of ticks through the use of a tick-killing robot. **Holly Gaff** (hgaff@odu.edu)1, Daniel Sonenshine1, and James Squire2, 1Old Dominion Univ., Norfolk, VA, 2Virginia Military Institute, Lexington, VA

11:30 **2676** What makes ticks bite: New paradigms in chemoreception. **R. Michael Roe** (michael\_roe@ncsu. edu)1, Ann Carr1, and Daniel Sonenshine2, 1North Carolina State Univ., Raleigh, NC, 2Old Dominion Univ., Norfolk, VA

**Symposium: Global Perspectives on Soft Ticks (Argasidae) as Pests and Disease Vectors**

***Room W414 D (Convention Center)***

**Moderator and Organizer:** Job Lopez, Baylor College of Medicine, Houston, TX

9:15 **2677** Adaptations for spirochete persistence and transmission by fast-feeding argasid ticks.  
**Tom Schwan** (tschwan@niaid.nih.gov), Rocky Mountain Laboratories, Hamilton, MT

9:45 **2678** *Ornithodoros brasiliensis* tick toxicosis in Brazil: Field and laboratory studies. **Jose Reck** (jose. reck@gmail.com), Finamor Institute of Veterinary Research, Eldorado do Sul, Brazil

10:00 **2679** Argasid systematics and the evolution of blood-feeding behavior: Perspectives from salivary gland transcriptomes. **Ben Mans** (mansb@arc.agric.za), Agricultural Research Council, Onderstepoort,  
South Africa

**10:15 BREAK**

10:30 **2680** Understanding the innate immune system of ticks. **Ryan Rego** (ryanomrego.cz@gmail.com), Czech Academy of Sciences, České Budějovice, Czech Republic

10:45 **2681** Ecology of *Ornithodoros turicata*: Success in the cavity environment. **Pete Teel** (pete.teel@agnet. tamu.edu), Texas A&M Univ., College Station, TX

11:00 **Panel Discussion**

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**Symposium: Excavation and Construction by Social Insects: Integrating Positive and Negative Space**

Room W240 D (Convention Center)

**Moderator and Organizer:** Paul Bardunias, State Univ. of New York, Syracuse, NY

9:15 **2682** Stigmergic construction and topochemical information shape ant nest architecture. **Guy Theraulaz** (guy.theraulaz@univ-tlse3.fr)1, Anaïs Khuong2,  
Jacques Gautrais2, Andréa Perna3, Pascale Kuntz4, and Christian Jost2, 1National Center for Scientific Research, Toulouse, France, 2Paul Sabatier Univ., Toulouse, France, 3Paris Diderot Univ., Paris, France, 4Univ. of Nantes, Nantes, France

9:30 **2683** The process of nest expansion in Macrotermitinae. **Paul Bardunias** (paulmb@ufl.edu) and Scott Turner, State Univ. of New York, Syracuse, NY

9:45 **2684** Sequential caching of sand and seeds in subterranean nests of the Florida harvester ant. **Christina Kwapich** (ckwapich@bio.fsu.edu)1 and Walter R. Tschinkel2, 1Arizona State Univ., Tempe, AZ, 2Florida State Univ., Tallahassee, FL

10:00 **2685** Absence of robust regulation of drone comb construction by the honey bee, *Apis mellifera*.  
**Stephen Pratt** (stephen.pratt@asu.edu), Jonathan Jackson, and M. Barnes, Arizona State Univ., Tempe, AZ

**10:15 BREAK**

10:30 **2686** The unified model: Agent-based modelling excavation and construction. **Pallavi Sharma** (pallavi-sharma@hotmail.com)1, Paul Bardunias2, and Rupert Soar1, 1Nottingham Trent Univ., Nottingham, United Kingdom, 2State Univ. of New York, Syracuse, NY

10:45 **2687** Form and function in ant nests.  
**Walter R. Tschinkel** (tschinkel@bio.fsu.edu), Florida State Univ., Tallahassee, FL

11:00 **2688** Data-driven modeling of construction behavior in mound-building termites. **Justin Werfel** (justin.werfel@wyss.harvard.edu)1, Paul Bardunias2, Benjamin Green1, Scott Turner2, and Radhika Nagpal1, 1Harvard Univ., Cambridge, MA, 2State Univ. of New York, Syracuse, NY

11:15 **2689** An individual-based model for termite tunnel patterns. **Sang-Hee Lee** (sunchaos@nims.re.kr), National Institute for Mathematical Sciences, Daeieon, South Korea

11:30 **2690** Living architectures in New World army ants. **Simon Garnier** (garnier@njit.edu)1, Chris Reid2, Mathew Lutz3, Scott Powell4, Albert Kao5, and  
Ian Couzin3, 1New Jersey Institute of Technology, Newark, NJ, 2The Univ. of Sydney, Syndey, Australia, 3Princeton Univ., Princeton, NJ, 4The George Washington Univ., Washington, DC, 5Harvard Univ., Cambridge, MA

11:45 **2691** External drivers of termite nest construction. **Rupert Soar** (rupert.soar@ntu.ac.uk)1, Pallavi Sharma1, Paul Bardunias2, and Scott Turner2, 1Nottingham Trent Univ., Nottingham, United Kingdom, 2State Univ. of New York, Syracuse, NY

12:00 **2692** Social facilitation of excavation in fire ants. **Daniel Goldman** (daniel.goldman@physics.gatech.edu)1, Daria Monaenkova2, Bhabesh Dutta3,  
Michael A. D. Goodisman1, Jungsoo Park1, and

Vadim Linevitch4, 1Georgia Institute of Technology, Atlanta, GA, 2Clemson Univ., Clemson, SC, 3Univ. of Georgia, Tifton, GA, 4John Bean Technologies Corporation, Chalfront, PA

12:15 **2693** Insect-built structures and swarm cognition. **Scott Turner** (jsturner@syr.edu), State Univ. of  
New York, Syracuse, NY

**Symposium: Beyond Pests: Biodiversity in the Urban Environment**

***Room W230 D (Convention Center)***

**Moderators and Organizers:** Emily Hartop and Brian V. Brown, Natural History Museum, Los Angeles, CA

9:15 **Introductory Remarks**

9:30 **2694** Science, education, and on-the-ground conservation to protect native bees. **Gordon W. Frankie** (gwfrankie@berkeley.edu)1, Sara Leon Guerrero1,  
Jaime Pawelek1, Mary Schindler1, Rollin Coville1, and Robbin W. Thorp2, 1Univ. of California, Berkeley, CA, 2Univ. of California, Davis, CA

9:45 **2695** Small flies in big cities: A taxonomic perspective on Chloropidae (Diptera) diversity in North American urban spaces. **Terry Wheeler** (terry. wheeler@mcgill.ca), McGill Univ., Sainte-Anne-de- Bellevue, QC, Canada

10:00 **2696** Tracking DNA footprints in home dust: Continental-scale arthropod diversity of our homes. **Anne A. Madden** (madden.anne@gmail.com)1,2,  
Rob R. Dunn2, and Noah Fierer1, 1Univ. of Colorado, Boulder, CO, 2North Carolina State Univ., Raleigh, NC

**10:15 BREAK**

10:30 **2697** NGS barcodes provide species-level resolution for non-biting midges (Diptera: Chironomidae) and reveal near-complete species turnover between  
urban and natural aquatic habitats. **Bilgenur Baloǧlu** (bilgenur.baloglu@u.nus.edu), Esther Clews, and Rudolf Meier, National Univ. of Singapore, Singapore, Singapore

10:45 **2698** The Swedish Malaise Trap Project (SMTP): A contribution to the taxonomic renaissance. **Dave Karlsson** (dave.karlsson@stationlinne.se), Station Linné, Öland, Sweden

11:00 **2699** The BioSCAN Project: Seizing opportunities in urban biodiversity research. **Emily A. Hartop** (ehartop@ nhm.org), Natural History Museum, Los Angeles, CA

11:15 **2700** What can I do for urban insect biodiversity? Applying lessons from ecological research.  
**Alvin J. Helden** (alvin.helden@anglia.ac.uk),  
Anglia Ruskin Univ., Cambridge, United Kingdom

11:30 **2701** Presentation withdrawn

11:45 **2702** Arthropods of our homes. **Misha Leong** (mleong@calacademy.org)1, Matthew Bertone2,  
Keith Bayless2, Rob R. Dunn2, and Michelle Trautwein1, 1California Academy of Sciences, San Francisco, CA, 2North Carolina State Univ., Raleigh, NC

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**THURSDAY**

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12:00 **2703** Discovery of high insect diversity in the mangrove and swamp forest remnants of urban Singapore facilitated by NGS barcodes. **Darren Yeo** (darrrn.yeo@gmail.com)1, Amrita Srivathsan1,  
Wendy Wang1, Jayanthi Puniamoorthy2, Maosheng Foo3, Patrick Grootaert4, Lena Chan5, Hui Ping Ang5, and Rudolf Meier1, 1National Univ. of Singapore, Singapore, Singapore, 2California Academy of Sciences, San Francisco, CA, 3Lee Kong Chian Natural History Museum, Singapore, Singapore, 4Royal Belgian Institute of Natural Sciences, Brussels, Belgium, 5National Parks Board, Singapore, Singapore

12:15 **2704** Dynamics of epigaeic arthropod assemblages from extensive green roofs in Edmonton Canada. **Colin Bergeron** (cb1@ualberta.ca), Jaime Pinzon, and John Spence, Univ. of Alberta, Edmonton, AB, Canada

**Symposium: Phylogeny and Evolution of Insect Communication Systems**

***Room W315 B (Convention Center)***

**ModeratorsandOrganizers:** JenniferZaspel1,RebeccaB.Simmons2, and Susan J. Weller3, 1Purdue Univ., West Lafayette, IN, 2Univ. of North Dakota, Grand Forks, ND, 3Univ. of Nebraska State Museum, Lincoln, NE

9:15 **2705** Plant-insect communication for offense and defense. Sergio Rasmann1 and **Alan Kergunteuil** (alan.kergunteuil@unine.ch)2, 1Univ. of Lausanne, Lausanne, Switzerland, 2Univ. of Neuchâtel, Neuchâtel, Switzerland

9:30 **2706** Phylogeny and evolution of communication: Danaine butterflies vs. arctiine moths. **Michael Boppré** (boppre@fzi.uni-freiburg.de), Albert Ludwigs Univ., Freiburg, Germany

9:45 **2707** Repeated evolution of insect adaptations to toxic pyrrolizidine alkaloids of plants. Dietrich Ober, Franziksa Heidemann, and **Miriam Gutt** (miriam.gutt@ googlemail.com), Kiel Univ., Kiel, Germany

10:00 **2708** Chemical dependency and toxic relationships in tiger moths (Lepidoptera: Erebidae). **Jennifer Zaspel** (jzaspel@purdue.edu)1, Susan J. Weller2, Alan Lemmon3, Emily Lemmon3, Clare Scott4, and Rebecca B. Simmons5, 1Purdue Univ., West Lafayette, IN, 2Univ. of Nebraska, Lincoln, NE, 3Florida State Univ., Tallahassee, FL, 4Univ. of Alabama, Tuscaloosa, AL, 5Univ. of North Dakota, Grand Forks, ND

**10:15 BREAK**

10:30 **2709** Different strokes for different folks?: Can we distinguish sonar-jamming and acoustic aposematism in tiger moths (Lepidoptera: Erebidae: Arctiinae)?  
**Nick Dowdy** (njdowdy@gmail.com) and William E. Conner, Wake Forest Univ., Winston-Salem, NC

10:45 **2710** A case study in Arctiinae: Co-opting defense signals for courtship. **Susan J. Weller** (welle008@umn. edu)1, Jennifer Zaspel2, Rebecca B. Simmons3,  
Clare Scott4, Taylor Ward5, and Heather Hendrickson5, 1Univ. of Minnesota, Minneapolis, MN, 2Purdue Univ., West Lafayette, IN, 3Univ. of North Dakota, Grand Forks, ND, 4Univ. of Alabama, Tuscaloosa, AL, 5Univ. of Minnesota, St. Paul, MN

11:00 **2711** Evolution and selection on wing pattern elements in tiger moths. **Rebecca B. Simmons** (rebecca.simmons@email.und.edu)1, Jennifer Zaspel2, Susan J. Weller3, and Diane Darland1, 1Univ. of North Dakota, Grand Forks, ND, 2Purdue Univ., West Lafayette, IN, 3Univ. of Nebraska, Lincoln, NE

11:15 **2712** The evolution of chemical mate signaling in orchid bees. **Santiago Ramírez** (sanram@ucdavis.edu)1, Philip Brand1, and Thomas Eltz2, 1Univ. of California, Davis, CA, 2Ruhr Univ., Bochum, Denmark

11:30 **2713** Acoustic communication in *Dendroctonus* and *Ips* bark beetles. **Kasey Maria Yturralde** (kasey. yturralde@dc.gov)1 and Richard Hofstetter2, 1Urban Forestry Administration, Washington, DC, 2Northern Arizona Univ., Flagstaff, AZ

11:45 **2714** Bioluminescence in beetles and its role in communication. **Marc A. Branham** (marcbran@ufl.edu), Univ. of Florida, Gainesville, FL

12:00 **2715** Jewel beetle color visual systems: An investigation of visual protein and spectral diversity within a charismatic insect group. **Nathan Lord** (bothriderid@gmail.com), Camilla Sharkey, and Seth Bybee, Brigham Young Univ., Provo, UT

12:15 **2716** Evolution of mimicry and speciation in *Heliconius* butterflies. **James Mallet** (jmallet@oeb. harvard.edu), Harvard Univ., Cambridge, MA

**Symposium: Towards Improved Reference Assemblies for Insect Genomes**

***Room W224 E (Convention Center)***

**Moderator and Organizer:** Igor Sharakhov, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:15 **2717** Improving arthropod assemblies: Lessons from the BCM-HGSC i5K pilot. **Shwetha Murali** (shwethacanchi.murali@bcm.edu), Daniel Hughes, Kim C. Worley, Richard Gibbs, and Stephen Richards, Baylor College of Medicine, Houston, TX

9:45 **2718** Single molecule sequencing-guided improvement of draft assemblies. **Scott J. Emrich** (semrich@nd.edu), Shenglong Zhu, and Danny Chen, Univ. of Notre Dame, South Bend, IN

10:00 **2719** Improving prospects for *de novo* reference assembly in polymorphic insects. **R. Rebecca Love** (Rachel.R.Love.33@nd.edu), Univ. of Notre Dame, South Bend, IN

**10:15 BREAK**

10:30 **2720** Super-scaffolding the fire ant genome and detection of chromosomal rearrangements.  
**Eckart Stolle** (e.stolle@qmul.ac.uk), Rodrigo Pracana, and Yannick Wurm, Queen Mary Univ. of London, London, United Kingdom

10:45 **2721** Canu: A new PacBio and Nanopore assembler for genomes large and small. **Adam Phillippy** (adam.phillippy@nih.gov), National Human  
Genome Research Institute, Bethesda, MD

11:15 **2722** Phylogenomics-inspired method for scaffold co-assembly in multiple genomes. Sergey Aganezov and **Max Alekseyev** (maxal@gwu.edu), The George Washington Univ., Ashburn, VA

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11:30 **2723** Improving *Anopheles* genomes assemblies using sequencing data and synteny evolution.  
**Cedric Chauve** (cedric.chauve@sfu.ca)1, Yoann Anselmetti2,3, Severine Berard2, and Eric Tannier4, 1Simon Fraser Univ., Burnaby, BC, Canada, 2Institute of Evolutionary Sciences, Montpellier, France, 3Claude Bernard Univ., Villeurbanne, France, 4INRA, Villeurbanne, France

11:45 **2724** Advanced cytogenetic physical mapping for the development of chromosome-based genome assemblies. **Maria Sharakhova** (msharakh@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

**Symposium: *Trichogramma* in Augmentative Biological Control: A Worldwide View of the Past, Present, and Future**

***Room W222 B (Convention Center)***

**Moderators and Organizers:** Brad Vinson1, Asha Rao1, and  
Shoil Greenberg2, 1Texas A&M Univ., College Station, TX, 2USDA (Retired), Carmel, IN

9:15 **2725** Physiological interaction between egg parasitoids and their hosts. **S. Bradleigh Vinson** (bvinson@tamu.edu) and Asha Rao, Texas A&M Univ., College Station, TX

9:45 **2726** Approaches for improving methods for quality control of *Trichogramma* rearing and application. **Shoil Greenberg** (shoilgreenberg@gmail.com), USDA (Retired), Carmel, IN

10:00 **2727** Production and utilization of trichogrammatids - Indian scenario. **Lalitha Yadavalli** (ylalitha3112@yahoo. co.in), National Bureau of Agricultural Insects Resources, Bangalore, India

* **SD2728**Methods and technical facilities for *Trichogramma* releases (experience of countries from former USSR). **B. Chicu** (boris49@inbox.ru), Academy of Sciences of Moldova, Moldova, Moldova
* **SD2729**Mechanization of propagation of *Trichogramma* spp. on factitious host. **V. Gorban** (vgorban.alimeco@yahoo. com), Academy of Sciences of Moldova, Moldova, Moldova
* **SD2730**Genetic improvement and field evaluation of *Trichogramma chilonis* in India. **Sushil Jalali** (jalalisk@gmail.com), National Bureau of Agricultural Insect Resources, Bangalore, India

**10:15 BREAK AND POSTER SESSION**

10:30 **2731** Reproductive ecology of *Trichogramma*. **Veronique Martel** (veronique.martel@canada.ca), Univ. of New Brunswick, Fredericton, NB, Canada

10:45 **2732** The role of replaceable and density-dependent mortality in assessing augmentative releases of *Trichogramma* in U.S. cotton. **Charles P. C. Suh** (charles.suh@ars.usda.gov), USDA - ARS, College Station, TX

11:00 **2733** Quality control of mass rearing of *Trichogramma* on artificial media. **Lu Xin** (greenhopelv@163.com), Guangdong Entomological Institute, Guangzhou, China

**Symposium: Virus-Insect Interactions**

***West Hall F1 (WF1) (Convention Center)***

**Moderators and Organizers:** Bryony Bonning1, Lyric Bartholomay2, and Carla Saleh3, 1Iowa State Univ., Ames, IA, 2Univ. of Wisconsin, Madison, WI, 3Pasteur Institute, Paris, France

9:15 **2734** Using *Drosophila* genetics to define factors involved in antiviral immunity to human arboviruses. **Sara Cherry** (cherrys@med.upenn.edu), Univ. of Pennsylvania, Philadelphia, PA

9:45 **2735** Characterization of virus-lepidopteran host interactions using a *Lymantria dispar* model system. **Don Gammon** (don.gammon@umassmed.edu)1 and Craig Mello2, 1Univ. of Massachusetts Medical School, Worcester, MA, 2Univ. of Massachusetts, Worcester, MA

10:00 **2736** Systemic spread of antiviral RNAi immunity in insects through extracellular vesicles containing viral RNAs. Carla Saleh and **Yasutsugu Suzuki** (yasutsugu. suzuki@pasteur.fr), Pasteur Institute, Paris, France

**10:15 BREAK**

10:30 **2737** Novel viral and host factors determining arbovirus vector competence in mosquitoes.  
Gorben Pijlman and **Giel Göertz** (giel.goertz@wur.nl), Wageningen Univ. and Research Centre, Wageningen, Netherlands

10:45 **2738** How do arboviruses escape the mosquito midgut? Analysis of a novel mechanism. **Alexander Franz** (franza@missouri.edu), Univ. of Missouri, Columbia, MO

11:00 **2739** Pathogen-host interactions between deformed wing virus (DWV) and the honey bee (*Apis mellifera*). **Sebastian Gisder** (sebastian.gisder@hu-berlin.de) and Elke Genersch, Institute for Bee Research,

Hohen Neuendorf, Germany

11:15 **2740** Cathepsin B localization and activity modulates *Polerovirus* transmission efficiency by *Myzus persicae*. **Michelle Cilia** (mlc68@cornell.edu)1, Patricia Pinheiro2, and Murad Ghanim3, 1USDA - ARS, Ithaca, NY,

2Cornell Univ., Ithaca, NY, 3Agricultural Research Organisation, Bet-Dagan, Israel

11:30 **2741** Dissecting the molecular interplay between tospoviruses and their thrips vectors. **Anna Whitfield** (aewtospo@ksu.edu)1, Ismael Badillo-Vargas2, Catherine Stewart1, and Dorith Rotenberg1, 1Kansas State Univ., Manhattan, KS, 2Univ. of Florida, Quincy, FL

11:45 **2742** Deep sequencing data reveal viral sequences integrated into insect genomes. **Sijun Liu** (sliu@iastate. edu)1, Yuting Chen1, Thomas Sappington2, and  
Bryony Bonning1, 1Iowa State Univ., Ames, IA, 2USDA - ARS, Ames, IA

12:00 **2743** Defense and counter-defense in antiviral RNA silencing pathways of insects. **Ronald Van Rij** (ronald. vanrij@radboudumc.nl), Radboud Univ. Nijmegen Medical Centre, Nijmegen, Netherlands

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**THURSDAY**

**Thursday, September 29 • MORNING •**

**Symposium: Population Biology of Winter Moth, *Operophtera brumata* L., and Related Geometrids on Two Continents**

***Room W331 C (Convention Center)***

**Moderator and Organizer:** Joseph Elkinton, Univ. of Massachusetts, Amherst, MA

11:45 **2753** Why are Bruce spanworm, *Operophtera bruceata*, outbreaks in North America so infrequent and short-lived? **Hannah Broadley** (hbroadley@cns. umass.edu), Joseph Elkinton, and John Burand, Univ. of Massachusetts, Amherst, MA

12:00 **2754** Role of dispersal in regulating densities of outbreak populations of winter moth in North America. **Adam Pepi** (apepi@umass.edu), Hannah Broadley, and Joseph Elkinton, Univ. of Massachusetts, Amherst, MA

12:15 **2755** Population dynamics and biological control  
of outbreak populations of winter moth in the north- eastern United States. **Joseph Elkinton** (elkinton@ent. umass.edu) and George Boettner, Univ. of Massachusetts, Amherst, MA

**Symposium: Stable Isotope ‘Fingerprinting’ in Insect Ecology**

***Room W231 B (Convention Center)***

**Moderators and Organizers:** Shawn Steffan1,2 and  
Yoshito Chikaraishi3, 1USDA - ARS, Madison, WI, 2Univ. of Wisconsin, Madison, WI, 3Japan Agency for Marine-Earth Science & Technology, Yokosuka, Japan

9:15 **2756** CSIA fingerprinting for the assessment of trophic position and habitat use in insects.  
**Yoshito Chikaraishi** (ychikaraishi@jamstec.go.jp), Japan Agency for Marine-Earth Science & Technology, Yokosuka, Japan

9:45 **2757** Microbes are trophic analogues of arthropods, mammals, and fish: Isotopic fingerprinting unites ‘green’ and ‘brown’ food webs. **Shawn Steffan** (steffan@entomology.wisc.edu)1,2, Yoshito Chikaraishi3, Prarthana Dharampal1, Cameron Currie1, Heidi Horn1, and Jonathan Pauli1, 1Univ. of Wisconsin, Madison, WI, 2USDA - ARS, Madison, WI, 3Japan Agency for Marine- Earth Science & Technology, Yokosuka, Japan

**10:15 BREAK**

10:30 **2758** Evidence of microbial provisioning of essential amino acids in an endotherm: Combining compound- specific stable isotope analysis with NexGen sequencing. **Seth Newsome** (newsome@unm.edu)1 and

Marilyn Fogel2, 1Univ. of New Mexico, Albuquerque, NM, 2Univ. of California, Merced, CA

10:45 **2759** Intra-trophic isotopic discrimination of 15N/14N associated with the catabolism of amino acids in plants. **Yuko Takizawa** (takizaway@jamstec.go.jp)1 and Yoshito Chikaraishi2, 1Hokkaido Univ., Sapporo, Japan, 2Japan Agency for Marine-Earth Science & Technology, Yokosuka, Japan

11:00 **2760** Temporal and population-level variation in amino acid δ15N values: Implications for entomology. **Peggy Ostrom** (ostrom@msu.edu)1 and  
Yoshito Chikaraishi2, 1Michigan State Univ., East Lansing, MI, 2Japan Agency for Marine-Earth Science & Technology, Yokosuka, Japan

11:15 **2761** Compound-specific stable isotope analysis  
of phenotypic body morphs of bluegills (*Lepomis macrochirus*) from the unregulated Sipsey River system. **Prarthana Dharampal** (prarthana.1120@gmail. com)1 and Robert Findlay2, 1Univ. of Wisconsin, Madison, WI, 2Univ. of Alabama, Tuscaloosa, AL



9:15 **2744**  
the origin of invasive populations of winter moth in North America. **Jeremy C. Andersen** (jandersen@ berkeley.edu)1, Nathan Havill2, Joseph Elkinton3, Snorre Hagan4, and Adalgisa Caccone5, 1Univ. of California, Berkeley, CA, 2USDA - Forest Service, Hamden, CT, 3Univ. of Massachusetts, Amherst, MA, 4Norwegian Institute for Agricultural and Environmental Research, Svanvik, Norway, 5Yale Univ., New Haven, CT

9:30 **2745** Population genetics of winter moth: Hybridization between non-native winter moth and native Bruce spanworm. **Nathan Havill** (nphavill@ fs.fed.us)1, Jeremy C. Andersen2, Joseph Elkinton3, and Adalgisa Caccone4, 1USDA - Forest Service, Hamden, CT, 2Univ. of California, Berkeley, CA, 3Univ. of Massachusetts, Amherst, MA, 4Yale Univ., New Haven, CT

9:45 **2746** Evolutionary ecology of an invasive geometrid. **Tea Ammunét** (tea.ammunet@slu.se) and Helena Bylund, Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

10:00 **2747** Adapting to a warming world: Winter moth (*Operophtera brumata*) plastic and genetic responses in seasonal timing to increased temperatures.  
**Lucia Salis** (l.salis@nioo.knaw.nl) and Marcel Visser, Netherlands Institute of Ecology, Wageningen, Netherlands

**10:15 BREAK**

10:30 **2748** Meso-scale geometrid guild dynamics in a geographically complex sub-arctic birch forest ecosystem. **Ole-Petter Vindstad** (ole.p.vindstad@uit. no)1, Jane Jepsen2, Malin Ek1, and Rolf Ims1, 1The Arctic Univ. of Norway, Tromsø, Norway, 2Norwegian Institute for Nature Research, Tromsø, Norway

10:45 **2749** Outbreak range expansions in geometrid moths as drivers of ecosystem state changes in sub-arctic birch forests. **Jane Jepsen** (jane.jepsen@nina.no)1, Ole-Petter Vindstad2, Malin Ek2, and Rolf Ims2, 1Norwegian Institute for Nature Research, Tromsø, Norway, 2The Arctic Univ. of Norway, Tromsø, Norway

11:00 **2750** Density-dependent and density-independent effects of predators and parasitoids on cyclic population dynamics of the autumnal moth. **Tero Klemola** (tero. klemola@utu.fi), Kai Ruohomaki, and Tommi Andersson, Univ. of Turku, Turku, Finland

11:15 **2751** Virus occurrence in two coexisting geometrid species. **Helena Bylund** (helena.bylund@slu.se) and Tea Ammunét, Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

11:30 **2752** Did introduced parasitoids really control the winter moth in British Columbia?: A 35-year retrospective. **Jens Roland** (jroland@ualberta.ca), Univ. of Alberta, Edmonton, AB, Canada

Population genetics of winter moth: Identifying

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11:30 **2762** Using CSIA to identify unexpected hosts for spotted wing drosophila, *Drosophila suzukii*. **Christelle Guédot** (guedot@wisc.edu)1, Emma Pelton1, Yoshito Chikaraishi2, and Shawn Steffan3, 1Univ. of Wisconsin, Madison, WI, 2Japan Agency for Marine- Earth Science & Technology, Yokosuka, Japan, 3USDA - ARS, Madison, WI

11:45 **2763** Isotopic fractionation associated with *in vitro* enzymatic deamination of glutamic acid. **Akiko Goto** (akigoto@staff.kanazawa-u.ac.jp)1,2, Kasumi Miura2, Takashi Korenaga2,3, Takashi Hasegawa1,

Naohiko Ohkouchi4, and Yoshito Chikaraishi4, 1Kanazawa Univ., Kanazawa, Japan, 2Tokyo Metropolitan Univ., Hachioji, Japan, 3Chiba Institute of Science, Chiba, Japan, 4Japan Agency for Marine-Earth Science & Technology, Yokosuka, Japan

**Symposium: Case Studies in Entomology: Four Examples of Global Excellence**

***Room W222 A (Convention Center)***

**Moderators and Organizers:** Margaret Hardy and Myron Zalucki, Univ. of Queensland, Brisbane, Australia

9:15 **2764** The role of the ESA International Branch in fostering collaboration. **Myron Zalucki** (m.zalucki@ uq.edu.au) and Margaret Hardy, Univ. of Queensland, Brisbane, Australia

9:30 **2765** Presentation withdrawn

9:45 **2766** Opportunities for sharing entomology expertise internationally through United States federal agency programs. **Kaitlin Stack Whitney** (whitney3@wisc.edu), Univ. of Wisconsin, Madison, WI

10:00 **2767** Integrating project results across time and space: The contribution of ACIAR to entomological research in the Asia-Pacific region. **Richard Markham** (richard.markham@aciar.gov.au), Australian Centre for International Agricultural Research, Bruce, Australia

**10:15 BREAK**

10:30 **2768** Experiences in collaborations across regional and disciplinary borders in rice pest management. **Kong Luen Heong** (klheong@yahoo.com)1,  
Zeng-Rong Zhu1, Josef Settele2, Geoffrey Gurr3,  
Jiaan Cheng1, Monina Escalada4, and Geoff Norton5, 1Zhejiang Univ., Hangzhou, China, 2Helmholtz Centre for Environmental Research, Leipzig, Germany, 3Charles Sturt Univ., Orange, Australia, 4Visayas State Univ., Baybay City, Philippines, 5Univ. of Queensland, Brisbane, Australia

10:45 **Panel Discussion**

**Symposium: Entomology without Borders: Senior Member Symposium with Retired and Emeriti Professionals on Sharing their Involvement after Retirement**

***Room W231 C (Convention Center)***

**Moderators and Organizers:** Kenneth A. Sorensen1 and  
Ken Pruess2, 1North Carolina State Univ., Raleigh, NC, 2Univ. of Nebraska, Lincoln, NE

9:15 **2769** Life cycle of an emeritus entomologist and ESA senior-student networks and mentoring. **Kenneth A. Sorensen** (kenneth\_sorensen@ncsu.edu), North Carolina State Univ., Raleigh, NC

9:30 **2770** Retirement: A time for hobbies. **Ken Pruess** (kpruess2@unl.edu), Univ. of Nebraska, Lincoln, NE

9:45 **2771** Sixty years in biocontrol. **Benjamin Puttler** (puttlerbe@Missouri.edu), Univ. of Missouri, Columbia, MO

10:00 **2772** Retirement as an extension of a professional career: Tales of a happy wanderer. **Elvis Heinrichs** (eheinrichs2@unl.edu), Univ. of Nebraska, Lincoln, NE

**10:15 BREAK**

10:30 **2773** Always one more bug: Activities in a second career of a dozen years at the McGuire Center for Lepidoptera and Diversity, Gainesville, FL.  
**Charles V. Covell** (ccovell@flmnh.ufl.edu), Florida Museum of Natural History, Gainesville, FL

10:45 **2774** Retirement and leadership with entrepreneurs. **John Foster** (jfoster1@unl.edu), Univ. of Nebraska, Lincoln, NE

11:00 **Open remarks and discussion by retired professional scientists**

11:15 **Open business session**

**Symposium: Sin Fronteras: Forging Collaborations through the Americas: 4th Latin American/ Hispanic Symposium**

***Room W340 A (Convention Center)***

**Moderators and Organizers:** Ana Legrand1, Steven Reyna2, Silvia Rondon3, and Raul Medina4, 1Univ. of Connecticut, Storrs, CT, 2North Carolina State Univ., Raleigh, NC, 3Oregon State Univ., Hermiston, OR, 4Texas A&M Univ., College Station, TX

**2775** Networks of ideas and people: Nothing is past, nothing is lost. **Ernesto Gianoli** (egianoli@gmail.com), Univ. of La Serena, La Serena, Chile

9:45 **2776** How to establish research collaborations in Latin America and the Caribbean: The case of greenhouse pest management. **Luis A. Cañas** (canas.4@osu.edu), The Ohio State Univ., Wooster, OH

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10:00 **2777** Challenges and recommendations for new faculty in Latin America. **Diego Rincon** (drincon@ corpoica.org.co), Colombian Agricultural Research Corporation, Mosquera, Colombia

**10:15 BREAK**

10:30 **2778** Periplo: From maize farmer to green revolutionary to foreign explorer to maize researcher. **Julio Bernal** (juliobernal@tamu.edu), Texas A&M Univ., College Station, TX

10:45 **2779** Twenty years after ‘I just came to do a Mas- ters’ and other journeys in entomology. **Carlos Bogran** (cbogran@ohp.com), OHP, Inc., College Station, TX

11:00 **2780** Ecuador: A gold mine for pollinator explorations from the Amazon to the Galapagos! **Sujaya Rao** (sujaya@oregonstate.edu), Oregon State Univ., Corvallis, OR

11:15 **2781** Systematic and biodiversity studies of entomology in Guatemala. **Jack Schuster** (jschuste@ uvg.edu.gt), Univ. of Valle de Guatemala, Guatemala, Guatemala

11:30 **2782** Aloha!! Importance of surveying invasive species for conservation purposes. **Leyla V. Kaufman** (leyla@hawaii.edu), Univ. of Hawai’i, Honolulu, HI

11:45 **2783** Plant health task force of Procinorte: A trinational effort against invasive species of North American agriculture. **Jose Lopez** (lopez.jose@inifap. gob.mx), INIFAP, Nuevo León, México

12:00 **2784** Collaborative efforts for controlling the tomato leafminer, *Tuta absoluta*, a native species of South America and a threat for the world. **Patricia Pereyra** (ppereyra@cepave.edu.ar), National Univ. of La Plata, Buenos Aires, Argentina

**Symposium: Economics of IPM in the 21st Century: Multiple Perspectives from Around the World**

***Room W331 A (Convention Center)***

**Moderators and Organizers:** David Onstad and Philip Crain, DuPont, Wilmington, DE

9:15 **2785** Finding the economics in economic entomology: The last 8 years. Philip Crain, David Onstad, and  
**Zaiqi Pan** (zaiqi.pan@cgr.dupont.com), DuPont, Wilmington, DE

9:30 **2786** Economic value of arthropod biological control in IPM. **Steven Naranjo** (steve.naranjo@ars.usda.gov)1, Peter Ellsworth2, and George Frisvold3, 1USDA - ARS, Maricopa, AZ, 2Univ. of Arizona, Maricopa, AZ, 3Univ. of Arizona, Tucson, AZ

10:00 **2787** Economic impact of classical biological control of papaya mealybug in India. **Rangaswamy R. Muniappan** (rmuni@vt.edu) and George Norton, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

**10:15 BREAK**

10:30 **2788** Risk-based IPM for soybean aphid using neonicotinoid seed treatments and foliar insecticides. **Paul D. Mitchell** (pdmitchell@wisc.edu) and  
Nicola Carey, Univ. of Wisconsin, Madison, WI

10:45 **2789** Assessment of a more conservative stink  
bug economic threshold for managing stink bugs in Brazilian soybean production. **Adeney Bueno** (adeney. bueno@embrapa.br), Embrapa, Londrina, Brazil

11:00 **2790** Economic evaluation of integrated pest management program to control the Asian tiger mosquito in New Jersey. **Yara Halasa** (yara@brandeis. edu) and Don Shepard, Brandeis Univ., Waltham, MA

11:15 **2791** Have IPM farmer field schools (FFS) worked in the Philippines? An economist’s perspective. **Roderick Rejesus** (rod.rejesus@gmail.com), North Carolina State Univ., Raleigh, NC

11:30 **2792** Chronicling successful integration of technology and knowledge over 25 years of IPM in Arizona.

**Peter Ellsworth** (peterell@ag.arizona.edu)1, Al Fournier1, John Palumbo2, Steven Naranjo3, and George Frisvold4, 1Univ. of Arizona, Maricopa, AZ, 2Univ. of Arizona, Yuma, AZ, 3USDA - ARS, Maricopa, AZ, 4Univ. of Arizona, Tucson, AZ

11:45 **2793** Economics of western corn rootworm management. **Philip Crain** (philip.crain@gmail.com)1, Zaiqi Pan1, David Onstad1, and J. Lindsey Flexner2, 1DuPont, Wilmington, DE, 2DuPont Pioneer, Johnston, IA

**Symposium: Talking to Swarms Without Borders: Methods for Engaging the Public in the Buzz about Entomology**

***Room W330 B (Convention Center)***

**Moderators and Organizers:** William R. Morrison1 and Nicole F. Quinn2, 1USDA - ARS, Kearneysville, WV, 2Michigan State Univ., East Lansing, MI

9:15 **2794** Outreach in science: Where we’re at, and  
why we need to engage the public in the buzz about entomology. **Nicole F. Quinn** (quinnni2@msu.edu)1, William R. Morrison2, Torri Hancock2, and Tracy C. Leskey2, 1Michigan State Univ., East Lansing, MI, 2USDA - ARS, Kearneysville, WV

9:30 **2795** Fluent in “Bug”: The magical language that inspires learning. **Kristie Reddick** (contactus@thebug- chicks.com) and Jessica Honaker, The Bug Chicks, Portland, OR

9:45 **2796** MSU Bug House: Ages 3 to 93, entomology for a diverse audience. **Bernice DeMarco** (demarc10@msu. edu) and Gary Parsons, Michigan State Univ.,  
East Lansing, MI

10:00 **2797** Integrating live insects as pets in elementary school classrooms. **Amanda R. Lorenz-Reaves** (lorenzam@msu.edu), Julie Libarkin, Nicole A. Fisher, and Gabriel Ording, Michigan State Univ., East Lansing, MI

**10:15 BREAK**

10:30 **2798** Bringing Blattodea back to Breckinridge: 4-H insect program ignites interest in science among middle school students. **Alexandria N. Bryant** (alexandria.bryant@uky.edu)1 and William R. Morrison2, 1Univ. of Kentucky, Hardinsburg, KY, 2USDA - ARS, Kearneysville, WV

10:45 **2799** Why people swarm to insect activities: The Purdue experience. **Tom Turpin** (turpin@purdue.edu), Purdue Univ., West Lafayette, IN

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**THURSDAY**

**Thursday, September 29 • MORNING •**

11:00 **2800** Team *Trissolcus*: A case study in effective public science outreach. **Matthew L. Buffington** (matt. buffington@ars.usda.gov), USDA - ARS, Washington, DC

11:15 **2801** From combat boots to sweep nets: Experience in outreach with America’s veterans. **Adam Ingrao** (ingraoad@msu.edu), Michigan State Univ.,  
East Lansing, MI

11:30 **2802** Acquiring accurate insect data via citizen science: The tale of four programs. **Mary M. Gardiner** (gardiner.29@osu.edu)1, Leslie Allee2, Peter Brown3, Brian M. Kleinke4, John Losey2, Chelsea A. Gordon4, Helen Roy5, and Rebecca R. Smyth2, 1The Ohio State Univ., Wooster, OH, 2Cornell Univ., Ithaca, NY, 3Animal and Environmental Research Group, East Rd., United Kingdom, 4The Ohio State Univ., Columbus, OH, 5Natural Environment Research Council, Wallingford, United Kingdom

**Symposium: Epigenetics and Insect Adaptation to Their Environment**

***West Hall F3 (WF3) (Convention Center)***

**Moderators and Organizers:** Denis Tagu1 and Jennifer A. Brisson2, 1INRA, Le Rheu, France, 2Univ. of Rochester, Rochester, NY

9:15 **2803** Epigenetics as an answer to Darwin’s “special difficulty”: Natural selection of metastable epialleles in honey bee castes. **Douglas Ruden** (douglasr@wayne. edu), Wayne State Univ., Detroit, MI

9:45 **2804** Evolutionary and developmental variation in DNA methylation in Hymenoptera. **Brendan Hunt** (huntbg@uga.edu), Univ. of Georgia, Griffin, GA

10:00 **2805** Epigenetic cross-talk between malaria parasites and their mosquito vectors. **Elena Gómez-Díaz** (elena.gomez-diaz@emory.edu)1,2, Rakiswendé Yerbanga3, Thierry Lefèvre3,4, and Victor Corces1, 1Emory Univ., Atlanta, GA, 2Biological Station of Doñana, Seville, Spain, 3Health Sciences Research Institute, Bobo-Dioulasso, Burkina Faso, 4Univ. of Montpellier, Montpellier, France

**10:15 BREAK**

10:30 **2806** Epigenetic regulation of aphid phenotypic plasticity of the reproductive mode. Gautier Richard1, Fabrice Legeai1,2, Nathalie Leterme1, Sylvie Hudaverdian1, Sylvie Tanguy1, Denis Tagu1, and **Gaël Le Trionnaire** (gael.letrionnaire@rennes.inra.fr)1, 1INRA, Le Rheu, France, 2IRISA/INRIA, Rennes, France

10:45 **2807** Allele-specific transcriptome and methylome analysis reveals *cis*-regulation of DNA methylation and lack of genomic imprinting in *Nasonia*. **Xu Wang** (xw54@cornell.edu)1, John H. Werren2, and

Andrew G. Clark1, 1Cornell Univ., Ithaca, NY, 2Univ. of Rochester, Rochester, NY

11:00 **2808** TALE and CRISPR based genome and epigenome editing: Finding function in the non-coding genome. **Eric Mendenhall** (eric.mendenhall@uah.edu), Candice Coppola, and Timley Watkins, Univ. of Alabama, Huntsville, AL

11:15 **2809** BIPAA/Askomics, a new and easy approach  
for querying genomics and epigenomics elements in interaction. **Fabrice Legeai** (fabrice.legeai@rennes.inra. fr)1,2, Charles Bettembourg2, Anthony Bretaudeau1,2, Yvanne Chaussin2, Olivier Dameron2, and Denis Tagu1, 1INRA, Le Rheu, France, 2IRISA/INRIA, Rennes, France

11:30 **2810** Regulatory properties of piRNA clusters  
from *Drosophila melanogaster*. Cynthia Dennis,  
Emilie Brasset, Silke Jensen, and **Chantal Vaury** (chantal.vaury@udamail.fr), Univ. of Clermont-Ferrand, Clermont-Ferrand, France

11:45 **2811** Epigenetic programming of caste-specific division of labor in the ant *Camponotus floridanus*. **Riley J. Graham** (riley.grhm@gmail.com)1,  
Daniel F. Simola1, Cristina M. Brady1, Brittany L. Enzmann2, Claude Desplan3, Anandasankar Ray4, Laurence Zwiebel5, Roberto Bonasio1, Danny Reinberg3, Jürgen Liebig2, and Shelley Berger1, 1Univ. of Pennsylvania, Philadelphia, PA, 2Arizona State Univ., Tempe, AZ, 3New York Univ., New York, NY, 4Univ. of California, Riverside, CA, 5Vanderbilt Univ., Nashville, TN

**Symposium: Bioinspiration Crossing Disciplinary Borders**

***Room W315 A (Convention Center)***

**Moderators and Organizers:** Marianne Alleyne1 and Catherine Loudon2, 1Univ. of Illinois, Champaign, IL, 2Univ. of California, Irvine, CA

9:15 **2812** Insect-inspired robots as tools for robot- inspired biology. **Robert Wood** (rjwood@seas.harvard. edu), Harvard Univ., Cambridge, MA

9:45 **2813** Cockroaches inspire exoskeletal shells and wings that help robots traverse obstacles and self-right. **Chen Li** (chen.li@jhu.edu)1, Ronald S. Fearing2, and Robert J. Full2, 1Johns Hopkins Univ., Baltimore, MD, 2Univ. of California, Berkeley, CA

10:00 **2814** Physical insecticides — bioinspiration from the action of bean leaves on bed bugs. **Catherine Loudon** (cloudon@uci.edu), Univ. of California, Irvine, CA

**10:15 BREAK**

10:30 **2815** Linking protein-catechol-chitin interactions  
to the physical properties of beetle elytral cuticle, a multicomponent biomaterial. M. Coleman Vaclaw1, Patricia A. Sprouse1, Neal Dittmer2, Michael Kanost2, Prajnaparamita Dhar1, and **Stevin Gehrke** (shgehrke@ ku.edu)1, 1Univ. of Kansas, Lawrence, KS, 2Kansas State Univ., Manhattan, KS

10:45 **2816** Antimicrobial and superhydrophobic properties of insect wings as inspiration for nanostructured engineered materials. **Marianne Alleyne** (vanlaarh@ life.illinois.edu)1, Nenad Miljkovic1, Junho Oh1,

Nicole Leahy1, and Donald M. Cropek2, 1Univ. of Illinois, Champaign, IL, 2U.S. Army Corps of Engineers, Champaign, IL

11:00 **2817** Insights from developmental studies into the evolution of spider silk glands and the engineering of artificial silk production. Cheryl Hayashi and **Crystal Chaw** (ro.chaw@ucr.edu), Univ. of California, Riverside, CA

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**THURSDAY**

**Thursday, September 29 • MORNING •**

11:15 **2818** The multi-linked mechanism of active ventilation in beetles: An inspiration for novel flow control. **Hodjat Pendar** (hpendar@vt.edu) and John Socha, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

11:30 **2819** Nature inspired flow sensing: The long road from ecomechanics to microsensors. **Jérôme Casas** (jerome.casas@univ-tours.fr)1 and Gijs Krijnen2, 1Univ. of Tours, Tours, France, 2Univ. of Twente, Enschede, Netherlands

11:45 **2820** Conception of an active amplification mechanism in infrared receptors of pyrophilous *Melanophila* beetles. **Helmut Schmitz** (h.schmitz@ uni-bonn.de), Univ. of Bonn, Bonn, Germany

12:00 **2821** Cognitive challenges of biologically inspired design. **Ashok Goel** (goel@cc.gatech.edu), Georgia Institute of Technology, Atlanta, GA

12:15 **2822** From social insects to smart, flexible, adaptive teams of robots: The biomechanics of group decision-making. **Theodore Pavlic** (tpavlic@asu.edu), Sara Walker, and Stephen Pratt, Arizona State Univ., Tempe, AZ

12:30 **2823** Collective behavior in ants and engineered networks. **Deborah M. Gordon** (dmgordon@stanford. edu), Stanford Univ., Stanford, CA

**Symposium: Olfaction and Olfaction-Mediated Behaviors**

***West Hall F4 (WF4) (Convention Center)***

**Moderators and Organizers:** Bill Hansson1 and Laurence Zwiebel2, 1Max Planck Institute for Chemical Ecology, Jena, Germany, 2Vanderbilt Univ., Nashville, TN

9:15 **2824** Ecological context of mosquito odorant receptor function. **Jonathan Bohbot** (jonathanbohbot@ yahoo.com), The Hebrew Univ., Rehovot, Israel

9:30 **2825** Pheromone preference decoded. **Teun Dekker** (teun.dekker@slu.se)1, Fotini Koutroumpa2,  
Melanie Unbehend3, Zsolt Karpati4, Astrid Groot5, and David Heckel3, 1Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, 2INRA, Versailles, France, 3Max Planck Institute for Chemical Ecology, Jena, Germany, 4Hungarian Academy of Sciences, Budapest, Hungary, 5Univ. of Amsterdam, Amsterdam, Netherlands

9:45 **2826** Olfaction-mediated aggregation and sex in your kitchen. **Coby Schal** (coby@ncsu.edu), North Carolina State Univ., Raleigh, NC

10:00 **2827** Using natural odor variation to probe olfactory coding. **Brian Smith** (brianhsmith@asu.edu), Arizona State Univ., Tempe, AZ

**10:15 BREAK**

10:30 **2828** A new *Drosophila* pheromone and its neural substrate. **Bill Hansson** (hansson@ice.mpg.de), Max Planck Institute for Chemical Ecology, Jena, Germany

10:45 **2829** Olfaction-guided navigation of the desert ant *Cataglyphis*. **Markus Knaden** (mknaden@ice.mpg.de), Max Planck Institute for Chemical Ecology,  
Jena, Germany

11:00 **2830** Olfactory-mediated behavior and the neural basis of pollinator-plant interaction. **Jeff Riffell** (jriffell@u.washington.edu), Univ. of Washington, Seattle, WA

**Symposium: Endocrine and Neural Networks that Control and Regulate Behavioral Programs**

***Room W223 A (Convention Center)***

**Moderators and Organizers:** Erik Johnson1 and Young-Joon Kim2, 1Wake Forest Univ., Winston-Salem, NC, 2Gwangju Institute of Science and Technology, Gwangju, South Korea

9:15 **2831** Characterization of a neuroendocrine network that connects chemosensory signals to developmental timing and behavior in *Drosophila melanogaster*. Yuya Ohhara1, Mikkal Blick2, Michael O’Connor3, and **Naoki Yamanaka** (naoki.yamanaka@ucr.edu)2, 1Univ. of Shizuoka, Shizuoka, Japan, 2Univ. of California, Riverside, CA, 3Univ. of Minnesota, Minneapolis, MN

9:30 **2832** Neuropeptide regulation of reproductive behaviors in *Bombyx mori*. **Dusan Zitnan** (dusan. zitnan@savba.sk), Ivana Daubnerova, Daniel Cizmar, Branislav Bednar, and Ladislav Roller, Slovak Academy of Sciences, Bratislava, Slovakia

9:45 **2833** Regulation of ecdysis by orcokinin neuropeptides in the kissing bug *Rhodnius prolixus*. **Sheila Ons** (sheila.ons@presi.unlp.edu.ar), National Univ. of La Plata, La Plata, Argentina

10:00 **2834** The circuit mechanism for courtship behavior in *Drosophila melanogaster*. **Daisuke Yamamoto** (daichan@m.tohoku.ac.jp), Tohoku Univ., Sendai, Japan

**10:15 BREAK**

10:30 **2835** Genetic dissection of neuropeptide-controlled behavior in *Drosophila*. **John Ewer** (john.ewer@uv.cl) and Wilson Mena, Univ. of Valparaiso, Valparaiso, Chile

10:45 **2836** Timing of eclosion behaviour in *Drosophila*. **Christian Wegener** (christian.wegener@biozentrum. uni-wuerzburg.de)1, Mareike Selcho1, Carola Millán2, Franziska Ruf1, Angelina Palacios2, Jiangtian Chen1, Lilian Ubillo2, Chihiro Ito3, and John Ewer2, 1Univ. of Würzburg, Würzburg, Germany, 2Univ. of Valparaiso, Valparaiso, Chile, 3Okayama Univ., Okayama, Japan

11:00 **2837** Central pattern generators coordinate successful fertilization and egg-laying behavior in the female locust, *Locusta migratoria*. **Angela Lange** (angela.lange@utoronto.ca), Univ. of Toronto, Mississauga, ON, Canada

11:15 **2838** Modulations of diuretic hormone 44 pathway and sperm ejection timing in post-mated *Drosophila* females. **Young-Joon Kim** (kimyj@gist.ac.kr), Gwangju Institute of Science and Technology, Gwangju, South Korea

11:30 **2839** Multiple nutrient sensors in central neurons that regulate reproduction in *Drosophila*. **Erik Johnson** (johnsoec@wfu.edu), Wake Forest Univ., Winston-Salem, NC

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**THURSDAY**

**Thursday, September 29 • MORNING •**

**Symposium: Integrated Pest Management Around the World**

***Room W231 A (Convention Center)***

**Moderators and Organizers:** Sandipa G. Gautam1, Jhalendra Rijal2, and Sudan Gyawaly3, 1Oklahoma State Univ., Stillwater, OK, 2Univ. of California Cooperative Extension, Modesto, CA, 3Society of Overseas Nepalese Entomologists, Blacksburg, VA

9:15 **2840** Integrated pest and pollinator management: Investigating impacts of different pesticide programs on pest and pollinator communities in commercial orchards. **Neelendra K. Joshi** (nkjoshi@uark.edu)1, Timothy W. Leslie2, Edwin Rajotte2, and

David J. Biddinger3, 1Univ. of Arkansas, Fayetteville, AR, 2Pennsylvania State Univ., University Park, PA, 3Pennsylvania State Univ., Biglerville, PA

9:30 **2841** Toward a more selective pests management program in Virginia vineyards. **Douglas G. Pfeiffer** (dgpfeiff@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:45 **2842** Current status of IPM-based pest management practices in commercial vegetable productions in Nepal. **Sudan Gyawaly** (gyawaly17@gmail.com)1, Jhalendra Rijal2, Rajendra Regmi3, Krishna Puri4,

Rajan Ghimire5, and Nirajan Bhattarai3, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Univ. of California Cooperative Extension, Modesto, CA, 3Agriculture and Forestry Univ., Rampur, Nepal, 4Univ. of California, Davis, CA, 5New Mexico State Univ., Clovis, NM

10:00 **2843** IPM in the South Central US: Use of dynamic pest monitoring and management systems. **Kris Giles** (kris.giles@okstate.edu)1 and Brian McCornack2, 1Oklahoma State Univ., Stillwater, OK, 2Kansas State Univ., Manhattan, KS

**10:15 BREAK**

10:30 **2844** Integrated pest management and conservation agriculture in commercial vegetable home gardens. **Manuel Reyes** (reyesreyesmanny@gmail.com),  
North Carolina A&T State Univ., Greensboro, NC

10:45 **2845** IPM vs. IRM: The experiences from western corn rootworm management. **Ram Shrestha** (shrestrb@iastate.edu) and Aaron Gassmann, Iowa State Univ., Ames, IA

**Symposium: *Drosophila suzukii*, an Invasive Pest of Small and Stone Fruits**

***Room W240 C (Convention Center)***

**Moderators and Organizers:** Vaughn Walton1, Gianfranco Anfora2, Nik G. Wiman3, and Ashfaq Sial4, 1Oregon State Univ., Corvallis, OR, 2Edmund Mach Foundation, San Michele all’Adige, Italy, 3Oregon State Univ., Aurora, OR, 4Univ. of Georgia, Athens, GA

9:15 **2846** Current status of the *Drosophila suzukii* ecology and management in an Alpine production region (Trentino, Italy). **Gianfranco Anfora** (gianfranco. anfora@fmach.it)1, Alberto Grassi1, Valerio Mazzoni1, Valerio Stacconi1, Omar Stabelli1, Vaughn Walton2, and Claudio Ioriatti1, 1Edmund Mach Foundation, San Michele all’Adige, Italy, 2Oregon State Univ., Corvallis, OR

9:30 **2847** *Drosophila suzukii* invasion in South America. **Marindia Depra** (marindiadepra@gmail.com)1 and Vera Valente2, 1Federal Univ. of Rio Grande, Porto Alegre, Brazil, 2Federal Univ. of Pelotas, Pelotas, Brazil

9:45 **2848** Worldwide invasion history of *Drosophila suzukii*. **Martha Pascual** (martapascual@ub.edu), Univ. of Barcelona, Barcelona, Spain

10:00 **2849** Biology, management, and population modeling of *Drosophila suzukii* in western North American production regions. **Vaughn Walton** (vaughn. walton@oregonstate.edu)1, Nik G. Wiman2, Daniel Dalton1, Betsey Miller1, Riki York1, Peter Shearer3,

Samantha L. Tochen1, Lynell K. Tanigoshi4,  
Beverly S. Gerdeman5, Jana Lee6, Claudio Loriatti7, Gianfranco Anfora7, Alberto Grassi7, Rufus Isaacs8, and Hannah Burrack9, 1Oregon State Univ., Corvallis, OR, 2Oregon State Univ., Aurora, OR, 3Oregon State Univ., Hood River, OR, 4Washington State Univ., Mt. Vernon, WA, 5Washington State Univ., Vancouver, WA, 6USDA - ARS, Corvallis, OR, 7Edmund Mach Foundation,  
San Michele all’Adige, Italy, 8Michigan State Univ.,  
East Lansing, MI, 9North Carolina State Univ., Raleigh, NC

**10:15 BREAK**

10:30 **2850** Spotted wing drosophila’s natural enemies  
and the importance of landscape ecology for classical biological control. **Kent M. Daane** (kdaane@ucanr.edu), Univ. of California, Berkeley, CA

10:45 **2851** Tritrophic interactions between host plant, phytophagous and entomophagous insects: The  
case of the invasive species *Drosophila suzukii*. **Patricia Gibert** (patricia.gibert@univ-lyon1.fr)1, Mathilde Poyet2, Patrice Eslin3, Olivier Chabrerie3,  
and Emmanuel Desouhant2, 1Univ. Claude Bernard, Villeurbanne, France, 2Lyon Univ., Villeurbanne, France, 3Univ. of Picardie Jules Verne, Amiens, France

11:00 **2852** Presentation withdrawn

11:15 **2853** The identification of viral pathogens suitable for the control of *Drosophila suzukii*. Darren Obbard1, **Nathan Medd** (nathan.medd@ed.ac.uk)1, Jerry Cross2, and Simon Fellous3, 1The Univ. of Edinburgh, Edinburgh, United Kingdom, 2East Malling Research, Kent, United Kingdom, 3INRA, Montpellier, France

11:30 **2854** Genome-enabled spotted wing drosophila research. **Joanna Chiu** (jcchiu@ucdavis.edu), Univ. of California, Davis, CA

11:45 **2855** A season-long strategy to manage spotted wing drosophila. **Hannah Burrack** (hannah\_burrack@ ncsu.edu)1, Lauren M. Diepenbrock2, Katharine Swoboda Bhattarai 1, Yanan Zheng1, and Ashfaq Sial3, 1North Carolina State Univ., Raleigh, NC, 2Univ. of Missouri, Columbia, MO, 3Univ. of California, Berkeley, CA

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**THURSDAY**

**Thursday, September 29 • MORNING •**

**Symposium: Arboviruses and One Health**

***Room W230 C (Convention Center)***

**Moderators and Organizers:** Dana Vanlandingham1 and Rosemary Sang2, 1Kansas State Univ., Manhattan, KS, 2Kenya Medical Research Institute, Nairobi, Kenya

9:15 **2856** Ecology of West Nile virus in California exemplifies the One Health paradigm. **William Reisen** (wkreisen@gmail.com), Univ. of California, Davis, CA

9:30 **2857** An arbovirus system with One Health consequences in East Africa. **Ann Powers** (akp7@cdc. gov), Centers for Disease Control and Prevention, Fort Collins, CO

9:45 **2858** Arboviruses and hemorrhagic fever surveillance in Kenya towards achieving enhanced preparedness and response with a One Health approach. **Rosemary Sang** (rosemary.sang@usamru-k. org)1, Joel Lutomiah1, Konongoi Limbaso1, Victor Ofula2, Albert Nyunja2, Albina Makio2, Frederick Eyase2, Rodney Colden2, Edith Chepkorir3, Caroline Tigoi3, Collins Odhiambo3, Ian Njeru4, Daniel Langat4, Jaqueline Kasiiti5, and Rees Murithi5, 1Kenya Medical Research Institute, Nairobi, Kenya, 2U.S. Army Medical Research Directorate, Nairobi, Kenya, 3International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 4Ministry of Health, Nairobi, Kenya, 5Ministry of Livestock, Nairobi, Kenya

10:00 **2859** Climate-population analysis of potential mosquito vectors of emerging arbovirus disease threats to the US. **Seth Britch** (seth.britch@ars.usda. gov), USDA - ARS, Gainesville, FL

**10:15 BREAK**

10:30 **2860** Factors affecting the ability of mosquitoes to transmit Rift Valley fever virus. **Michael Turell** (mturell@erols.com), U.S. Army Medical Command (Retired), Frederick, MD

10:45 **2861** Chikungunya and mosquito vectors.  
**Stephen Higgs** (shiggs@bri.ksu.edu), Yan-Jang Huang, and Dana Vanlandingham, Kansas State Univ., Manhattan, KS

11:00 **2862** Zika virus transmission in the Americas. **Christopher Mores** (cmores@lsu.edu)1,2, Craig Stoops2, and Rebecca Christofferson1, 1Louisiana State Univ., Baton Rouge, LA, 2U.S. Navy, Lima, Peru

11:15 **2863** Assessment of risk of a Japanese encephalitis virus introduction in the United States.

**Dana Vanlandingham** (dlvanlan@vet.ksu.edu)1, Yan-Jang Huang1, Susan Hettenbach1, Julie Harbin1, So Lee Park1, Alan Barrett2, Lee Cohnstaedt3, and Stephen Higgs1, 1Kansas State Univ., Manhattan, KS, 2The Univ. of Texas, Galveston, TX, 3USDA - ARS, Manhattan, KS

11:30 **2864** Viral genetics as a critical factor to control the infection and dissemination of yellow fever virus in *Aedes aegypti*. **Yan-Jang Huang** (yshuang@ksu.edu)1, John Nuckols2, Stephen Higgs1, Alan Barrett3, and Dana Vanlandingham1, 1Kansas State Univ., Manhattan, KS, 2U.S. Army, Fort Detrick, MD, 3The Univ. of Texas, Galveston, TX

11:45 **2865** Molecular signatures of a midgut escape barrier in *Culex quinquefasciatus* mosquitoes infected by West Nile virus. **Gregory Ebel** (gregory.ebel@colostate.edu), Colorado State Univ., Fort Collins, CO

**Symposium: New Insights into the Metabolism of Mosquitoes that are Vectors of Human Diseases**

***Room W414 A (Convention Center)***

**Moderator and Organizer:** Patricia Scaraffia, Tulane Univ., New Orleans, LA

9:15 **2866** Temporal regulation of metabolism during mosquito reproduction. **Alexander Raikhel** (araikhel@ ucr.edu)1, Yuan Hou2, Xue-Li Wang2, Tusar Saha1, Sourav Roy1, Bo Zhao1, and Zhen Zou2, 1Univ. of California, Riverside, CA, 2Chinese Academy of Sciences, Beijing, China

9:45 **2867** Metabolic analysis of the juvenile hormone synthesis pathways in mosquitoes. **Fernando Noriega** (noriegaf@fiu.edu), Marcela Nouzova, Crisalejandra Rivera-Perez, and Maria Areiza, Florida International Univ., Miami, FL

10:00 **2868** Transcriptome sequencing provides insights to the metabolic underpinnings of photoperiodic dia- pause in the Asian tiger mosquito, *Aedes albopictus*. **Peter A. Armbruster** (paa9@georgetown.edu)1, Xin Huang1, Zachary A. Batz1, Monica F. Poelchau1, Julie A. Reynolds2, and David L. Denlinger2, 1Georgetown Univ., Washington, DC, 2The Ohio State Univ., Columbus, OH

**10:15 BREAK**

10:30 **2869** Recent advances in the understanding of nitro- gen and carbon metabolism in *Aedes aegypti* mosqui- toes. **Patricia Scaraffia** (pscaraff@tulane.edu), Tulane Univ., New Orleans, LA

10:45 **2870** Exploiting metabolic pathways to regulate vec- tor competence in *Aedes aegypti* during dengue virus infection. **Rushika Perera** (rushika.perera@colostate. edu)1, Nunya Chotiwan1, Barb Andre1, Irma San- chez-Vargus1, Jeffrey M. Grabowski2, Amber Hopf-jan- nasch2, Erik Gough2, Ernesto Nakayasu2, Catherine Hill2, and Richard J. Kuhn2, 1Colorado State Univ., Fort Collins, CO, 2Purdue Univ., West Lafayette, IN

11:00 **2871** Mitochondrial metabolism and the connections between physiology and immunity in *Anopheles* mos- quitoes. **Shirley Luckhart** (sluckhart@ucdavis.edu), Univ. of California, Davis, CA

**Symposium: Peridomestic Animals and Chagas Vector Control**

***Room W230 B (Convention Center)***

**Moderators and Organizers:** Ricardo Gürtler1 and Pamela Pen- nington2, 1Univ. of Buenos Aires, Buenos Aires, Argentina, 2Univ. of Valle de Guatemala, Guatemala, Guatemala

9:15 **2872** Vector blood meal analysis to evaluate the impact of community-based (or Ecohealth) house improvements for vector control. **M. Carlota Monroy** (mcarlotamonroy@gmail.com), Univ. of San Carlos, Guatemala City, Guatemala

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9:30 **2873** Vector saliva: The vector-host interphase. **Marcos Pereira** (marcoshp@icb.ufmg.br), Federal Univ. of Minas Gerais, Belo Horizonte, Brazil

9:45 **2874** Anthroponotic dispersal, ecological host fitting, and mosaic population structure of sylvatic *Trypanosoma cruzi*: Insights from highland Bolivia. **Louisa Messenger** (louisa.messenger@lshtm.ac.uk), London School of Hygiene and Tropical Medicine, London, United Kingdom

10:00 **2875** Synanthropic rodent control to reduce transmission risk. **Pamela Pennington** (pamelap@ uvg.edu.gt), Univ. of Valle de Guatemala, Guatemala, Guatemala

**10:15 BREAK**

10:30 **2876** The role of the zoonotic cycle in domestic transmission in Ecuador. **Mario J. Grijalva** (grijalva@ ohio.edu), Pontifical Catholic Univ., Quito, Ecuador

10:45 **2877** A veterinary vaccine to reduce the contribution of domestic dogs to *Trypanosoma cruzi* transmission in the Yucatan Peninsula, Mexico. **Eric Dumonteil** (edumonte@tulane.edu), Autonomous Univ. of Yucatán, Mérida, Mexico

**Symposium: Stable Flies in Agroecosystems: An International Problem**

***Room W232 B (Convention Center)***

**Moderator and Organizer:** David Taylor, USDA - ARS, Lincoln, NE

9:15 **2878** The race between research and compliance to combat stable flies in western Australia. **David Cook** (david.cook2@agric.wa.gov.au), Dept. of Agriculture and Food, South Perth, Australia

9:30 **2879** Biology of stable fly on tropical fruits (pineapple, banana, and oil palm), its management strategies, and impacts on national livestock. **Jose Solorzano** (asolorzano@inta.go.cr)1, David Taylor2, and Jannery Gomez1, 1INTA, San José, Costa Rica, 2USDA - ARS, Lincoln, NE

9:45 **2880** Stable fly outbreaks related to sugarcane production in Brazil: Current situation and future outlook. **Paulo Cancado** (paulo.cancado@embrapa.br)1, Thadeu Barros1, Taciany Ferreira Dominghetti2, and Cleber Soares1, 1Embrapa Beef Cattle, Campo Grande, Brazil, 2Federal Univ. of Matogrosso do Sul, Campo Grande, Brazil

10:00 **2881** Development of stable flies and house flies (Diptera: Muscidae) in dewatered sewage biosolids. **Carl W. Doud** (cdoud@co.midland.mi.us)1, David Taylor2, and Ludek Zurek3, 1Midland County Mosquito Control, Sanford, MI, 2USDA - ARS, Lincoln, NE, 3Kansas State Univ., Manhattan, KS

**10:15 BREAK**

10:30 **2882** Characterization of stable fly developmental substrates. **Kristina Friesen** (kristina.friesen@ars.usda. gov)1, Dennis Berkebile1, Erin Scully2, Lisa Durso1,  
Brian Wienhold1, Junwei Zhu1, and David Taylor1, 1USDA - ARS, Lincoln, NE, 2USDA - ARS, Manhattan, KS

10:45 **2883** Volatile semiochemicals associated with stable fly agroecosystems. **Jerry Zhu** (jerry.zhu@ars.usda. gov)1, Nadia Jelvez2, Antonio Euzebio Goulart Sant’ana2, and Jose Solorzano3, 1USDA - ARS, Lincoln, NE, 2Federal Univ. of Alagoas, Maceió, Brazil, 3INTA, San José, Costa Rica

11:00 **2884** Are agronomic residues the “missing link” for understanding stable fly population dynamics in the US? **David Taylor** (dave.taylor@ars.usda.gov),  
Kristina Friesen, and Jerry Zhu, USDA - ARS, Lincoln, NE

**Symposium: Vector Biology and Ecology Perspective: Roadblocks and Solutions to Malaria Elimination**

***Room W414 B (Convention Center)***

**Moderator and Organizer:** Jan E. Conn, New York State Dept. of Health, Slingerlands, NY

9:15 **2885** Metabolic and target-site mechanisms combine to confer strong DDT resistance in *Anopheles gambiae*. **Martin Donnelly** (m.j.donnelly@liverpool.ac.uk), Liverpool School of Tropical Medicine, Liverpool, United Kingdom

9:45 **2886** High burden of malaria following scale-up of control interventions in Nchelenge District, Luapula Province, Zambia. **Douglas E. Norris** (dnorris@jhsph. edu)1, Smita Das1, Mbanga Muleba2, Christine Jones1, Julia Pringle1, and Jennifer Stevenson3, 1Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, 2Tropical Disease Research Center, Ndola, Zambia, 3Macha Research Trust, Choma, Zambia

10:00 **2887** Vector behaviour in Latin America: Challenges and opportunities for malaria elimination.  
**Martha L. Quinones** (mlquinonesp@unal.edu.co)1, Martha Ahumada2, Amy Krystosik3, Gerry Killeen4, Socrates Herrera5, and John Beier6, 1National Univ.

of Colombia, Bogotá, Colombia, 2National Institute of Health, Bogotá, Colombia, 3Kent State Univ.,  
San Francisco, CA, 4Liverpool School of Tropical Medicine, Liverpool, United Kingdom, 5CAUCASECO, Cali, Colombia, 6Univ. of Miami, Miami, FL

**10:15 BREAK**

10:30 **2888** Genetic differentiation between exophagic  
and endophagic malaria vector populations in Brazil. **Paulo Ribolla** (pribolla@ibb.unesp.br), São Paulo State Univ., Botucatu, Brazil

10:45 **2889** Complex resting and biting behaviors of malaria vectors in rural transmission settings in India. **Sunita Swain** (swain.sunita@gmail.com)1 and Matthew B. Thomas2, 1Research Consultant to Penn State, Rourkela, India, 2Pennsylvania State Univ., University Park, PA

11:00 **Discussion**

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**Symposium: Molecular Strategies/Mechanisms of Insect Reproduction**

***Room W331 B (Convention Center)***

**Moderators and Organizers:** Muhammad Tufail1 and Makio Takeda2, 1King Saud Univ., Riyadh, Saudi Arabia, 2Kobe Univ., Kobe, Japan

9:15 **2890** Function of the *Deleted Azoospermia* (*DAZ*) family gene in spermatogenesis in haploid male of the sawfly. **Masatsugu Hatakeyama** (sawfly@affrc.go.jp)1 and Kazuki Sekiné2, 1National Institute of Agrobiological Sciences, Tsukuba, Japan, 2Rissho Univ., Kumagaya, Japan

9:30 **2891** Elucidating the molecular mechanism of transovarial transmission of tick-borne rickettsiae. **Shahid Karim** (shahid.karim@usm.edu), Univ. of Southern Mississippi, Hattiesburg, MS

9:45 **2892** Differential reproductive strategy in two wing-morphs of the brown planthopper,  
*Nilaparvata lugens* Stål (Hemiptera: Delphacidae). **Muhammad Tufail** (mtufail@ksu.edu.sa)1,  
Muhammad Naeemullah2, Prem Sharma3, Makio Takeda4, and Chiharu Nakamura4, 1King Saud Univ., Riyadh, Saudi Arabia, 2Pakistan Agricultural Research Council, Islamabad, Pakistan, 3National Agricultural Research Council, Kathmandu, Nepal, 4Kobe Univ., Kobe, Japan

10:00 **2893** Integration of midgut-fat body-gonadal axis in *Periplaneta americana*: Monoamine and peptide regulation. **A. S. M. Kamruzzaman** (asm\_kzaman@ hotmail.com)1, Azam Mikani2, Hironobu Asano1,  
Azza Elgendy3, Muhammad Tufail4, Susumu Hiragaki1, and Makio Takeda1, 1Kobe Univ., Kobe, Japan,

2Tarbiat Modares Univ., Tehran, Iran, 3Cairo Univ., Cairo, Egypt, 4King Saud Univ., Riyadh, Saudi Arabia

**10:15 BREAK**

10:30 **2894** Molecular characterization and RNAi-mediated knockdown of vitellogenin gene in red palm weevil, *Rhynchophorus ferrugineus* (Olivier).  
**Abdulrahman Aldawood** (aldawood@ksu.edu.sa), Khalid Mahmood, Muhammad Tufail, Mureed Husain, and Khawaja Ghulam Rasool, King Saud Univ.,

Riyadh, Saudi Arabia

10:45 **2895** Molecular cloning, characterization, and disruption of vitellogenin gene by RNAi in warehouse moth, *Cadra cautella* (Walker). **Khawaja Ghulam Rasool** (krasool@ksu.edu.sa), Mureed Husain, Muhammad Tufail, Khalid Mehmood, and Abdulrahman Aldawood, King Saud Univ., Riyadh, Saudi Arabia

11:00 **2896** Molecular characterization of vitellogenin receptor and explore their uniqueness on reproduction with respect to lepidopteran insect species. **Muthukalingan Krishnan** (profmkrish@yahoo.com), Barathidasan Univ., Tiruchirappalli, India

11:15 **2897** Conservation of the Mos/MAPK signaling pathway during insect oocyte maturation: A case  
study in the silkworm, *Bombyx mori*. **Megumi Sumitani** (sumikasashima@affrc.go.jp)1, Daisuke Yamamoto2, Hideki Sezutsu1, and Mtsatsugu Hatakeyama1,

1National Institute of Agrobiological Sciences, Tsukuba, Japan, 2Jichi Medical Univ., Shimotsuke, Japan

**Symposium: Global Challenges in Applied Urban Entomology**

***Room W232 C (Convention Center)***

**Moderator and Organizer:** Ron Harrison, Orkin Pest Control, Atlanta, GA

9:15 **2898** Termite issues and control internationally. **Brian T. Forschler** (bfor@uga.edu), Univ. of Georgia, Athens, GA

9:30 **2899** Global food safety. **Zia Siddiqi** (zsiddiqi@rollins. com), Orkin Pest Control, Atlanta, GA

9:45 **2900** Training and certifications internationally. **Chris Stelzig** (cstelzig@entsoc.org), Entomological Society of America, Annapolis, MD

10:00 **2901** International experience with the kudzu bug, *Megacopta cribraria* F. (Hemiptera: Plataspidae). **Wayne Gardner** (wgardner@uga.edu), Univ. of Georgia, Griffin, GA

**10:15 BREAK**

10:30 **2902** Pests unique to international situations.  
**Pat Copps** (pcopps@rollins.com), Orkin Pest Control, Riverside, CA

10:45 **2903** Urban pest ant management with a minimal impact on the environment. **Dong-Hwan Choe** (donghwan.choe@ucr.edu), Univ. of California, Riverside, CA

11:00 **2904** Manufacturing, registering, and shipping products globally. **Cisse Spragins** (cspragins@rockwelllabs.com), Rockwell Labs, Ltd., Kansas City, MO

11:15 **2905** International urban pest control franchising. **Tom Luczynski** (tluczynski@rollins.com), Orkin Pest Control, Atlanta, GA

**Graduate Student Oral Competition: Agricultural and Forest Entomology: Pollinators**

***Room W224 C (Convention Center)***

**Moderator:** Justin Cappadonna, The Univ. of Queensland, Brisbane, Australia

9:15 **2906** The effects of land abandonment on bees (Hymenoptera: Apoidea) in NE Portugal. **Andreia Penado** (andreiapenado@gmail.com)1,2, Hugo Rebelo2,3,  
Pedro Beja2,4, Thomas Wood1, Ellen Rotheray1, and Dave Goulson1, 1Univ. of Sussex, Brighton, United Kingdom, 2CIBIO, Vairão, Portugal, 3Univ. of Bristol, Bristol, United Kingdom, 4Tropical Scientific Reserch Institute, Lisbon, Portugal

9:30 **2907** Wild bee communities in non-crop land cover in the Maine (USA) wild blueberry production landscape. **Brianne Du Clos** (brianne.duclos@maine.edu),  
Cynthia Loftin, and Frank Drummond, Univ. of Maine, Orono, ME

9:45 **2908** Integrating nutritional studies into targeted floral provisioning for *Bombus impatiens*. **Erin Treanore** (etreanore@gmail.com), Anthony Vaudo, R. Carley Miller, Christina M. Grozinger, and Shelby J. Fleischer, Pennsylvania State Univ., University Park, PA

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10:00 **2909** The potential of alternative manageable bee species for raspberry pollination. **Corey Andrikopoulos** (cja576@gmail.com)1, James H. Cane2, and  
Diane G. Alston1, 1Utah State Univ., Logan, UT, 2USDA - ARS, Logan, UT

**10:15 BREAK**

10:30 **2910** Diversity in motion: Temporal responses of bee communities to a density gradient of a flowering invasive. **Michael Minnick** (minnicmj@miamioh.edu) and Thomas O. Crist, Miami Univ., Oxford, OH

10:45 **2911** The influence of distinct pollinators on  
male and female reproductive success in alfalfa. **Emmanuel Santa-Martinez** (santamartnez@wisc.edu)1 and Johanne Brunet2, 1Univ. of Wisconsin, Madison, WI, 2USDA - ARS, Madison, WI

11:00 **2912** The susceptibility of the alfalfa leafcutting bee (*Megachile rotundata*) to three pyrethroids used in mosquito management. **Alyssa Piccolomini** (alyssa. piccolomini@montana.edu) and Robert K. D. Peterson, Montana State Univ., Bozeman, MT

11:15 **2913** Pollinator associations with willow biomass crop utilized for phytoremediation. **Giuseppe Tumminello** (gtummine@syr.edu)1, Timothy Volk1, Scott McArt2, and Melissa K. Fierke1, 1State Univ. of New York, Syracuse, NY, 2Cornell Univ., Ithaca, NY

**Graduate Student Oral Competition: Agricultural and Forest Entomology: Vectors and Others**

***Room W240 B (Convention Center)***

**Moderator:** BorisCastro,DowAgroSciences,Indianapolis,IN

9:15 **2914** Non-feeding modes of *Tomato yellow leaf curl virus* transmission by whiteflies (*Bemisia tabaci*) and implications for viral epidemics. **Wendy G. Marchant** (wmar@uga.edu) and Rajagopalbabu Srinivasan, Univ. of Georgia, Tifton, GA

9:30 **2915** Assessing the role of onion thrips (*Thrips tabaci*) in bacterial leaf blight of onion. **Ari Grode** (grodeari@msu.edu), Prissana Wiriyajitsomboon, Mary Hausbeck, and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

9:45 **2916** A transformed commensal blocks transmission of the global plant pathogen, *Xylella fastidiosa,* by its most important vector. **Arinder Arora** (arinder.arora@ gmail.com)1,2, Kendra N. Pesko2, Thomas A. Miller3, and Ravi Durvasula2, 1Texas A&M Univ., College Station, TX, 2Univ. of New Mexico, Albuquerque, NM, 3Univ. of California, Riverside, CA

10:00 **2917** Competition with non-vectors mediates virus-vector interactions. **Paul Chisholm** (paul. chisholm@email.wsu.edu) and David Crowder, Washington State Univ., Pullman, WA

**10:15 BREAK**

10:30 **2918** Fungal-insect symbiosis: Exploring the relationship between the yeast *Kodamaea ohmeri*  
and its host, the small hive beetle, *Aethina tumida*. **Brogan Amos** (brogan.amos@uq.edu.au)1,2, Diana Leemon2, R. Andrew Hayes3, and Michael J. Furlong1, 1Univ. of Queensland, Brisbane, Australia, 2Queensland Dept. of

Agriculture and Fisheries, Brisbane, Australia, 3Univ. of the Sunshine Coast, Sippy Downs, Australia

10:45 **2919** How to analyze the data from an efficacy test? Evaluating the effect of different statistical analyses on the outcome of a pesticide efficacy experiment  
**H. Alejandro Merchan** (hamercha@ncsu.edu),

T. Aurora Toennisson, and Hannah Burrack, North Carolina State Univ., Raleigh, NC

11:00 **2920** Towards lower-cost, user friendly acoustic detection systems for hidden insect infestations in trees. **Barukh Rohde** (barukh94-school@yahoo.com)1 and Richard Mankin2, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Gainesville, FL

11:15 **2921** Host switching by ecological fitting generates oscillations in diet breadth. **Mariana Braga** (mariana. braga@zoologi.su.se)1, Sabrina Araujo2, Niklas Janz1, Sören Nylin1, and Walter Boeger2, 1Stockholm Univ., Stockholm, Sweden, 2Federal Univ. of Paraná, Curitiba, Brazil

**Graduate Student Oral Competition: Apidology, Sericulture, and Social Insects: Pollinators**

***Room W224 D (Convention Center)***

**Moderators:** Analiza P. Alves1 and Evelien VanEkert2, 1DuPont Pioneer, Johnston, IA, 2USDA - ARS, Maricopa, AZ

9:15 **2922** Pollen foraging comparison of *Bombus huntii* and *Apis mellifera* (Hymenoptera: Apidae). **Houston Judd** (houstonjudd@gmail.com)1, Ricardo Ramirez1, and James Strange2, 1Utah State Univ., Logan, UT, 2USDA - ARS, Logan, UT

9:30 **2923** Andromonoecy might enhance fitness in muskmelon (*Cucumis melo* L.) by improving pollination efficiency. **Revanasidda Aidhbhavi** (rshlb1114@gmail. com), Vasuki Belavadi, and Yaraballi Srinivasa, Univ. of Agricultural Sciences, Bangalore, India

9:45 **2924** Effects of surrounding landscape complexity on bee communities and pollination to soybean. **Ashley St. Clair** (astclair@iastate.edu), Amy Toth, Adam Dolezal, Ge Zhang, and Matt O’Neal, Iowa State Univ., Ames, IA

10:00 **2925** Landscape simplification constrains adult body size in native bees. **Heather Grab** (hlc66@cornell.edu)1, Julia Brokaw2, Bryan N. Danforth1, Jason Gibbs2,  
Alena Hutchinson1, Rufus Isaacs2, Katja Poveda1,

Miles Renauld1, and Gregory M. Loeb3, 1Cornell Univ., Ithaca, NY, 2Michigan State Univ., East Lansing, MI, 3Cornell Univ., Geneva, NY

**10:15 BREAK**

10:30 **2926** Influence of cultural practices on soybean nectar production. **Ty Smith** (tms377@msstate.edu)1, Angus Catchot1, Jeffrey Harris2, Natraj Krishnan1,  
Jeff Gore3, and Trent Irby1, 1Mississippi State Univ., Mississippi State, MS, 2USDA - ARS, Baton Rouge, LA, 3Mississippi State Univ., Stoneville, MS

10:45 **2927** Do honey bees (*Apis mellifera* L.) near reconstructed prairies collect significant amounts of food from native prairie flowers? **Morgan Carr-Markell** (carrm163@umn.edu)1, Cora Demler1, Scott Cornman2, Deborah Iwanowicz3, and Marla Spivak1, 1Univ. of

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Minnesota, St. Paul, MN, 2U.S. Geological Survey, Fort Collins, CO, 3U.S. Geological Survey, Kearneysville, WV

11:00 **2928** How landscape use affects bee health and foraging patterns. **Rachel Olsson** (rachel.olsson@email. wsu.edu) and David Crowder, Washington State Univ., Pullman, WA

**Graduate Student Oral Competition: Biodiversity, Biogeography, and Conservation of Arthropods: Butterflies and Others**

***Room W224 F (Convention Center)***

**Moderators:** Katrina Menard1 and Floyd Shockley2, 1Sam Noble Oklahoma Museum of Natural History, Norman, OK, 2Smithsonian Institution National Museum of Natural History, Washington, DC

9:15 **2929** Does density of host plant (*Asclepias* spp.) and surrounding habitat influence monarch butterfly (*Danaus plexippus*) oviposition? **Teresa Blader** (teresa.blader@gmail.com)1, Richard Hellmich2, and Sue Blodgett1, 1Iowa State Univ., Ames, IA, 2USDA - ARS, Ames, IA

9:30 **2930** Habitat influences on monarch (*Danaus plexippus*) ovipositioning rates and survival of eggs and larvae. **Andrew Myers** (myersan7@msu.edu) and Douglas Landis, Michigan State Univ., East Lansing, MI

9:45 **2931** Evaluating the influence of urbanization on monarch butterfly (*Danaus plexippus*)-parasite interactions. **Kelsey Deal** (kelsey.deal@okstate.edu) and Kristen Baum, Oklahoma State Univ., Stillwater, OK

10:00 **2932** An individual-based model for the endangered Karner blue butterfly and implications for conservation. **Lainey Bristow** (lainey.bristow@gmail.com)1,  
Jessica Hellmann2, and Ralph Grundel3, 1Univ. of

Notre Dame, South Bend, IN, 2Univ. of Minnesota, St. Paul, MN, 3U.S. Geological Survey, Chesterton, IN

**10:15 BREAK**

10:30 **2933** Phylogeography of *Neophasia* butterflies (Lepidoptera: Pieridae) at a major North American ecotone. **Dale Halbritter** (dhalb001@ufl.edu),  
Jaret Daniels, and Akito Kawahara, Univ. of Florida, Gainesville, FL

10:45 **2934** Factors associated with ant tending in Fender’s blue butterfly (*Plebejus icarioides fenderi*): Implications for habitat restoration and species recovery.  
**Cameron Thomas** (cameron.thomas@wsu.edu) and Cheryl Schultz, Washington State Univ., Vancouver, WA

11:00 **2935** The state of conservation of *Stichelia pelotensis* Biezanko, Mielke & Wedderhoff, [1979] (Lepidoptera: Papilionoidea: Riodinidae) in Southern Brazil.  
**Ana Paula dos Santos de Carvalho** (acarvalho@ufl.edu)1, Francisco Candido Cardoso Barreto2, and

Ana Beatriz Barros de Morais3, 1Univ. of Florida, Gainesville, FL, 2Federal Univ. of Espírito Santo, Vitória, Brazil, 3Federal Univ. of Santa Maria, Santa Maria, Brazil

11:15 **2936** Modeling the distribution of odonates: From the pages of 20th century field notes to the shapefiles of the 21st century. **Emily Sandall** (els22@psu.edu)1, Claire Jones2, and Andrew Deans1, 1Pennsylvania State Univ., University Park, PA, 2DePaul Univ., Chicago, IL

11:30 **2937** The *Micropeza* Meigen (Diptera: Micropezidae) of Central America. **Morgan Jackson** (morgandjackson@ gmail.com)1, Jeffrey Skevington2, and Stephen Marshall1, 1Univ. of Guelph, Guelph, ON, Canada, 2Agriculture and Agri-Food Canada, Ottawa, ON, Canada

11:45 **2938** Diptera as potential bioindicators in lowland wet grasslands. **John Carey** (jgjcarey@gmail.com)1, Christopher Williams2, and Michael J. Gormally1, 1National Univ. of Ireland, Galway, Ireland, 2Liverpool John Moores Univ., Liverpool, United Kingdom

12:00 **2939** The Pselaphini (Staphylinidae: Pselaphinae) of New Zealand. **Brittany Owens** (brittanyeowens@gmail. com) and Christopher E. Carlton, Louisiana State Univ., Baton Rouge, LA

12:15 **2940** Population estimation of the American burying beetle (*Nicrophorus americanus*) in southeastern Oklahoma. **Kyle Risser** (kyle.risser@okstate.edu),  
Kris Giles, and Carmen Greenwood, Oklahoma State Univ., Stillwater, OK

**Graduate Student Oral Competition: Functional Genomics and Transgenesis**

***Room W240 A (Convention Center)***

**Moderators:** István Mikó1 and David Furth2, 1Pennsylvania State Univ., University Park, PA, 2Smithsonian Institution National Museum of Natural History, Washington, DC

9:15 **2941** Functional importance of group I chitin deacetylases in cuticle morphology of *Tribolium castaneum* adult. **Seulgi Mun** (sruki21@gmail.com)1, Mi Young Noh1, Subbaratnam Muthukrishnan2,

Karl J. Kramer2, and Yasuyuki Arakane1, 1Chonnam National Univ., Gwangju, South Korea, 2Kansas State Univ., Manhattan, KS

9:30 **2942** *De novo* transcriptomic analysis of density- dependent phase plasticity in a locust species (*Schistocerca piciefrons*) and two closely related non-swarming grashoppers. **Bert Foquet** (bertfoquet@ tamu.edu) and Hojun Song, Texas A&M Univ., College Station, TX

9:45 **2943** Using long-term cell tracking and transgenic crickets to understand how a well-ordered insect embryo is built. **Seth Donoughe** (donoughe@fas.harvard. edu), Jordan Hoffmann, Chris Rycroft, and

Cassandra Extavour, Harvard Univ., Cambridge, MA

10:00 **2944** Antennal transcriptome analysis and expression profile of the seabuckthorn carpenter moth, *Holcocerus hippophaecolus* (Lepidoptera: Cossidae). **Ping Hu** (hupingcs@163.com), Jing Tao, Pengfei Lu, and You-Qing Luo, Beijing Forestry Univ., Beijing, China

**10:15 BREAK**

10:30 **2945** Global analysis of microRNA species in the gall midge *Mayetiola destructor*. **Chen Du** (cdu@ksu.edu)1, Ming-Shun Chen2, and R. Jeff Whitworth1, 1Kansas State Univ., Manhattan, KS, 2USDA - ARS, Manhattan, KS

10:45 **2946** Can transgenic flies overexpressing antioxidant enzymes blunt radiation-induced oxidative stress and improve mating success? **Vanessa Simoes Dias** (vanessadias@ufl.edu)1, Nicholas M. Teets1, Marc Schetelig2, Alfred Handler3, Daniel Hahn1, and Gabriel Araujo4,

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1Univ. of Florida, Gainesville, FL, 2Fraunhofer Institute for Molecular Biology and Applied Ecology, Gießen, Germany, 3USDA - ARS, Gainesville, FL, 4Federal Univ. of Bahia, Salvador, Brazil

11:00 **2947** The influence of learning on mate recognition and choice in the Asian citrus psyllid, *Diaphorina citri*. **Dara Stockton** (dara.stockton@ufl.edu), Xavier Martini, Lukasz Stelinski, and Laura Pescitelli, Univ. of Florida, Lake Alfred, FL

11:15 **2948** Octopamine and tyramine regulate the group thermoregulatory fanning response in honey bees (*Apis mellifera L.*). **Chelsea N. Cook** (chelsea.cook@ colorado.edu)1, Michael D. Breed1, and Colin Brent2, 1Univ. of Colorado, Boulder, CO, 2USDA - ARS, Maricopa, AZ

11:30 **2949** Transcriptional variation of the red imported fire ant (*Solenopsis invicta*) worker brain during task allocation. **Chloë Hawkings** (chloe.hawks@tamu.edu) and Cecilia Tamborindeguy, Texas A&M Univ., College Station, TX

11:45 **2950** Searching for venom: Comparative transcriptomics in robber flies (Diptera: Asilidae). **Chris Cohen** (myelaphus@ gmail.com) and Michael Brewer, East Carolina Univ., Greenville, NC

12:00 **2951** Identification and characterization of insect effector proteins and nutrient transporter genes underlying plant manipulation. **Léa Fléchon** (flechon.lea@ laposte.net), Chaoyang Zhao, and Paul Nabity, Washington State Univ., Pullman, WA

12:15 **2952** *Spiroplasma-Toxoptera citricida* interactions: From comparative biology to transcriptomic analysis. **Aline Guidolin** (aline.guidolin@usp.br) and Fernando Cônsoli, Univ. of São Paulo, Piracicaba, Brazil

**Graduate Student Oral Competition: Integrated Pest Management and Sustainable Agriculture: Thrips and Others**

***Room W232 A (Convention Center)***

**Moderators:** Gail Kampmeier1 and Damayant Buchori2, 1Illinois Natural History Survey (Retired), Champaign, IL, 2Bogor Agricultural Univ., Bogor, Indonesia

9:15 **2953** Value of neonicotinoid insecticide seed treatments in mid-south cotton (*Gossypium hirsutum* L.) production systems. **John North** (jhn39@msstate.edu)1, Jeff Gore2, Angus Catchot1, Scott Stewart3, Gus Lorenz4, Fred Musser1, Don Cook2, David L. Kerns5, and Darrin Dodds1,

1Mississippi State Univ., Mississippi State, MS, 2Mississippi State Univ., Stoneville, MS, 3Univ. of Tennessee, Jackson, TN, 4Univ. of Arkansas, Lonoke, AR, 5Louisiana State Univ., Winnsboro, LA

9:30 **2954** Influence of tobacco thrips (*Frankliniella fusca*) and reniform nematodes (*Rotylenchulus reniformis*) on cotton yield. **Whitney Crow** (wdc165@msstate.edu)1, Angus Catchot1, Jeff Gore2, Darrin Dodds1,

Thomas W. Allen1, and Don Cook2, 1Mississippi State Univ., Mississippi State, MS, 2Mississippi State Univ., Stoneville, MS

9:45 **2955** Feeding and oviposition by neonicotinoid- resistant and susceptible *Frankliniella fusc*a (Thysanoptera: Thripidae) on cotton seedlings grown from neonicotinoid treated seed. **Damon D’Ambrosio** (dadambro@ncsu.edu), Anders Huseth, Thomas Chappell, Dhilati Oza, Andrea Prestemon, and George G. Kennedy, North Carolina State Univ., Raleigh, NC

10:00 **2956** Interaction between herbicide injury and thrips injury in peanut. **Joel Moor** (jcm563@msstate.edu)1, Jeff Gore1, Don Cook1, Angus Catchot2, Fred Musser2, and Chris Dobbins1, 1Mississippi State Univ., Stoneville, MS, 2Mississippi State Univ., Mississippi State, MS

**10:15 BREAK**

10:30 **2957** Monitoring tobacco thrips, *Frankliniella fusca* (Hinds), resitance to neonicotinoid insecticides in the mid-south. **Chelsie Darnell** (chd102@msstate.edu)1, Angus Catchot1, Fred Musser1, Don Cook2, Jeff Gore2, Darrin Dodds1, and Shannon Morsello3, 1Mississippi State Univ., Mississippi State, MS, 2Mississippi State Univ., Stoneville, MS, 3Syngenta, Greensboro, NC

10:45 **2958** Host preference of melon thrips, *Thrips palmi* Karny (Thysanoptera: Thripidae), to six vegetable crops. **Mohammad Razzak** (rafi321@ufl.edu) and Dakshina Seal, Univ. of Florida, Homestead, FL

11:00 **2959** The evaluation of new Bt technologies for the control of thrips and plant bugs. **Scott Graham** (sgraha24@vols.utk.edu) and Scott Stewart, Univ. of Tennessee, Jackson, TN

11:15 **2960** Injury assessment and economic thresholds for three species of flower thrips found in Florida strawberry. **Iris Strzyzewski** (istrz228@ufl.edu)1, Joseph E. Funderburk1, Hugh A. Smith2, and

Justin Renkema2, 1Univ. of Florida, Quincy, FL, 2Univ. of Florida, Wimauma, FL

11:30 **2961** Advancing onion thrips (*Thrips tabaci*) control and onion production with a multi-faceted IPM program. **Ashley Leach** (al2282@cornell.edu), Stephen Reiners, and Brian A. Nault, Cornell Univ., Geneva, NY

11:45 **2962** Host plant preference and performance of *Klambothrips myopori* (Thysanoptera) in southern California. **Christopher Shogren** (cshog001@ucr.edu), Univ. of California, Riverside, CA

12:00 **2963** Identifying changes in gene expression that may promote virulence in the soybean aphid, *Aphis glycines*. **Ashley Yates** (yates.229@buckeyemail.osu. edu), Raman Bansal, Vitor Pavinato, and

Andrew Michel, The Ohio State Univ., Wooster, OH

12:15 **2964** Finding new ways to control carrot rust fly (*Psila rosae*) in Ontario, Canada. **Jason Lemay** (jlemay@mail.uoguelph.ca), Cynthia Scott-Dupree, and Mary Ruth McDonald, Univ. of Guelph, Guelph, ON, Canada

12:30 **2965** New issues emerging in Canadian carrot weevil (*Listronotus oregonensis*) control. **Zachariah Telfer** (ztelfer@uoguelph.ca), Mary Ruth McDonald, and Cynthia Scott-Dupree, Univ. of Guelph, Guelph, ON, Canada

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**THURSDAY**

**Thursday, September 29 • MORNING •**

**Graduate Student Oral Competition: Urban Entomology in a Changing Environment: Ants**

***Room W224 B (Convention Center)***

**Moderator:** Grzegorz Buczkowski, Purdue Univ., West Lafayette, IN

9:15 **2966** Black carpenter ant (*Camponotus pennsylvanicus*, De Geer) phylogenetics within Indiana. **Adam Salyer** (asalyer@purdue.edu), Michael Scharf, Gary Bennett, and Grzesiek Buczkowski, Purdue Univ., West Lafayette, IN

9:30 **2967** The pest case and management of the tramp ant, *Trichomyrmex destructor* (Jerdon, 1851), in Northern Taiwan (Hymenoptera: Formicidae). **Feng-Chuan Hsu** (d04b44002@ntu.edu.tw)1, Jaw-Jinn Jong2, and Chung-Chi Lin3, 1National Taiwan Univ., Taipei, Taiwan, 2New Taipei Municipal Er Chong Junior High School, New Taipei City, Taiwan, 3National Changhua Univ. of Education, Changhua, Taiwan

9:45 **2968** Linking community composition with morphological and physiological traits across urbanization gradients. **Abe Perez** (abe.perez@case. edu) and Sarah Diamond, Case Western Reserve Univ., Cleveland, OH

10:00 **2969** Effects of laboratory maintenance on cuticular hydrocarbons and conspecific aggression in odorous house ants (*Tapinoma sessile*). **Tim Luttermoser** (tlutterm@purdue.edu), Matthew Ginzel, Gary Bennett, and Grzesiek Buczkowski, Purdue Univ., West Lafayette, IN

**10:15 BREAK**

10:30 **2970** Analysis of diets for rearing the tawny crazy ant (*Nylanderia fulva*). **Andrew Davitt** (andrew.davitt@ tamu.edu), Aaron Tarone, and Edward Vargo, Texas A&M Univ., College Station, TX

10:45 **2971** Effects of the tawny crazy ant (*Nylanderia fulva*) on the ant community at the Port of Savannah, Georgia. **Benjamin Gochnour** (bmg1110@gmail.com), Univ. of Georgia, Griffin, GA

11:00 **2972** I’ll have what she’s having: Next-Generation insights into the diets of invasive ants.

**MacKenzie Kjeldgaard** (mkjeldgaard@tamu.edu)1, Jason Wulff1, Edward G. LeBrun2, Gregory Sword1,  
and Micky Eubanks1, 1Texas A&M Univ., College Station, TX, 2The Univ. of Texas, Austin, TX

11:15 **2973** Trophic ecology of a polymorphic invasive ant: Parsing within and between colony contributions. **Karl Roeder** (karoeder@ou.edu) and Michael Kaspari, Univ. of Oklahoma, Norman, OK

**Graduate Student Oral Competition: Urban Entomology in a Changing Environment: Home and Warehouse Pests**

***Room W224 A (Convention Center)***

**Moderator:** Peter Edde, Altria Client Services, Inc., Richmond, VA

9:15 **2974** Eliminating cockroach infestations and reducing pesticide use in apartments by integrated pest management. **Chen Zha** (chen.zha1@rutgers.edu) and Changlu Wang, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

9:30 **2975** Toxicity and repellency of essential oils on the Turkestan cockroach, *Blatta lateralis* (Blattodea: Blattidae). **Sudip Gaire** (sudipg@nmsu.edu),  
Alvaro Romero, Mary O’Connell, and F. Omar Holguin, New Mexico State Univ., Las Cruces, NM

9:45 **2976** Mathematic models for maximizing the efficacy of a synthetic amorphous zeolite intended for grain protection. **Kouame Yao** (kdyao@ksu.edu), Subramanyam Bhadriraju, and Kun Yan Zhu, Kansas State Univ., Manhattan, KS

10:00 **2977** Effect of temperature and life stage on the bacterial community associated with khapra beetle, *Trogoderma granarium* (Coleoptera: Dermestidae). **Diana Wilches** (dm.wilchescorreal@uleth.ca)1, Robert Laird1, Kevin Floate2, and Paul Fields3, 1Univ. of Lethbridge, Lethbridge, AB, Canada, 2Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, 3Agriculture and Agri-Food Canada, Winnipeg, MB, Canada

**10:15 BREAK**

10:30 **2978** Phosphine resistance in *Rhyzopertha dominica* (F.) (Coleoptera: Bostrichidae) in North America: Incidence, severity, and work towards a rapid assay for detection. **Edwin Afful** (eddafful@ksu.edu) and Thomas Phillips, Kansas State Univ., Manhattan, KS

10:45 **2979** Assessing efficacy of botanicals to control maize weevil (Coleoptera: Curculionidae) in stored sorghum grain. **Hame Abdou Kadi Kadi** (hkadikadi@ yahoo.com) and Bonnie Pendleton, West Texas A&M Univ., Canyon, TX

11:00 **2980** Entomophagy in the Wild West, the struggles of eating insects in Wyoming. **Megan Wilson** (mwilso39@uwyo.edu), Univ. of Wyoming, Laramie, WY

**Contributed Papers: Biodiversity, Biogeography, and Conservation of Arthropods: Population and Community Diversity**

***Room W331 D (Convention Center)***

**Moderators:** Daniel Gruner1 and Andrea Lucky2, 1Univ. of Maryland, College Park, MD, 2Univ. of Florida, Gainesville, FL

9:15 **2981** Cercopids of Madagascar: Where do you come from and where are you going? **Adeline Soulier-Perkins** (soulier@mnhn.fr), Morgane Bequet-Rennes, and  
Eric Guilbert, National Museum of Natural History, Paris, France

9:30 **2982** The Pentatomidae of the Franklin Parker Preserve in the New Jersey Pine Barrens. **Greg Cowper** (cowper@ansp.org), Drexel Univ., Philadelphia, PA

9:45 **2983** Nutrient subsidies and the biogeography of invertebrate communities on islands off Canada’s Pacific coast. **Crystal Ernst** (crystal\_ernst@sfu.ca)1,2 and John Reynolds1,2, 1Hakai Institute, Heriot Bay, BC, Canada, 2Simon Fraser Univ., Burnaby, BC, Canada

10:00 **2984** The story of “Many Thunders”: Species delimitation of the highly polymorphic Neotropical damselfly genus *Polythore* (Zygoptera:Polythoridae). **Melissa Sánchez Herrera** (melsanc@gmail.com)1, Christopher Beatty1, William R. Kuhn1, Emilio Realpe2,

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Camilo Salazar3, Andrea C. Encalada4, and Jessica Ware1, 1Rutgers, The State Univ. of New Jersey, Newark, NJ, 2Univ. of the Andes, Bogotá, Colombia, 3Univ. of Rosario, Bogotá, Colombia, 4Univ. of San Francisco, Quito, Ecuador

**10:15 BREAK**

10:30 **2985** Insect taxonomic diversity in the Korean peninsula. **Hong-Yul Seo** (aphid@korea.kr)1,  
Tae-Woo Kim, Ki-Gyoung Kim, Tae-Wha Kang, and Seon-Yi Kim, National Institute of Biological Resources, Incheon, South Korea

10:45 **2986** Delimitation, biogeography, and diversification of *Choristoneura* Lederer (Lepidoptera: Tortricidae) using molecular evidence. **Giovanny Fagua** (faguagon@ualberta.ca)1,2 and Felix Sperling1, 1Univ. of Alberta, Edmonton, AB, Canada, 2Pontifical Catholic Univ., Bogotá, Colombia

11:00 **2987** A summary of current arthropod conservation work in British Columbia, Canada. **Jennifer Heron** (jennifer.heron@gov.bc.ca), British Columbia Ministry of Environment, Vancouver, BC, Canada

11:15 **2988** Ecophylogenetics of flies (Diptera) in a subarctic site, Churchill (MB, Canada). **Anna M. Solecki** (asolecki@uoguelph.ca)1, Terry A. Wheeler2, and  
M. Alex Smith1, 1Univ. of Guelph, Guelph, ON, Canada, 2McGill Univ., Sainte-Anne-de-Bellevue, QC, Canada

11:30 **2989** Benthic macroinvertebrate community structure in a sub-tropical river system, South Africa: Implications for conservation. **Augustine Niba** (aniba@wsu.ac.za), Walter Sisulu Univ., Mthatha, South Africa

11:45 **2990** Historical biogeography of higher termites. **Thomas Bourguignon** (thomas.bourgui@gmail.com)1, Nathan Lo2, Jan Sobotnik3, Naeem Iqbal4, Eric Coissac5, Simon Ho2, Maria Lee6, David Sillam-Dussès7,8, Barbora Krizkova3, Yves Roisin9, Theo Evans10, and Aleš Buček3, 1The Univ. of Sydney, Camperdown, Australia, 2The Univ. of Sydney, Sydney, Australia, 3Czech Univ. of Life Sciences, Prague, Czech Republic, 4Ghazi Univ., Ghazi, Pakistan, 5Univ. Grenoble Alpes, Grenoble, France, 6National Univ. of Singapore, Singapore, Singapore, 7Univ. of Paris, Villetaneuse, France, 8IRD, Bondy, France, 9Free Univ. of Brussels, Brussels, Belgium, 10Univ. of Western Australia, Perth, Australia

12:00 **2991** Ants in the saltmarsh: What they tell us about natural and technological disasters. **Linda Hooper-Bui** (lindabui@lsu.edu), Rachel M. Strecker, and Xuan Chen, Louisiana State Univ., Baton Rouge, LA

**Contributed Papers: Bioinformatics and Comparative Genomics of Arthropods: Gene Expression**

***Room W330 A (Convention Center)***

**Moderators:** Reed Johnson1 and Margaret Allen2, 1The Ohio State Univ., Wooster, OH, 2USDA - ARS, Stoneville, MS

9:15 **2992** Identifying heme importers and exporters through RNA seq analysis in *Aedes aegypti*. **Heather Eggleston** (abbyhl07@vt.edu)1,2,

Michelle A. E. Anderson1, and Zach Adelman1,2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Texas A&M Univ., College Station, TX

9:30 **2993** Transcriptome analysis of putative effector genes in Phylloxeridae. **Chaoyang Zhao** (chaoyang\_zhao@ wsu.edu), Léa Fléchon, Zhen Fu, and Paul Nabity, Washington State Univ., Pullman, WA

9:45 **2994** Differential cellulase gene expression in response to different cellulose diets in *Ctenolepisma longicaudata*. **Ratnasri Pothula** (rmallipe@vols.utk. edu)1, William Klingeman1, Margaret Staton1,

Brian Johnson2, and Juan Luis Jurat-Fuentes1, 1Univ. of Tennessee, Knoxville, TN, 2Univ. of California, Davis, CA

10:00 **2995** Presentation withdrawn

**10:15 BREAK**

10:30 **2996** Complementary expansions and contractions of the odorant, gustatory, and ionotropic receptor  
gene families in arthropods. **Hugh M. Robertson** (hughrobe@life.uiuc.edu), Univ. of Illinois, Champaign, IL

10:45 **2997** Comparative genomics of tephritid fruit flies: Strategies and approaches in genome sequencing and analysis. **Scott Geib** (scott.geib@ars.usda.gov) and Sheina Sim, USDA - ARS, Hilo, HI

11:00 **2998** Comparative analysis of chemosensory gene families in five tsetse fly species. Rosaline Macharia1, Paul Mireji2, Edwin Murungi3, Grace Murilla4,  
Alan Christoffels5, Serap Aksoy6, and **Daniel Masiga** (dmasiga@icipe.org)1, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Yale Univ. School of Public Health, New Haven, CT, 3Egerton Univ., Nakuru, Kenya, 4Kenya Agricultural and Livestock Research Organization, Nairobi, Kenya, 5South African National Bioinformatics Institute, Cape Town, South Africa, 6Yale Univ., New Haven, CT

11:15 **2999** Comparative population genomics in halictid bees provides insights into the evolution of social behavior. **Benjamin Rubin** (berubin@princeton.edu) and Sarah Kocher, Princeton Univ., Princeton, NJ

11:30 **3000** The microbiome of the mechanical vectors *Chrysomya megacephala* (blow fly) and *Musca domestica* (house fly). **Ana Junqueira** (anacarolina@ ntu.edu.sg)1, Enzo Acerbi1, Daniela Moses1, Daniel Paulo2, Ana Azeredo-Espin2, Bodo Linz3, Aakrosh Ratan4,

and Stephan Schuster1, 1Nanyang Technological Univ., Singapore, Singapore, 2Univ. of Campinas, Campinas, Brazil, 3Pennsylvania State Univ., University Park, PA, 4Univ. of Virginia, Charlotesville, VA

11:45 **3001** Comparative analysis of genome level changes in *Helicoverpa armigera* (Lepidoptera: Noctuidae) over two decades. **Omaththage P. Perera** (op.perera@ars. usda.gov) and Randall Luttrell, USDA - ARS, Stoneville, MS

12:00 **3002** Proteomic and comparative genomic analysis of seminal fluid in *Apis mellifera* drones from regions with or without *Varroa destructor*. **Patricia Bohls** (pabohls@ ucdavis.edu) and Elina Nino, Univ. of California, Davis, CA

12:15 **3003** Gene duplication in the evolution of sex- and caste-biased gene expression. **Linh Chau** (lchau6@ gatech.edu) and Michael A. D. Goodisman, Georgia Institute of Technology, Atlanta, GA

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**THURSDAY**

**Thursday, September 29 • MORNING •**

**Contributed Papers: Biological Control and Insect Pathology: Plant and Other Extracts as Biocides**

***Room W314 A (Convention Center)***

**Moderators:** Jan Richter1 and Naveeda Qureshi2, 1Dept. of Agriculture and Rural Development, Bloemfontein, FL, South Africa, 2Quaid-i-Azam Univ., Islamabad, Pakistan

9:15 **3004** Effect of foliar application of some biocides on the predators associated with *Aphis craccivora* (Koch) and *Bemisia tabaci* (Genn). **Anwar Elsheikh** (anwar. elsheikh1@gmail.com)1 and M. Aassar2, 1Minufiya  
Univ., Shibin El Kom, Egypt, 2Plant Protection Research Institute, Giza, Egypt

9:30 **3005** Effect of *Acorus calamus* L*.* extract on the toxicity, feeding, and life table of *Crocidolomia pavonana* L. (Lepidoptera: Pyralidae).  
**Purwatiningsih Purwatiningsih** (purwati\_ningsih2000@ yahoo.com), The Univ. of Jember, Jember, Indonesia

9:45 **3006** Toxicity comparisons of 10 insecticides to *Bemisia tabaci* (MEAM1) and its superiority parasitoid *Eretmocerus hayati*. **Deying Ma** (mdyxnd@163.com), Xin Zhang, and Yingmiao Guo, Xinjiang Agricultural Univ., Urumqi, China

10:00 **3007** Antitermitic and protozoacidal properties of selected plant extractives against building-infesting lower termite *Heterotermes indicola* (Wasmann) (Isoptera: Rhinotermitidae) and its gut flagellates. **Naveeda Qureshi** (naveedaqresh@gmail.com), Quaid-i-Azam Univ., Islamabad, Pakistan

**10:15 BREAK**

10:30 **3008** Chromatographic profiling of constituents in extracts from intact silverleaf nightshade plants and damaged by *Leptinotarsa texana* (Schaeffer).  
**Jan Richter** (richtjm@gmail.com)1 and Maria Cawood2, 1Dept. of Agriculture and Rural Development, Bloemfontein, South Africa, 2Univ. of the Free State, Bloemfontein, South Africa

10:45 **3009** Resistance of commercial and non-commercial woods against *Heterotermes indicola* (Wasmann) (Isoptera: Rhinotermitidae) in laboratory and field conditions. **Muhammad Afzal** (mafzal@bs.qau.edu.pk), Quaid-i-Azam Univ., Islamabad, Pakistan

11:00 **3010** Essential oil variation of twenty-two genotypes of *Citrus* in Brazil — chemometric approach and repellency against *Diaphorina citri* Kuwayama.  
**Maria Silva** (dmfs@ufscar.br)1, Moacir Andrade1,

João Fernandes1, Paulo Vieira1, Paulo Bogorni2, and José Vendramim2, 1Federal Univ. of São Carlos,  
São Carlos, Brazil, 2Univ. of São Paulo, Piracicaba, Brazil

**Contributed Papers: Ecology and Population Dynamics: Behavior**

***Room W225 B (Convention Center)***

**Moderators:** Kyle Hurley1 and Leigh Boardman2, 1Univ. of Central Arkansas, Conway, AR, 2Univ. of Florida, Gainesville, FL

9:15 **3011** Emergency alert! Plants communicate about herbivory through arbuscular mycorrhizal fungi. **Zoe Getman-Pickering** (zg94@cornell.edu) and Jennifer Thaler, Cornell Univ., Ithaca, NY

9:30 **3012** Misdirected courtship in a community of colorful *Habronattus* jumping spiders. **Lisa Taylor** (lisa.taylor@ufl.edu)1 and Kevin McGraw2, 1Univ. of Florida, Gainesville, FL, 2Arizona State Univ., Tempe, AZ

9:45 **3013** Influence of sugar resources and nest entrance size on parasitism of arboreal ants in a coffee plantation. **Esteli Jimenez-Soto** (maesjime@ucsc. edu)1, Iris Rivera-Salinas2, and Stacy M. Philpott1, 1Univ. of California, Santa Cruz, CA, 2Autonomous Univ. of Chapingo, Texcoco, Mexico

10:00 **3014** Curious cutting: Trichomes of non-native plant trigger vein-cutting by soybean loopers. **Kyle Hurley** (kylehurley87@gmail.com) and David Dussourd, Univ. of Central Arkansas, Conway, AR

**10:15 BREAK**

10:30 **3015** Paternal caring behavior against ants in a giant water bug. **Shin-ya Ohba** (ooba@nagasaki-u.ac.jp) and Airi Maeda, Nagasaki Univ., Nagasaki, Japan

10:45 **3016** Oviposition host selection in the Ozark Baltimore checkerspot, *Euphydryas phaeton ozarkae*. **Stephen Robertson** (smr020@email.uark.edu)1 and William Baltosser2, 1Univ. of Arkansas, Fayetteville, AR, 2Univ. of Arkansas, Little Rock, AR

11:00 **3017** Wavelength preference and orientation to  
light sources in the oriental stink bug, *Plautia stali*. **Takuya Uehara** (tue@affrc.go.jp)1, Terumi Yamaguchi1, Toyomi Kotaki1, Kentaro Arikawa2, Motohiro Wakakuwa2, and Masami Shimoda1, 1National Institute of Agrobiological Sciences, Tsukuba, Japan, 2Graduate Univ. for Advanced Studies, Hayama, Japan

11:15 **3018** Caterpillar counterploy: Acid secretion of anti-predator gland deactivates plant defense. **David Dussourd** (dussourd@uca.edu)1,  
Madalyn Van Valkenburg1, Kalavathy Rajan2, and Danielle Carrier2, 1Univ. of Central Arkansas, Conway, AR, 2Univ. of Arkansas, Fayetteville, AR

11:30 **3019** Monitoring and forecasting of *Helicoverpa armigera* with the help of pheromone traps in India. **Chandra Srivastava** (csrivastava63@gmail.com), Banaras Hindu Univ., Varanasi, India

**Contributed Papers: Ecology of Pesticides, Resistance, Toxicology, and Genetically Modified Crops**

***Room W340 B (Convention Center)***

**Moderators:** Nastaran Tofangsazi1 and Nicholas Friedenberg2, 1Univ. of California, Riverside, CA, 2Applied Biomathematics, Setauket, NY

9:15 **3020** Rapid detection of Asian citrus psyllid, *Diaphorina citri*, insecticide resistance using the bottle bioassay. **Xuedong Chen** (xuedongc@yahoo.com) and Lukasz Stelinski, Univ. of Florida, Lake Alfred, FL

9:30 **3021** Residual insecticide efficacy on field population of *Diaphorina citri* in California. **Nastaran Tofangsazi** (nastaran.tofangsazi@ucr.edu)1, Elizabeth Grafton- Cardwell2, and Matthew P. Daugherty1, 1Univ. of California, Riverside, CA, 2Univ. of California, Exeter, CA

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9:45 **3022** Insecticidal effect of some plant extracts on citrus mealybug *Planococcus citri* (Risso) (Hemiptera:

Pseudococcidae). **Muhammad Majeed Zeeshan** (zeeshan.majeed@uos.edu.pk), Muhammad Abkar, Muhammad Afzal, Muhammad Nawaz, and Muhammad Asam Riaz, Univ. of Sargodha, Sargodha, Pakistan

10:00 **3023** Investigating malathion-resistance in spotted wing drosophila populations from British Columbia, Canada. **Murali-Mohan Ayyanath** (murali-mohan. ayyanath@agr.gc.ca)1, Cheryl Zurowski1, Ian Scott2, and Kenna Mackenzie1, 1Agriculture and Agri-Food Canada, Summerland, BC, Canada, 2Agriculture and Agri-Food Canada, London, ON, Canada

**10:15 BREAK**

10:30 **3024** Molecular characteristics, mRNA expression, and alternative splicing of a ryanodine receptor gene in the Oriental fruit fly, *Bactrocera dorsalis* (Hendel). **Guo-Rui Yuan** (ygr@swu.edu.cn), Wen-Zhi Shi, and Jin-Jun Wang, Southwest Univ., Chongqing, China

10:45 **3025** Obliquebanded leafroller (Lepidoptera: Tortricidae) resistance to insecticides in Michigan apple and cherry orchards. **Abdulwahab Hafez** (hafezabd@ msu.edu), John Wise, David Mota-Sanchez, Larry Gut, and Christine Vandervoort, Michigan State Univ., East Lansing, MI

11:00 **3026** Identification and expression analysis of cytochrome P450 gene families in the red palm weevil, *Rhynchophorus ferrugineus* (Olivier). **Binu Antony** (binuantony1@yahoo.co.in), Jibin Johny, Mehmoud Abdelazim, and Saleh A. Aldosari, King Saud Univ., Riyadh, Saudi Arabia

11:15 **3027** Toward greater genetic complexity in IRM modeling. **Nicholas Friedenberg** (nick@ramas.com), Applied Biomathematics, Setauket, NY

11:30 **3028** Modeling genetics-based methods of insect crop pest control. **Nina Alphey** (nina.alphey@zoo.ox.ac. uk) and Michael Bonsall, Univ. of Oxford, Oxford, United Kingdom

11:45 **3029** Synergistic impact of Diver® on toxicity of some neonicotinoids against cotton mealybug, *Phenacoccus solenopsis* (Hemiptera: Pseudococcidae), under laboratory conditions. **Muhammad Dildar Gogi** (drmdgogi1974@gmail.com), Mubashar Iqbal, Muhammad Jalal Arif, Muhammad Ahsan Khan, Muhammad Sufyan, Ahmad Nawaz, and Muhammad Arshad, Univ. of Agriculture, Faisalabad, Pakistan

**Contributed Papers: Genetics and Evolutionary Entomology: Trait Expression**

***Room W224 G (Convention Center)***

**Moderators:** Amanda Whispell1 and Isobel Ronai2, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2The Univ. of Sydney, Sydney, Australia

9:15 **3030** *Pax6* in Collembola: Adaptive evolution of eye regression. Ya-Nan Hou, Sheng Li, and **Yun-Xia Luan** (yxluan@sibs.ac.cn), Chinese Academy of Sciences, Shanghai, China

9:30 **3031** Why do some beetles fly with their elytra closed? **Wataru Kojima** (koj.wataru@gmail.com)1,2 and Toshihide Kato1, 1The Univ. of Tokyo, Tokyo, Japan, 2National Taiwan Normal Univ., Taipei, Taiwan

9:45 **3032** A comparative analysis of seasonal polyphenism in Junoniini butterflies. **Jameson Clarke** (jameson. clarke@duke.edu), Duke Univ., Durham, NC

10:00 **3033** The transcription factor Apontic-like controls diverse coloration pattern in caterpillars. **Shinichi Yoda** (yoda@ib.k.u-tokyo.ac.jp)1, Junichi Yamaguchi1,  
Toshiya Ando1, Takaaki Daimon2, and Haruhiko Fujiwara1, 1The Univ. of Tokyo, Kashiwa, Japan, 2National Institute of Agrobiological Sciences, Tsukuba, Japan

**10:15 BREAK**

10:30 **3034** Characterization of quantitative trait loci associated with soybean aphid adaptation to resistant plants. **Vitor Pavinato** (correapavinato.1@osu.edu)1, Doris Lagos-Kutz2, Glen L. Hartman3, Curtis B. Hill4, Anitha Chirumamilla5, and Andrew Michel1, 1The Ohio State Univ., Wooster, OH, 2USDA - ARS, Urbana, IL, 3National Soybean Research Center, Urbana, IL, 4Agricen Sciences LLC, Pilot Point, TX, 5North Dakota State Univ., Fargo, ND

10:45 **3035** Gene expression plasticity response to alternative host plants in the speciation process of *Spodoptera frugiperda* strains. **Karina Silva-Brandão** (klsilva@gmail.com)1, Marcelo Brandão2, Renato Horikoshi1, Daniel Bernardi1, Celso Omoto1, and Antonio Figueira1, 1Univ. of São Paulo, Piracicaba, Brazil, 2Univ. of Campinas, Campinas, Brazil

11:00 **3036** Longer is better: Mouthpart plasticity in a novel environment. **Pablo Allen** (pabloallen@ufl.edu) and Christine W. Miller, Univ. of Florida, Gainesville, FL

11:15 **3037** Hunting by ear: The evolution of sarcophagid hearing and acoustic eavesdropping. **Brian Stucky** (stuckyb@colorado.edu)1,2 and Robert Guralnick1,2, 1Univ. of Florida, Gainesville, FL, 2Univ. of Colorado, Boulder, CO

11:30 **3038** The function of appendage patterning genes in extreme mandible development of a sexually dimorphic stag beetle. **Hiroki Gotoh** (h-r-goto@ees.hokudai.ac. jp)1, Robert Zinna2, Hitoshi Miyakawa3, Asano Ishikawa4, Yuki Ishikawa5, Yasuhiro Sugime6, Doug Emlen7,

Laura C. Lavine2, and Toru Miura6, 1Nagoya Univ., Chikusa, Japan, 2Washington State Univ., Pullman, WA, 3Utsunomiya Univ., Utsunomiya, Japan,  
4National Institute of Genetics, Mishima, Japan, 5Nagoya Univ., Nagoya, Japan, 6Hokkaido Univ., Sapporo, Japan, 7Univ. of Montana, Missoula, MT

11:45 **3039** Now you see me, now you don’t – how  
*Argia apicalis* males hide in plain sight (Odonata: Coenagrionidae). **Amanda Whispell** (amanda.whispell@ rutgers.edu), Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

12:00 **3040** Sexual selection on pheromone phenotype in *Heliothis virescens*. **Jeremy Heath** (jjheath@ncsu.edu)1, Astrid Groot1,2, Michiel van Wijk1,2, and Coby Schal1, 1North Carolina State Univ., Raleigh, NC, 2Univ. of Amsterdam, Amsterdam, Netherlands

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**THURSDAY**

**Thursday, September 29 • MORNING •**

12:15 **3041** The evolution of Geadephagan chemical defense: Molecular evolution and functional validation of genes essential to quinone production in two bombardier beetle species using RNAi. **Aman Gill** (amango@gmail.com)1, Tanya Renner2, Athula Attygalle3, Wendy Moore4, and Kipling Will1, 1Univ. of California, Berkeley, CA, 2San Diego State Univ., San Diego, CA, 3Stevens Institute of Technology, Hoboken, NJ, 4Univ. of Arizona, Tucson, AZ

**Contributed Papers: Invasive and Exotic Entomology: Diagnostics, Methods, and Responses**

***Room W223 B (Convention Center)***

**Moderators:** Patrice Bouchard1 and Norman Barr2, 1Agriculture and Agri-Food Canada, Ottawa, ON, Canada, 2USDA - APHIS, Edinburg, TX

9:15 **3042** Responding to the introduction of high-risk exotic pests in the United States — the supporting role of New Pest Response Guidelines.  
**Godshen Pallipparambil** (grpallip@ncsu.edu)1,  
Trang Vo2, and Karl Suiter1, 1NSF Center for Integrated Pest Management, Raleigh, NC, 2USDA - APHIS, Riverdale Park, MD

9:30 **3043** New Pest Response Guidelines (USDA - APHIS - NPRG): Response options to a potential US invasion by a West and Central Asian pest of wheat and barley, *Eurygaster integriceps* Puton. **Jaap B. van Kretschmar** (jbkretsc@ncsu.edu) and Karl Suiter, NSF Center for Integrated Pest Management, Raleigh, NC

9:45 **3044** Diagnostics response to the detection and eradication of Queensland fruit fly (*Bactrocera tryoni*) in Auckland, New Zealand. Dave Voice1, Alan Flynn2, and **Sherly George** (sherly.george@mpi.govt.nz)2, 1Ministry for Primary Industries, Christchurch,  
New Zealand, 2Ministry for Primary Industries, Auckland, New Zealand

10:00 **3045** Oregon’s onslaught of terrestrial exotic invertebrates. **James R. LaBonte** (jlabonte@oda.state. or.us), Oregon Dept. of Agriculture, Salem, OR

**10:15 BREAK**

10:30 **3046** Adventive weevils (Coleoptera: Curculionoidea) recorded from Canada. **Patrice Bouchard** (patrice. bouchard@agr.gc.ca)1, Hume Douglas1, and Robert S. Anderson2, 1Agriculture and Agri-Food Canada, Ottawa, ON, Canada, 2Canadian Museum of Nature, Ottawa, ON, Canada

10:45 **3047** Disentangling the complex invasion history  
of *Drosophila suzukii* by means of ABC-Random Forest treatments. **Antoine Fraimout** (antoine.fraimout@edu. mnhn.fr), National Center for Scientific Research, Paris, France

11:00 **3048** New insights into the reproductive transcriptome profile of the Mediterranean fruit  
fly, *Ceratitis capitata*. **Ingrid Curril** (icurril@gwdg.de), Georg Oberhofer, Julia Golldamm, and Ernst Wimmer, Georg August Univ., Göttingen, Germany

11:15 **3049** Acceptance of molecular diagnostic protocols: A national and international perspective. **Norman Barr** (norman.b.barr@aphis.usda.gov), USDA - APHIS, Edinburg, TX

**Contributed Papers: Medical and Veterinary Entomology: Mosquito Ecology and Management**

***Room W230 A (Convention Center)***

**Moderators:** Kathleen Walker1, Barry Alto2, and Habte Tekie3, 1Univ. of Arizona, Tucson, AZ, 2Univ. of Florida, Vero Beach, FL, 3Addis Ababa Univ., Addis Ababa, Ethiopia

9:15 **3050** Risk of transmission of emergent lineages of chikungunya virus by Florida mosquito vectors. **Barry Alto** (bwalto@ufl.edu), Keenan Wiggins, Bradley Eastmond, Daniel Velez, L. Philip Lounibos, and Cynthia C. Lord, Univ. of Florida, Vero Beach, FL

9:30 **3051** Evaluation of neem (*Azadirachta indica* A. Juss.) seed and leaf extracts for larvicdal and growth regulatory activities against *Anopheles arabiensis* Patton (Diptera: Culicidae) under laboratory conditions. **Habte Tekie** (habte\_tm@yahoo.com)1 and

Getnet Atnafu2, 1Addis Ababa Univ., Addis Ababa, Ethiopia, 2Debre Markos Univ., Debre Markos, Ethiopia

9:45 **3052** Genetic variability of *Aedes aegypti* (Linnaeus) mosquito populations in El Salvador. **Andrea Joyce** (ajoyce2@ucmerced.edu)1, Miguel Moreno Mendoza2, Melany Murillo Torres3, and Eduardo Romero Chevez4, 1Univ. of California, Merced, CA, 2School of Biology,  
San Salvador, El Salvador, 3CENSALUD, San Salvador, El Salvador, 4Ministry of Health, San Salvador, El Salvador

10:00 **3053** Ecology of insect species in Buruli ulcer endemic and non-endemic parts of Nigeria, West Africa. **Joy Anogwih** (joyaa10@gmail.com)1, Chiamaka Odenigbo2, and Fouad Adetoro3, 1Auburn Univ., Auburn, AL, 2Univ. of Lagos, Yaba, Nigeria, 3Univ. of Lagos, Akoka, Nigeria

**10:15 BREAK**

10:30 **3054** Large indoor cage study of the suppression  
of stable *Aedes aegypti* populations by the release of thiotepa-sterilised males. **René Gato** (rene@ipk.sld.cu), Institute Pedro Kourí, Havana, Cuba

10:45 **3055** Enlisting citizen scientists for disease vector surveillance: The great Arizona mosquito hunt.

**Kathleen Walker** (krwalker@cals.arizona.edu)1,  
Robin Rathman2, Hayley Yaglom3, Craig Levy4,  
Kacey Ernst1, Benjamin Beal1, Mariana Casal3,  
Andrew Strumpf4, and Dawn Stokka4, 1Univ. of Arizona, Tucson, AZ, 2Cienega High School, Vail, AZ, 3Arizona Dept. of Health Services, Phoenix, AZ, 4Maricopa County Dept. of Public Health, Phoenix, AZ

11:00 **3056** Monitoring *Aedes albopictus* abundance and effectiveness of control interventions in an European urban area. Beniamino Caputo1, Mattia Manica1, Roberto Rosa’2, and **Alessandra della Torre** (ale.dellatorre@uniroma1.it)1, 1Sapienza Univ. of Rome, Rome, Italy, 2Edmund Mach Foundation, San Michele all’Adige, Italy

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11:15 **3057** Suppression of an isolated population of the mosquito vector *Aedes polynesiensis* on the atoll of Tetiaroa, French Polynesia, by sustained release of *Wolbachia-*incompatible male mosquitoes.

**Hervé Bossin** (hbossin@ilm.pf)1, Hereiti Petit1,  
Jerome Marie1, Benoit Stoll2, and Michel Cheong Sang1, 1Institute Louis Malarde, Papeete, French Polynesia, 2Univ. of French Polynesia, Faaa, French Polynesia

11:30 **3058** Not going high? Climate change and the distribution of invasive *Aedes* mosquitoes across an altitudinal gradient in their native range. **Luis Chaves** (lchaves@nagasaki-u.ac.jp), Nagasaki Univ., Nagasaki, Japan

11:45 **3059** Unraveling host-vector-arbovirus interactions by two-gene high resolution melting mosquito bloodmeal analysis in a Kenyan wildlife-livestock interface. **Jandouwe Villinger** (jandouwe@icipe.org)1, David Omondi1, Yvonne Ajamma1, Burtram Fielding2, Laban Njoroge3, and Daniel Masiga1, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Univ. of Western Cape, Bellville, South Africa, 3National Museums of Kenya, Nairobi, Kenya

12:00 **3060** Factors affecting the ability of *Culex pipiens* mosquitoes to transmit Rift Valley fever virus. **Adrian Zagrajek** (adrian.zagrajek@pirbright.ac.uk) and Anthony Wilson, The Pirbright Institute, Woking, United Kingdom

**Contributed Papers: Morphology, Systematics, and Phylogeny: Lepidoptera**

***Room W330 C (Convention Center)***

**Moderators:** Paul Goldstein1 and Erik van Nieukerken2, 1USDA - ARS, Washington, DC, 2Naturalis Biodiversity Center, Leiden, Netherlands

9:15 **3061** Histology of Lepidoptera: An analysis  
of stain performance on Lepidoptera wings and genitalia. **Christi Jaeger** (christi@ualberta.ca), Mississippi Entomological Museum, Mississippi State, MS

9:30 **3062** Structures and development of the clear wing in Lepidoptera. **Yusuke Kondo** (yougot2003@hotmail. com) and Haruhiko Fujiwara, The Univ. of Tokyo, Kashiwa, Japan

9:45 **3063** Male scent scales of Tortricidae and Gelechiidae (Lepidoptera). **Richard Brown** (moth@ra.msstate. edu)1, Sangmi Lee2, and Joaquin Baixeras3, 1Mississippi Entomological Museum, Mississippi State, MS, 2Arizona State Univ., Tempe, AZ, 3Univ. of València, València, Spain

10:00 **3064** New fossil Lepidoptera (Insecta: Amphiesmenoptera) from the Middle Jurassic Jiulongshan Formation of northeastern China. **Chungkun Shih** (chungkun.shih@gmail.com)1,2, Weiting Zhang3, Conrad Labandeira1,2,4, Jae-Cheon Sohn2,5, Donald R. Davis2, Jorge Santiago-Blay2, Oliver Flint2, and Dong Ren1, 1Capital Normal Univ., Beijing, China, 2Smithsonian Institution National Museum of Natural History, Washington, DC, 3Shijiazhuang Univ. of Economics, Shijiazhuang, China, 4Univ. of Maryland, College Park, MD, 5Mokpo National Univ., Moppo, South Korea

**10:15 BREAK**

10:30 **3065** Phylogeny and divergence times of pygmy leafmining moths (Lepidoptera: Nepticulidae), the earliest lepidopteran radiation on angiosperms? Camiel Doorenweerd1,2, **Erik van Nieukerken** (erik.vannieukerken@naturalis.nl)1, and Robert Hoare3, 1Naturalis Biodiversity Center, Leiden, Netherlands, 2Univ. of Amsterdam, Amsterdam, Netherlands, 3Landcare Research, Auckland, New Zealand

10:45 **3066** A taxonomic study of the genus *Anatrachyntis* Meyrick (Lepidoptera: Cosmopterigidae) in Japan. **Toshiya Hirowatari** (hirowat\_t@agr.kyushu-u.ac.jp)1 and Hiroshi Kuroko2, 1Kyushu Univ., Fukuoka, Japan, 2Osaka Prefecture Univ., Kishiwada, Japan

11:00 **3067** Phylogenetic relationships, wing shape, and the evolution of tails across the Arsenurinae (Lepidoptera: Bombycoidea: Saturniidae). **Chris Hamilton** (chamilton@ flmnh.ufl.edu)1, Nathalie Keller1, Jesse Breinholt1,

Jesse R. Barber2, and Akito Kawahara1, 1Univ. of Florida, Gainesville, FL, 2Boise State Univ., Boise, ID

11:15 **3068** Phylogenetic underpinnings of the Acronictinae and Amphipyrinae (Lepidoptera: Noctuidae) and implications for understanding larval and life history evolution in the lower Noctuidae. **David L. Wagner** (david.wagner@uconn.edu)1, Jadranka Rota2,

Niklas Wahlberg2, Brigette Zacharczenko1,  
Kevin Keegan1, Chris Schmidt3, and Reza Zahiri4, 1Univ. of Connecticut, Storrs, CT, 2Lund Univ., Lund, Sweden, 3Agriculture and Agri-Food Canada, Ottawa, ON, Canada, 4Canadian Food Inspection Agency, Ottawa, ON, Canada

11:30 **3069** Beach plum (*Prunus maritima*) (Rosaceae)  
as an overlooked lepidopteran host: Life histories of the dune noctuid (*Sympistis riparia*) and the coastal heathland cutworm (*Abagrotis nefascia*) (Lepidoptera: Noctuidae). **Paul Goldstein** (paul.goldstein@ars.usda. gov)1 and Michael Nelson2, 1USDA - ARS, Washington, DC, 2Natural Heritage & Endangered Species Program, Westborough, MA

11:45 **3070** Presentation withdrawn

12:00 **3071** Phylogenomics of an endemic Hawaiian butterfly reveal complex patterns of divergence and isolation. **Daniel Rubinoff** (rubinoff@hawaii.edu)1, William Haines1, Sheina Sim2, and Scott Geib2, 1Univ. of Hawai’i, Honolulu, HI, 2USDA - ARS, Hilo, HI

12:15 **3072** Phylogenetic relationships of subfamilies in the family Hesperiidae (Lepidoptera: Hesperioidea) from China. **Xiangqun Yuan** (yuanxq@nwsuaf.edu.cn), Yiping LI, Ke Gao, and Feng Yuan, Northwest A&F Univ., Yangling, China

12:30 **3073** Sorting *incertae sedis*: Molecular phylogeny of Asian skippers (Lepidoptera: Hesperiidae). **Hideyuki Chiba** (skipper@i.bekkoame.ne.jp), Freelance, Fukuoka, Japan

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**THURSDAY**

**Thursday, September 29 • MORNING •**

**Contributed Papers: Morphology, Systematics, and Phylogeny: Bees, Ants, and Wasps**

***Room W224 H (Convention Center)***

**Moderators:** Rodolfo Probst1 and Manuela Sann2, 1Museum of Zoology of the Univ. of São Paulo, São Paulo, Brazil, 2Museum of Natural History, Berlin, Germany

9:15 **3074** Vespidae phylogenomics and the origins of eusociality. **Patrick Piekarski** (pkpiekarski@gmail.com)1, J. M. Carpenter2, Alan Lemmon3, Emily Lemmon3, and Barbara Sharanowski1, 1Univ. of Central Florida, Orlando, FL, 2American Museum of Natural History, New York, NY, 3Florida State Univ., Tallahassee, FL

9:30 **3075** Phylogenetic relationships of apoid wasps and bees inferred from analyzing target DNA enrichment data. **Manuela Sann** (manuela.sann@mfn-berlin.de)1, Ralph Peters2, Oliver Niehuis2, Christoph Mayer2, Alexander Donath2, Malte Petersen2, Sarah Bank2,  
Lars Podsiadlowski3, Karen Meusemann2, Bernhard Misof2, Christoph Bleidorn4, and Michael Ohl1, 1Museum of Natural History, Berlin, Germany, 2Zoological Reserch Museum Alexander Koenig, Bonn, Germany, 3Univ.

of Bonn, Bonn, Germany, 4Univ. of Leipzig, Leipzig, Germany

9:45 **3076** The evolution of diet breadth in *Melissodes* Latreille (Hymenoptera: Apidae). **Karen Wright** (karen@sevilleta.unm.edu) and Kelly Miller, Univ. of New Mexico, Albuquerque, NM

10:00 **3077** Brood parasitism in spider wasps, with special reference to its behavior of a species (Hymenoptera: Pompilidae). **Akira Shimizu** (shimizu-akira@tmu.ac.jp) and Hiroaki Kurushima, Tokyo Metropolitan Univ., Hachioji, Japan

**10:15 BREAK**

10:30 **3078** Taxonomic revision of the Neotropical velvet ant genus *Tallium* André with discussion of two novel setal types (Hymenoptera: Mutillidae). **Craig Brabant** (brabant@entomology.wisc.edu), Wisconsin Insect Research Collection, Madison, WI

10:45 **3079** Delineating boundaries: A taxonomic revision and phylogeny of the ant genus *Prenolepis* (Hymenoptera: Formicidae: Formicinae). **Jason Williams** (jleewill@gmail.com) and John S. LaPolla, Towson Univ., Towson, MD

11:00 **3080** Ants of the *Pachycondyla* genus group in Ecuador: Phylogeny, taxonomy, and distribution. **Adrian Troya** (adrian.troya@epn.edu.ec) and Oscar Suing, National Polytechnic School, Quito, Ecuador

11:15 **3081** The phylogeny of the ant genus *Temnothorax*. **Matthew Prebus** (mmprebus@ucdavis.edu), Univ. of California, Davis, CA

11:30 **3082** Molecular and morphological characters as tools to resolve cryptic species taxonomy and phylogenetics — the case of the ant genus *Basiceros* (Formicidae: Myrmicinae: Attini). **Rodolfo Probst** (probstrodolfo@gmail.com)1, Corrie Moreau2, and Carlos Brandão1, 1Museum of Zoology of the Univ. of São Paulo, São Paulo, Brazil, 2The Field Museum of Natural History, Chicago, IL

11:45 **3083** Microbial diversity and distribution within a widespread Neotropical ant host (*Cephalotes atratus*): An evolutionary and geographic perspective.  
**Shauna Price** (slprice@gmail.com) and Corrie Moreau, The Field Museum of Natural History, Chicago, IL

**Contributed Papers: Morphology, Systematics, and Phylogeny: Tenebrionids, Clerids, Staphylinids, and Scarabs**

***Room W225 A (Convention Center)***

**Moderators:** John Leavengood1 and Adam Brunke2, 1USDA - APHIS, Pharr, TX, 2Natural History Museum, Vienna, Austria

9:15 **3084** Phylogeography of trogolobitic beetles in Appalachia. **Karen Ober** (kober@holycross.edu), College of the Holy Cross, Worcester, MA

9:30 **3085** A phylogenomic study of the Tenebrionidae. **Kojun Kanda** (kojun.kanda@nau.edu)1, Aaron Smith1, and David Maddison2, 1Northern Arizona Univ., Flagstaff, AZ, 2Oregon State Univ., Corvallis, OR

9:45 **3086** A revised Amphidorini (Coleoptera: Tenebrionidae) classification based on morphological and molecular data. **Aaron Smith** (aaron.smith@nau. edu)1, Kojun Kanda1, and M. Andrew Johnston2, 1Northern Arizona Univ., Flagstaff, AZ, 2Arizona State Univ., Tempe, AZ

10:00 **3087** Pantropical Carabidae: Studies of the genus *Plochionus* Dejean 1821, the tent-caterpillar hunters. **Beulah Garner** (b.garner@nhm.ac.uk), The Natural History Museum, London, United Kingdom

**10:15 BREAK**

10:30 **3088** Phylogeny of Cleroidea (Coleoptera): Morphological and palaeontological evidence.  
**Jiri Kolibac** (jkolibac@mzm.cz), Moravian Museum, Brno, Czech Republic

10:45 **3089** The New World Hydnocerinae (Coleoptera: Cleridae): Slowly bringing clarity to a tortured taxonomic history. **John Leavengood** (johnshorrorcorner@gmail.com), USDA - APHIS, Pharr, TX

11:00 **3090** Morphology of the wing apparatus and flight characteristics of featherwing beetles (Coleoptera: Ptiliidae), the smallest free-living insects. **Alexey Polilov** (polilov@gmail.com), Natalija Reshetnikova, and Sergey Farisenkov, Lomonosov Moscow State Univ., Moscow, Russian Federation

11:15 **3091** Unravelling the cryptic diversity of Australia’s canthonine fauna (Scarabaeidae: Scarabaeinae: Canthonini) with a focus on *Lepanus* and allies. **Nicole Gunter** (ngunter@cmnh.org)1, Geoff Monteith2, and Tom Weir3, 1Cleveland Museum of Natural History, Cleveland, OH, 2Queensland Museum, Brisbane, Australia, 3Australian National Insect Collection,

Black Mountain, Australia

11:30 **3092** Towards the phylogenetic relationships of the genus *Batrisodes* Reitter (Staphylinidae: Pselaphinae) in the southern Appalachian Mountains, United States. **Laura Vasquez-Velez** (lvasque@clemson.edu), Clemson Univ., Clemson, SC

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**Thursday, September 29 • MORNING/AFTERNOON •**

11:45 **3093** Molecular phylogeny of the staphylinid beetle subfamily Aleocharinae (Coleoptera, Staphylinidae). **Vladimir Gusarov** (vladimir.gusarov@nhm.uio.no), Natural History Museum, Oslo, Norway

12:00 **3094** Extinct diversity and integrated, dated phylogeny of a megadiverse beetle lineage (Staphylinidae: Staphylinini) using data from μCT reconstruction of amber fossils. **Adam Brunke** (adam.j.brunke@gmail. com)1, Nesrine Akkari1, and Alexey Solodovnikov2, 1Natural History Museum, Vienna, Austria, 2Natural History Museum, Copenhagen, Denmark

**Thursday, September 29, 2016 • Afternoon**

**Symposium: Dynamic Interactions at the Tick- Host-Pathogen Interface**

***Room W240 C (Convention Center)***

**Moderator and Organizer:** Stephen Wikel, Quinnipiac Univ., Hamden, CT

1:30 **3095** Next-generation transcriptome and proteome approaches to better understand the transmission life-cycle of the tick *Ixodes ricinus*. **Michalis Kotsyfakis** (mich\_kotsyfakis@yahoo.com), Czech Academy of Sciences, Branisovska, Czech Republic

2:00 **3096** Inhibition of nod-like receptor sensing by a tick salivary protein. **Joao Pedra** (jpedra@som.umaryland. edu), Xiaowei Wang, and Dana Shaw, Univ. of Maryland, Baltimore, MD

2:15 **3097** Evolutionary analysis of host resistance to cattle tick infestation and tick-borne disease in ungulates. **Nicholas Jonsson** (nicholas.jonsson@ glasgow.ac.uk) and Michael Stear, Univ. of Glasgow, Glasgow, United Kingdom

2:30 **3098** Immunobiology of white-tailed deer response to vaccine targeting outbreak populations of cattle fever ticks in the U.S. **Adalberto Pérez de León** (beto.perezdeleon@ars.usda.gov)1, Ashley Petersen2, Lane Foil3, Felix Guerrero1, Maxim Lebedev2, and

Alan Young2, 1USDA - ARS, Kerrville, TX, 2South Dakota State Univ., Brookings, SD, 3Louisiana State Univ., Clinton, LA

2:45 **3099** Emerging role of basophils in acquired protective immunity to tick infestation.

**Hajime Karasuyama** (karasuyama.mbch@tmd.ac.jp), Tokyo Medical and Dental Univ., Tokyo, Japan

**Symposium: Invasive Bark and Ambrosia Beetles: A Pest Problem of Worldwide Significance**

***Room W414 C (Convention Center)***

**Moderators and Organizers:** Steven Seybold1 and  
Massimo Faccoli2, 1USDA - Forest Service, Davis, CA, 2Univ. of Padua, Padua, Italy

1:30 **3100** The walnut twig beetle, *Pityophthorus juglandis* Blackman (Coleoptera: Curculionidae: Scolytinae), in northern Italy. **Massimo Faccoli** (massimo.faccoli@unipd.it), Univ. of Padua, Padua, Italy

1:45 **3101** Non-native bark and ambrosia beetles in Canada: Pathways, spread, and impacts. **Leland Humble** (lhumble@nrcan.gc.ca)1 and David Langor2, 1Natural Resources Canada, Victoria, BC, Canada, 2Natural Resources Canada, Edmonton, AB, Canada

2:00 **3102** Impact of extreme climatic events on host selection by exotic ambrosia beetles in eastern North America. **Christopher Ranger** (christopher.ranger@ars. usda.gov), USDA - ARS, Wooster, OH

2:15 **3103** California, USA: A hotbed of invasive bark  
and ambrosia beetles on conifers and hardwoods. **Steven Seybold** (sjseybold@gmail.com), USDA - Forest Service, Davis, CA

2:30 **3104** Neotropical bark and ambrosia beetles in southern Florida, USA: Long overlooked native or recently introduced invasive species? **Thomas H. Atkinson** (thatkinson.austin@gmail.com), The Univ. of Texas, Austin, TX

2:45 **3105** Biology and mechanism of invasion by the red turpentine beetle in China. **Zhen Zhang** (zhangzhen@ caf.ac.cn), Chinese Academy of Forestry, Beijing, China

**3:00 BREAK**

3:15 **3106** Effect of habitat and climatic preferences on alien ambrosia beetle invasions in deciduous temperate forests. **Davide Rassati** (davide.rassati@unipd.it), Univ. of Padova, Legnaro, Italy

3:30 **3107** Biology and impact of Xyleborini ambrosia beetles in Japan. **Hisashi Kajimura** (kajimura@agr. nagoya-u.ac.jp), Nagoya Univ., Nagoya, Japan

3:45 **3108** The role of mating systems in bark and ambrosia beetle invasions. **Lawrence R. Kirkendall** (lawrence.kirkendall@zoo.uib.no), Univ. of Bergen, Bergen, Norway

4:00 **3109** Proactive empirical assessment of future invasive bark and ambrosia beetles. **Jiri Hulcr** (hulcr@ ufl.edu), Univ. of Florida, Gainesville, FL

4:15 **3110** International cooperation and earlier detection of bark and ambrosia beetles. **Robert Rabaglia** (brabaglia@fs.fed.us), USDA - Forest Service, Washington, DC

**Symposium: Millions of Hectares and Counting: Knowledge Gained during Recent Bark Beetle Outbreaks in Western North America**

***Room W314 A (Convention Center)***

**Moderators and Organizers:** Christopher J. Fettig1 and  
Ann M. Lynch2, 1USDA - Forest Service, Davis, CA, 2USDA - Forest Service, Tucson, AZ

1:30 **3111** Reconstructing historical *Dendroctonus ponderosae* activity in *Pinus contorta* forests in the northern Colorado Front Range. **Jose F. Negron** (jnegron@fs.fed.us) and Laurie S. Huckaby, USDA - Forest Service, Fort Collins, CO

1:45 **3112** Bark beetle dynamics across forested landscapes. **John E. Lundquist** (jlundquist@fs.fed.us)1 and  
Robin Reich2, 1USDA - Forest Service, Anchorage, AK, 2Colorado State Univ., Fort Collins, CO

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**THURSDAY**

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2:00 **3113** Extraordinary events in British Columbia: Chronicling the mountain pine beetle outbreak. **Lorraine Maclauchlan** (lorraine.maclauchlan@gov.bc.ca)1 and Jodi Axelson2, 1British Columbia Ministry of Forests, Lands and Natural Resource Operations, Kamloops, BC, Canada, 2British Columbia Ministry

of Forests, Lands and Natural Resource Operations, Williams Lake, BC, Canada

2:15 **3114** Mycoinsecticides: Developing new tools for bark beetle management. **Clifford Bradley** (cbradley@ montana.com)1, Egan Jankowski1, Janina Bradley1, Richard Hofstetter2, Christopher J. Fettig3,

Robert A. Progar4, Brytten E. Steed5, Steve Munson6, and Danielle Malesky6, 1Montana BioAgriculture, Inc., Missoula, MT, 2Northern Arizona Univ., Flagstaff, AZ, 3USDA - Forest Service, Davis, CA, 4USDA - Forest Service, La Grande, OR, 5USDA - Forest Service, Missoula, MT, 6USDA - Forest Service, Ogden, UT

2:30 **3115** Makings of a good host: Condition-dependent success of trees and bark beetles. **Mary L. Reid** (mreid@ucalgary.ca) and Megan D. Goulding, Univ. of Calgary, Calgary, AB, Canada

2:45 **3116** Physiological, physical, and chemical characteristics of Engelmann and blue spruces related to spruce beetle host selection, colonization, and reproduction. **Daniel S. Ott** (daniel.ott@oregonstate. edu)1, Christopher J. Fettig2, Steve Munson3,  
Darrell W. Ross1, Justin B. Runyon4, Frederick C.

Meinzer5, and Kimberly F. Wallin6, 1Oregon State Univ., Corvallis, OR, 2USDA - Forest Service, Davis, CA, 3USDA - Forest Service, Ogden, UT, 4USDA - Forest Service, Bozeman, MT, 5USDA - Forest Service, Corvallis, OR, 6Univ. of Vermont, Burlington, VT

**3:00 BREAK**

3:15 **3117** Survivor response to high-severity bark beetle outbreaks in a spruce-fir forest in southern Arizona, U.S.A. **Ann M. Lynch** (alynch@fs.fed.us)1 and Christopher D. O’Connor2, 1USDA - Forest Service, Tucson, AZ, 2USDA - Forest Service, Missoula, MT

3:30 **3118** Learning to speak beetle: Recent developments using sound in pest control. **Nicholas C. Aflitto** (na398@cornell.edu)1, Richard W. Hofstetter2,  
David Dunn3, James Windmill4, and Jeremy Gibson4, 1Cornell Univ., Ithaca, NY, 2Northern Arizona Univ., Flagstaff, AZ, 3Univ. of California, Santa Cruz, CA, 4Univ. of Strathclyde, Glasgow, United Kingdom

3:45 **3119** Exploiting the chemical ecology of the mountain pine beetle. **Robert A. Progar** (rprogar@ fs.fed.us)1, Christopher J. Fettig2, and Nancy E. Gillette3, 1USDA - Forest Service, La Grande, OR, 2USDA - Forest Service, Davis, CA, 3USDA - Forest Service, Berkeley, CA

4:00 **3120** Interactions among mountain pine beetle and associated mites and fungi in Colorado. **Javier E. Mercado** (jmercado01@fs.fed.us), USDA - Forest Service, Fort Collins, CO

**3121** Do bark beetle (*Dendroctonus* spp.) outbreaks affect wildfires? Assessing beetle-induced changes to tree chemistry and flammability. **Justin B. Runyon** (jrunyon@fs.fed.us)1, Michael J. Jenkins2, and

Wesley G. Page2, 1USDA - Forest Service, Bozeman, MT, 2Utah State Univ., Logan, UT

4:30 **3122** Carbon cycling in lodgepole pine forests after mountain pine beetle outbreaks. **E. Matthew Hansen** (matthansen@fs.fed.us)1, Michael C. Amacher1, Helga Van Miegroet2, James N. Long2, and

Michael G. Ryan3, 1USDA - Forest Service, Logan, UT, 2Utah State Univ., Logan, UT, 3Colorado State Univ., Fort Collins, CO

4:45 **3123** Red turpentine beetle: Innocuous native becomes invasive tree killer in China with new concerns for North America. **Nancy E. Gillette** (beetlegillette@ yahoo.com)1, Jianghua Sun2, and Min Lu2, 1USDA - Forest Service, Berkeley, CA, 2Chinese Academy of Sciences, Beijing, China

5:00 **3124** Coexistence of two aggressive species of  
pine bark beetle, *Dendroctonus frontalis* and *D. mesoamericanus*, in Chiapas, Mexico: Interactions and their influence on host colonization. **Alicia Niño-Domínguez** (pupa\_rlaveu@hotmail.com)1, Brian T. Sullivan2,

Jorge Macías-Sámano1, and Stephen R. Clarke3, 1College of Southern Border, Tapachula, Mexico, 2USDA - Forest Service, Pineville, LA, 3USDA - Forest Service, Lufkin, TX

**Symposium: Breeding Honey Bees, *Apis mellifera*, for Resistance to *Varroa destructor***

***Room W414 B (Convention Center)***

**Moderators and Organizers:** Ralph Büchler1, Robert G. Danka2, and Stephen Pernal3, 1Agency of Agriculture Hesse, Kirchhain, Germany, 2USDA - ARS, Baton Rouge, LA, 3Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada

1:30 **3125** Characteristics of a mite-resistant population of *Apis mellifera* in Northern Europe. **Barbara Locke** (barbara.locke@slu.se), Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

1:45 **3126** Honey bees surviving *Varroa destructor* infestations in the world: Lessons we can take.  
**Yves Le Conte** (yves.leconte@avignon.inra.fr), INRA, Avignon, France

2:00 **3127** The development and basic biology of honey bees that express *Varroa-*sensitive hygiene. **Jeffrey Harris** (jharris@entomology.msstate.edu), Mississippi State Univ., Mississippi State, MS

2:15 **3128** Selection in Europe for VSH-based resistance in Buckfast and Carniolan bees. **BartJan Fernhout** (bartjan.fernhout@aristabeeresearch.org), Arista Bee Research, Boxmeer, Netherlands

2:30 **3129** Chemical ecology of VSH. **Fanny Mondet** (fanny.mondet@paca.inra.fr)1, Cedric Alaux1,  
Joachim de Miranda2, Seo Hyun Kim3, Dominique Beslay1, Alison Mercer3, and Yves Le Conte1, 1INRA, Avignon, France, 2Swedish Univ. of Agricultural Sciences, Uppsala, Sweden, 3Univ. of Otago, Dunedin, New Zealand

2:45 **3130** Molecular and applied approaches to selecting honey bees (*Apis mellifera*) that are effective at removing *Varroa destructor* mites. **Greg J. Hunt** (ghunt@purdue.edu), Purdue Univ., West Lafayette, IN

**3:00 BREAK**

3:15 **3131** Grooming behaviour and resistance to *Varroa destructor*. **Ernesto Guzman** (eguzman@uoguelph.ca), Univ. of Guelph, Guelph, ON, Canada

3:30 **3132** Prospects for molecular markers to guide selective breeding of honey bees. **Leonard J. Foster** (foster@chibi.ubc.ca)1, M. Marta Guarna1, Shelley Hoover2, Rob Currie3, and Stephen Pernal4, 1The Univ. of British Columbia, Vancouver, BC, Canada, 2Alberta Agriculture and Rural Development, Lethbridge, AB, Canada, 3Univ. of Manitoba, Winnipeg, MB, Canada, 4Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada

3:45 **3133** Genomic mapping and candidate genes as approaches to MAS of VSH. **Lelania Bourgeois** (lanie.bourgeois@ars.usda.gov), USDA - ARS, Baton Rouge, LA

4:00 **3134** Proteomic marker-assisted selection for *Varroa* and disease resistance. **Stephen Pernal** (steve.pernal@ agr.gc.ca), Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada

4:15 **3135** Honey bee breeding program for increasing disease resistance and productivity. **Pierre Giovenazzo** (pierre.giovenazzo@bio.ulaval.ca)1 and Georges Martin2, 1Univ. Laval, Québec City, QC, Canada, 2Center for Research in Animal Science, Deschambault, QC, Canada

4:30 **3136** Smartbees project: Breeding for varroa mite resistance and preservation of honey bee diversity in Europe. **Ralph Büchler** (ralph.buechler@llh.hessen.de)1, Aleksandar Uzunov1, and Kaspar Bienefeld2, 1Landesbetrieb Landwirtschaft Hessen, Kirchhain, Germany, 2Institute for Bee Research, Hohen Neuendorf, Germany

4:45 **3137** Status of breeding and use of Russian and VSH honey bees worldwide. **Robert G. Danka** (bob. danka@ars.usda.gov), USDA - ARS, Baton Rouge, LA

**Symposium: Harnessing the Power of Genomics Tools: Functional Genomics of Pollinator Health**

***Room W340 A (Convention Center)***

**Moderators and Organizers:** Christina M. Grozinger1 and Robert Paxton2, 1Pennsylvania State Univ., University Park, PA, 2Martin Luther Univ., Halle, Germany

1:30 **3138** Genome-wide association mapping for studying the genetics of colony traits in honey bees (*Apis mellifera*). **Amro Zayed** (zayed@yorku.ca)1, Brock Harpur1, and Samir Kadri2, 1York Univ., Toronto, ON, Canada, 2São Paulo State Univ., Botucatu, Brazil

1:45 **3139** Genetic tools for selecting disease resistance in bee pollinators. **Jarkko Routtu** (jarkko.routtu@zoologie. uni-halle.de) and Robin Moritz, Martin Luther Univ., Halle, Germany

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**THURSDAY**

**Thursday, September 29 • AFTERNOON •**



2:00 **3140** Using honey bee genetics to breed for behavioral resistance to *Varroa* mites. **Jennifer M. Tsuruda** (jtsurud@clemson.edu)1, Greg Hunt2, and Miguel E. Arechavaleta-Velasco3, 1Clemson Univ., Clemson, SC, 2Purdue Univ., West Lafayette, IN, 3National Institute of Forestry Agriculture and Livestock, Ajuchitlan, Mexico

2:15 **3141** Ecological effects of genetic diversity in host-parasite interactions. **Sophie Evison** (s.evison@sheffield.ac.uk)1, Annette Jensen2, and William O. H. Hughes3, 1Univ. of Leeds, Leeds, United Kingdom, 2Univ. of Copenhagen, Frederiksberg, Denmark, 3Univ. of Sussex, Brighton, United Kingdom

2:30 **3142** Comparative genomics of *Parasaccharibacter apium*, a hive bacterium that benefits honey bee (*Apis mellifera*) health. **Vanessa Corby-Harris** (vanessa.corby@ars.usda.gov) and Kirk E. Anderson, USDA - ARS, Tucson, AZ

2:45 **3143** BioDirectTM to control *Varroa destructor* - new biologicals for effective protection from the devastating honey bee parasitic mite. **Alex Inberg** (alex.inberg@ monsanto.com), Monsanto Company, Chesterfield, MO

**3:00 BREAK**

3:15 **3144** Transcriptomic approaches to identify and rapidly diagnose novel viruses infecting bee populations worldwide. **David Galbraith** (dag5031@ gmail.com)1, Joyce Sakamoto1, Maryann Frazier1, Yanping Chen2, Diana Cox-Foster1, Harland M. Patch1, and Christina M. Grozinger1, 1Pennsylvania State Univ., University Park, PA, 2USDA - ARS, Beltsville, MD

3:30 **3145** Applied beenomics: New approaches to reduce honey bee disease. **Jay Evans** (evansj@ba.ars.usda. gov) and Yanping Chen, USDA - ARS, Beltsville, MD

3:45 **3146** A meta-analysis of transcriptomes to explore the molecular response of honey bees to pathogens. **Vincent Doublet** (vincent.doublet@zoologie.uni-halle.de)1, Yvonne Poeschl1, Andreas Gogol-Döring1, Robert Paxton2, and Christina M. Grozinger3, 1German Centre for Integrative Biodiversity Research, Leipzig, Germany, 2Martin Luther Univ., Halle, Germany, 3Pennsylvania State Univ., University Park, PA

4:00 **3147** Impact of biotic and abiotic stressors on  
honey bee health (*Apis mellifera*). **Francesco Nazzi** (francesco.nazzi@uniud.it)1 and Franco Pennacchio2, 1Univ. of Udine, Udine, Italy, 2Univ. of Naples Federico II, Portici, Italy

4:15 **3148** Staying healthy in times of stress: Genome-wide study of bumble bee diapause.  
**Etya Amsalem** (eua6@psu.edu)1, David Galbraith1, Jonathan Cnaani2, Peter E. A. Teal3, and  
Christina M. Grozinger1, 1Pennsylvania State Univ., University Park, PA, 2BizBee, Ein Yahav, Israel, 3USDA - ARS, Gainesville, FL

4:30 **3149** Nutritional genomics of bumble bees.  
**S. Hollis Woodard** (hollis.woodard@ucr.edu), Univ. of California, Riverside, CA

4:45 **3150** DNA barcoding of pollen for pollinator health: Challenges and prospects. **Berry J. Brosi** (bbrosi@ emory.edu)1, Karen Bell1, Kevin Burgess2, and Michael MacPherson3, 1Emory Univ., Atlanta, GA, 2Columbus State Univ., Columbus, GA, 3Chapman Univ., Orange, CA

**Symposium: Invasive Ants: Biology and Control**

***Room W232 A (Convention Center)***

**Moderators and Organizers:** Sanford Porter1, Joshua R. King2, David Oi1, and Robert Vander Meer1, 1USDA - ARS, Gainesville, FL, 2Univ. of Central Florida, Orlando, FL

1:30 **3151** Tawny crazy ant invasion: Chemical weapons and countermeasures, species displacement, and biotic homogenization. **Edward G. LeBrun** (edwardlebrun@ austin.utexas.edu), The Univ. of Texas, Austin, TX

1:45 **3152** Developing strategies for the control of tawny crazy ants, *Nylanderia fulva*. **David Oi** (david.oi@ars. usda.gov), USDA - ARS, Gainesville, FL

2:00 **3153** Challenges of “attempted” management of the invasive European red ant. **Eleanor Groden** (groden@ umit.maine.edu) and Elissa S. Ballman, Univ. of Maine, Orono, ME

2:15 **3154** Ants without borders: The case of *Wasmannia auropunctata*. **Cas Vanderwoude** (cas.vanderwoude@ gmail.com), Univ. of Hawai’i, Hilo, HI

2:30 **3155** Globalization and the spread of invasive ants. **Cleo Bertelsmeier** (cleo.bertelsmeier@unil.ch)1, Sébastien Ollier2, and Laurent Keller1, 1Univ. of Lausanne, Lausanne, Switzerland, 2Univ. of Paris Sud, Paris, France

2:45 **3156** Competition between invasive and native ants. **Joshua R. King** (joshua.king@ucf.edu), Univ. of Central Florida, Orlando, FL

**3:00 BREAK**

3:15 **3157** Usurpation of plant-pollinator mutualisms by non-native ants. **David Holway** (dholway@ucsd.edu)1, Erin Wilson Rankin2, and Lori Lach3, 1Univ. of California, La Jolla, CA, 2Univ. of California, Riverside, CA,

3James Cook Univ., Cairns, Australia

3:30 **3158** Fire ant biological control agents: *Pseudacteon* decapitating flies and other parasites. **Sanford Porter** (sanford.porter@ars.usda.gov)1, Luis Calcaterra2, Laura Varone2, and Juan Briano2, 1USDA - ARS, Gainesville, FL, 2Foundation for the Study of Invasive Species, Hurlingham, Argentina

3:45 **3159** *Solenopsis invicta*: Biologically-based control. **Robert Vander Meer** (bob.vandermeer@ars.usda.gov), USDA - ARS, Gainesville, FL

4:00 **3160** Ecology of ant-fungal pathogen interactions and the implications for biocontrol. Raquel Loreto 1,2 and **David Hughes** (dph14@psu.edu)1, 1Pennsylvania State Univ., University Park, PA, 2Federal Univ. of Viçosa, Viçosa, Brazil

4:15 **3161** Bioprospecting: Sequencing of invasive pest ant transcriptomes to facilitate discovery of viral biocontrol agents. **Steven Valles** (steven.valles@ars. usda.gov), USDA - ARS, Gainesville, FL

4:30 **3162** Applied systematics of *Pheidole*: An interactive review of the world’s most invasive ant lineage.  
**Eli Sarnat** (e.sarnat@gmail.com)1, Georg Fischer2, Benoit Guénard3, and Evan Economo2, 1Antwork Consulting, LLC, Davis, CA, 2Okinawa Institute of Science and Technology, Onna, Japan, 3Univ. of Hong Kong, Hong Kong, China

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**THURSDAY**

**Thursday, September 29 • AFTERNOON •**

**Symposium: Ecology, Surveillance, and Control of Biting Midges**

***Room W330 A (Convention Center)***

**Moderators and Organizers:** Lee Cohnstaedt1, Simon T. Carpenter2, and Glenn Bellis3, 1USDA - ARS, Manhattan, KS, 2The Pirbright Institute, Woking, United Kingdom, 3Research Institute for the Environment and Livelihoods, Darwin, Australia

*This symposium is generously sponsored by the North American Deer Farmer’s Association.*

3:45 **3171** Landscape-level spatial patterns of *Culicoides sonorensis* and bluetongue virus in Colorado. **Christie Mayo** (christie.mayo@colostate.edu), Colorado State Univ., Fort Collins, CO

4:00 **3172** *Culicoides* spp. distribution and seasonal abundance on a Florida deer farm where hemorrhagic disease is endemic. **Katherine Sayler** (saylerk@ufl. edu)1, Nathan Burkett-Cadena2, Erik Blosser2, Bethany McGregor2, J. K. Blackburn1, and

Samantha Wisely1, 1Univ. of Florida, Gainesville, FL, 2Univ. of Florida, Vero Beach, FL

4:15 **3173** Overwintering and strategies for surviving adverse conditions in *Culicoides sonorensis*. **Emily McDermott** (emcde002@ucr.edu), Univ. of California, Riverside, CA

4:30 **3174** Exploring semiochemicals for improving monitoring and control of *Culicoides* spp. **Miguel Miranda** (ma.miranda@uib.es), and Carlos Barcelo, Univ. of the Balearic Islands, Palma, Spain

4:45 **3175** *Culicoides* and reassortant bluetongue viruses: A study of virus/vector/host interactions. **Christopher Sanders** (christopher.sanders@pirbright.ac.uk)1, Eva Veronesi2, Kyriaki Nomikou1, Peter Mertens1, and Simon T. Carpenter1, 1The Pirbright Institute, Woking, United Kingdom, 2National Centre for Vector Entomology, Zürich, Switzerland

5:00 **3176** Quantifying the vector’s impact on the epi- demiology of *Culicoides-*borne equine arboviruses. **Lara Harrup** (lara.harrup@pirbright.ac.uk)1, Simon T. Carpenter1, Simon Gubbins1, and Gianni Lo Iacono2, 1The Pirbright Institute, Woking, United Kingdom, 2Univ. of Cambridge, Cambridge, United Kingdom

5:15 **3177** What influence does entomology have on policy decisions during arbovirus outbreaks? **Simon T. Carpenter** (simon.carpenter@pirbright.ac.uk), The Pirbright Institute, Woking, United Kingdom

**Symposium: Biogeographical Lessons Learned from the West Indies**

***West Hall F4 (WF4) (Convention Center)***

**Moderators and Organizers:** Jacqueline Miller1 and Michael A. Ivie2, 1Florida Museum of Natural History, Gainesville, FL, 2Montana State Univ., Bozeman, MT

*This symposium is generously sponsored by The International Biodiversity Foundation, Inc.*

1:30 **3178** Biodiversity and biogeography of Lepidoptera in the Bahamas. **Jacqueline Miller** (jmiller@flmnh.ufl. edu), Florida Museum of Natural History, Gainesville, FL

1:45 **3179** Bahamian elateroid beetle diversity and geographic relations. **Paul J. Johnson** (paul.johnson@ sdstate.edu), South Dakota State Univ., Brookings, SD

2:00 **3180** Role of Caribbean Islands in the diversification and biogeography of the neotropical *Heraclides* swallowtails. **Delano Lewis** (delano.lewis@ncu.edu.jm), Northern Caribbean Univ., Mandeville, Jamaica

1:30 **3163**  
of *Culicoides*. **Glenn Bellis** (glenn.bellis@agriculture. gov.au)1 and Alan Dyce2, 1Research Institute for the Environment and Livelihoods, Darwin, Australia, 2CSIRO, Sydney, Australia

1:45 **3164** DNA barcoding for species identification of biting midges (Ceratopogonidae: *Culicoides*) from Australasia and Eastern Asia. **David Gopurenko** (david. gopurenko@dpi.nsw.gov.au)1,2, Andrew Mitchell3, and Glenn Bellis4, 1New South Wales Dept. of Primary Industries, Wagga Wagga, Australia, 2Graham Centre for Agricultural Innovation, Wagga Wagga, Australia, 3Australian Museum, Sydney, Australia, 4Research Institute for the Environment and Livelihoods, Darwin, Australia

2:00 **3165** Searching for *Culicoides* vectors of bovine arboviruses in Japan. **Tohru Yanase** (tyanase@affrc. go.jp), National Institute of Animal Health, Kagoshima, Japan

2:15 **3166** *Culicoides imicola*: Phylogeography, population genetics, and invasive status in the Mediterranean basin. **Stéphanie Jacquet** (stephanie. jacquet@cirad.fr)1, Karine Huber1,2, Hélène Guis1, Thomas Balenghien1, Christine Chevillon3,4,

Jérémy Bouyer1, and Claire Garros1, 1CIRAD, Montpellier, France, 2INRA, Montpellier, France, 3National Center  
for Scientific Research, Montpellier, France, 4IRD, Montpellier, France

2:30 **3167** Population dynamics of *Culicoides imicola* and *Culicoides schultzei* gp. in dairy farms in Israel. **Yuval Gotlieb** (yuvalgd@yahoo.com), Yonatan Saroya, and Eyal Klement, The Hebrew Univ., Rehovot, Israel

2:45 **3168** Bionomics and vector competence among pre-alpine *Culicoides* species in Switzerland.  
**Anca Paslaru** (ancaiona.paslaru@uzh.ch), Alexander Mathis, and Eva Veronesi, National Centre for Vector Entomology, Zürich, Switzerland

**3:00 BREAK**

3:15 **3169** *Culicoides* (Diptera: Ceratopogonidae) as vectors of African horse sickness virus in South Africa. **Gert Venter** (venterg@arc.agric.za), Agricultural Research Council, Onderstepoort, South Africa

3:30 **3170** *Culicoides* species of the southeastern United States and their changing distributions. **Stacey Vigil** (svigil@uga.edu) and Joseph Corn, Univ. of Georgia, Athens, GA

The use of antennal sensilla in the systematics

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2:15 **3181** Firefly (Coleoptera: Lampyridae) species distribution across the Caribbean. **Oliver Keller** (okeller1977@gmail.com) and Marc Branham, Univ. of Florida, Gainesville, FL

2:30 **3182** Origin and biogeography of Greater Antillean water beetles: The genus *Crenitulus* like a model. **Albert Deler-Hernández** (adeler1982@gmail.com), Charles Univ., Prague, Czech Republic

2:45 **3183** The little fire ant, *Wasmannia auropunctata* (Roger), in the West Indies: Native pest or successful invasive species? **Bert Rivera Marchand** (brivera@ bc.inter.edu), Univ. of Puerto Rico, San Juan, PR

**3:00 BREAK**

3:15 **3184** Agricultural experiment station research collection: A centenary legacy of biodiversity.  
Edda Martinez1, **Rosa Franqui** (franqui@eea.uprm.edu)1, and Alejandro Segarra2, 1Museum of Entomology and Tropical Biodiversity, San Juan, PR, 2Univ. of Puerto Rico, Mayaguez, PR

3:30 **3185** The West Indian Beetle Fauna Project: 35 years update. **Michael A. Ivie** (mivie@montana.edu), Montana State Univ., Bozeman, MT

**Symposium: SOLA Scarab Workers**

***Room W223 A (Convention Center)***

**Moderator and Organizer:** Andrew B. T. Smith, Canadian Museum of Nature, Ottawa, ON, Canada

1:30 **3186** Elucidating dynastine (Coleoptera: Scarabaeidae) evolution with transcriptomic data. **Matthew Moore** (mrmoore19@ufl.edu)1, Marc Branham1, and R. Cave2, 1Univ. of Florida, Gainesville, FL, 2Univ. of Florida, Homestead, FL

1:45 **3187** Integrative phylogeny of dung beetles (Coleoptera: Scarabaeinae). **Sergei Tarasov** (sergxf@ yandex.ru), Univ. of Oslo, Oslo, Norway

2:00 **3188** Extinct lineages of Scarabaeoidea based on quantitative morphological approaches. **Yuanyuan Lu** (luyuanyuan442@163.com), Ming Bai, and  
Xing-Ke Yang, Chinese Academy of Sciences,

Beijing, China

2:15 **3189** Phylogeny of North American Sericini (Coleoptera: Melolonthinae). **Reese J. Worthington** (rworthin@go.olemiss.edu), Univ. of Mississippi, University, MS

2:30 **3190** First insights into the evolutionary history  
of the widespread African flower chafer genus *Eudicella* (Scarabaeidae: Cetoniinae) employing molecular phylogenetic methodology. **Matthias Seidel** (matthias.seidel@zns.uni-halle.de), National Museum, Prague, Czech Republic

2:45 **3191** Mechanisms of condition-dependent trait growth in the weapons of sexual selection: Insights from the beetles. **Laura C. Lavine** (lavine@wsu.edu)1 and Doug Emlen2, 1Washington State Univ., Pullman, WA, 2Univ. of Montana, Missoula, MT

**3:00 BREAK**

3:15 **3192** Scarab beetles collected by Charles Darwin  
in southern South America during the voyage of the H.M.S. Beagle. **Andrew B. T. Smith** (asmith@unl.edu), Canadian Museum of Nature, Ottawa, ON, Canada

3:30 **3193** Fabrician types of Scarabaeoidea in the Natural History Museum, London. **Maxwell Barclay** (m.barclay@ nhm.ac.uk), The Natural History Museum, London, United Kingdom

3:45 **3194** Necrocenoses in the West African Savanna: Scarabs rule. **Frank Krell** (frank.krell@dmns.org)1, Minnattallah Boutros2, Christian Linder3, and  
Sylvia Krell-Westerwalbesloh4, 1Denver Museum of Nature and Science, Denver, CO, 2GFA Consulting Group GmbH, Hamburg, Germany, 3On Your Own, Bielefeld, Germany, 4Univ. of Würzburg, Würzburg, Germany

4:00 **3195** Guild structure in *Chrysina* beetles. **Don Thomas** (donald.thomas@ars.usda.gov)1 and David C. Robacker2, 1USDA - ARS, Edinburg, TX, 2USDA - ARS, Weslaco, TX

4:15 **3196** Dung beetle (Scarabaeinae) endemisms in Costa Rica: A conundrum of speciation mechanisms. **Bert Kohlmann** (bkohlman@earth.ac.cr), Earth Univ., San José, Costa Rica

**Symposium: Regional Status of Microbial Control Programs**

***Room W232 B (Convention Center)***

**Moderators and Organizers:** Steven P. Arthurs1, Surendra Dara2, and Ralf-Udo Ehlers3, 1Univ. of Florida, Apopka, FL, 2Univ. of California, San Luis Obispo, CA, 3e-nema, Schwentinental, Germany

1:30 **3197** EU Regulation 2020: Stagnancy or new perspectives for biological control. **Ralf-Udo Ehlers** (ehlers@e-nema.de), e-nema, Schwentinental, Germany

1:45 **3198** Biopesticides — innovative technologies and strategies for pest control. **Tariq Butt** (t.butt@swansea. ac.uk), Gary Harper, Richard Massy, and James Taylor, Swansea Univ., Swansea, United Kingdom

2:00 **3199** Effect of regulation on commercial development of microbial biopesticides in the European Union. **Roma Gwynn** (rgwynn@biorationale.co.uk), Rationale Biopesticide Strategists, Duns, Scotland

2:15 **3200** Integration of microbial biopesticides in greenhouse floriculture: The Canadian experience. Graeme Murphy1, Rose Buitenhuis2, and  
**Michael Brownbridge** (michael.brownbridge@gmail. com)3, 1Ontario Ministry of Agriculture, Food and Rural Affairs, Vineland, ON, Canada, 2Vineland Research  
and Innovation Centre, Vineland Station, ON, Canada, 3Vineland Research and Innovation Centre, Lincoln, ON, Canada

2:30 **3201** The potential of entomopathogenic fungi to manage coffee berry borer in Hawaii.

**Robert Hollingsworth** (robert.hollingsworth@ars.usda. gov)1 and Donald C. Steinkraus2, 1USDA - ARS, Hilo, HI, 2Univ. of Arkansas, Fayetteville, AR

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**Thursday, September 29 • AFTERNOON •**

2:45 **3202** Review of biopesticides and their markets in the United States. **Steven P. Arthurs** (spa@ufl.edu)1 and Surendra Dara2, 1Univ. of Florida, Apopka, FL, 2Univ. of California, San Luis Obispo, CA

**3:00 BREAK**

3:15 **3203** Utilization of nucleopolyhedrovirus (NPVs)  
for control of lepidopteran pests in fruit and vegetable production. **William Stoneman** (bstoneman@andermattusa. com)1, Gisela Brand2, and Silvana Nidermann2, 1Andermatt Biocontrol AG, Madison, WI, 2Andermatt Biocontrol AG, Grossdietwil, Switzerland

3:30 **3204** Harvesting the power of fungal entomopathogens for controlling arthropod pests in Brazil. **Gabriel Mascarin** (gmmascar@gmail.com)1, Mark Jackson2, and  
Éverton Kamp Fernandes3, 1Embrapa Rice and

Beans, Santo Antônio de Goiás, Brazil, 2USDA - ARS, Peoria, IL, 3Federal Univ. of Goiás, Goiânia, Brazil

3:45 **3205** Overview of microbial control programmes in South Africa. **Justin Hatting** (HattingJ@arc.agric.za), Agricultural Research Council, Bethlehem, South Africa

4:00 **3206** Microbial control programmes in Eastern Africa. **Sunday Ekesi** (sekesi@icipe.org) and Jean Nguya Kalemba Maniania, International Centre of Insect Physiology and Ecology, Nairobi, Kenya

4:15 **3207** Microbial control: Progress from New Zealand. **Travis Glare** (travis.glare@lincoln.ac.nz)1 and Maureen O’Callaghan2, 1Bio-Protection Research Centre, Lincoln, New Zealand, 2AgResearch, Ltd., Christchurch, New Zealand

**Symposium: Climate Change Impacts and Insect Population Dynamics**

***West Hall F2 (WF2) (Convention Center)***

**Moderators and Organizers:** James Bell1, Carol Boggs2,  
John Terblanche3, and Toke Høye4, 1Rothamsted Research, Harpenden, United Kingdom, 2Univ. of South Carolina, Columbia, SC, 3Stellenbosch Univ., Stellenbosch, South Africa, 4Aarhus Univ., Rønde, Denmark

1:30 **3208** Insects and climate assessments: The Intergovernmental Panel on Climate Change (IPCC) and the U.S. National Assessment. **Camille Parmesan** (camille.parmesan@plymouth.ac.uk), Plymouth Univ.’s Marine Institute, Plymouth, United Kingdom

1:45 **3209** Demography and climate change in insects. **Carol Boggs** (cboggs@seoe.sc.edu)1,2 and Nicole Kish1,2, 1Univ. of South Carolina, Columbia, SC, 2Rocky Mountain Biological Laboratory, Crested Butte, CO

2:00 **3210** Relative importance of climate, habitat, and species’ traits on population dynamics. **Georgina Palmer** (georgina.palmer@york.ac.uk)1, Jane Hill1, Tom Brereton2, David Brooks3, Jason Chapman4, Richard Fox2,

Tom Oliver5, and Chris Thomas1, 1Univ. of York, York, United Kingdom, 2Butterfly Conservation, Wareham, United Kingdom, 3Rothamsted Research, Harpenden, United Kingdom, 4Univ. of Exeter, Penryn, United Kingdom, 5Univ. of Reading, Reading, United Kingdom

2:15 **3211** Energetic and life history consequences of cold adaptation in *Drosophila melanogaster*. **Caroline M. Williams** (cmw@berkeley.edu)1, Theodore Morgan2, David Allison3, and Daniel Hahn4, 1Univ. of California, Berkeley, CA, 2Kansas State Univ., Manhattan, KS, 3Univ. of Alabama, Birmingham, AL, 4Univ. of Florida, Gainesville, FL

2:30 **3212** No butterflies in the stomach: The collapse of insect-microbe symbiosis under climate change. **Dmitry Musolin** (musolin@gmail.com)1,2, Yoshitomo Kikuchi3, Akiyo Tada1, Nobuhiro Hari1, Takahiro Hosokawa4,5, Kenji Fujisaki1, and

Takema Fukatsu5, 1Kyoto Univ., Kyoto, Japan, 2Saint Petersburg State Forest Technical Univ., St. Petersburg, Russia, 3National Institute of Advanced Industrial Science and Technology, Sapporo, Japan, 4Kyushu Univ., Fukuoka, Japan, 5Advanced Industrial Science and Technology, Tsukuba, Japan

2:45 **3213** Hybridization in the context of a changing climate. **Sean Ryan** (ecophylic@gmail.com)1,2 and Jessica Hellmann1,3, 1Univ. of Notre Dame, South Bend, IN, 2USDA - ARS, Gainesville, FL, 3Univ. of Minnesota, St. Paul, MN

**3:00 BREAK**

3:15 **3214** Effects of weather and climate on butterfly population dynamics. **Tom Oliver** (t.oliver@reading. ac.uk), Univ. of Reading, Reading, United Kingdom

3:30 **3215** The role of climate change on insect herbivory rates derived from the fossil record. **Conrad Labandeira** (labandec@si.edu), Smithsonian Institution National Museum of Natural History, Washington, DC

3:45 **3216** Climate change and rapid bumblebee and butterfly losses within and across continents. **Jeremy Kerr** (jkerr@uottawa.ca), Ottawa-Carleton Institute of Biology, Ottawa, ON, Canada

4:00 **3217** Winners and losers of Arctic climate change  
— insect and spider abundance variation across  
two decades in high-arctic Greenland. **Toke Høye** (tth@aias.au.dk)1, Joseph Bowden2, Sarah Loboda3, Christopher Buddle3, Niels Schmidt4, and Jade Savage5, 1Aarhus Univ., Rønde, Denmark, 2Aarhus Univ., Aarhus, Denmark, 3McGill Univ., Sainte-Anne-de-Bellevue, QC, Canada, 4Aarhus Univ., Roskilde, Denmark, 5Bishop’s Univ., Sherbrooke, QC, Canada

4:15 **3218** Understanding the impacts of climate change on agricultural insect pests across Africa. **Madeleine Barton** (mbarton@sun.ac.za) and  
John Terblanche, Stellenbosch Univ., Stellenbosch, South Africa

4:30 **3219** Climate change impacts pest and beneficial insects over the last half century: Insights from the UK. **James Bell** (james.bell@rothamsted.ac.uk)1,  
Jesica Pérez Rodríguez2, Chris Shortall1, and  
Richard Harrington1, 1Rothamsted Research, Harpenden, United Kingdom, 2Univ. of València, València, Spain

4:45 **3220** Insect-plant phenological synchrony in a changing world. **Michael Singer** (michael.singer@ plymouth.ac.uk), Plymouth Univ., Plymouth, United Kingdom

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5:00 **3221** Spatial synchrony in marine and terrestrial systems. **Lawrence Sheppard** (lwsheppard@ku.edu)1, James Bell2, Richard Harrington2, Philip Reid3, and Daniel Reuman4, 1Univ. of Kansas, Lawrence, KS, 2Rothamsted Research, Harpenden, United Kingdom, 3Sir Alister Hardy Foundation for Ocean Science, Plymouth, United Kingdom, 4Univ. of Kansas, Lawrence, KS

5:15 **3222** Invasion biology and climate change: Comparing retracting and expanding species. **Jane Hill** (jane.hill@ york.ac.uk), Georgina Palmer, Phil Platts, and  
Chris Thomas, Univ. of York, York, United Kingdom

**Symposium: Next-Generation Technologies for Insect Control**

***Room W224 D (Convention Center)***

**Moderators and Organizers:** Murugesan Rangasamy1,  
Nandi Nagaraj1, Renata Bolognesi2, Blair Siegfried3, and Swapna Priya Rajarapu4, 1Dow AgroSciences, Indianapolis, IN, 2Monsanto Company, Chesterfield, MO, 3Univ. of Florida, Gainesville, FL, 4Purdue Univ., West Lafayette, IN

1:30 **3223** Western corn rootworm — integrated management strategies for IRM. **Matthew Carroll** (matthew.carroll@monsanto.com), Graham P. Head, and Sean Evans, Monsanto Company, St. Louis, MO

1:45 **3224** Presentation withdrawn

2:00 **3225** SmartStax® PRO corn — next-generation technology for corn rootworm management.  
**Bradley W. Hopkins** (bwhopkins@dow.com),  
Dwain M. Rule, and Nicholas Storer, Dow AgroSciences, Indianapolis, IN

2:15 **3226** SPEARTM: First commercialization of a cystine-knot insecticide. **John Sorenson** (JSorenson@ vestaron.com), Vestaron Corporation, Kalamazoo, MI

2:30 **3227** New binary-toxin against western corn rootworm from a non-*Bacillus thuringiensis*

bacterium. **Amit Sethi** (amit.sethi@pioneer.com)1, Claudia Pérez-Ortega2, Mark Nelson2, Timothy M. Nowatzki1, Nasser Yalpani1, Lu Liu3, Gusui Wu1, J. Lindsey Flexner1, and Laura S. Higgins1, 1DuPont Pioneer, Johnston, IA, 2DuPont Pioneer, Wilmington, DE, 3DuPont Pioneer, Hayward, CA

2:45 **3228** Advancing microbial control in temperate orchard systems. **David Shapiro-Ilan** (david.shapiro@ ars.usda.gov), USDA - ARS, Byron, GA

**3:00 BREAK**

3:15 **3229** Modification of a Bt toxin to target Asian citrus psyllid (*Diaphorina citri*; Hemiptera).  
Maria Fernandez Luna1, **Yuting Chen** (yutingc@iastate. edu)1, Michael B. Blackburn2, David Hall3,  
Biviana Flores-Escobar1, and Bryony Bonning1,  
1Iowa State Univ., Ames, IA, 2USDA - ARS, Beltsville, MD, 3USDA - ARS, Ft. Pierce, FL

3:30 **3230** Controlling honey bee pests and pathogens in the 21st century. **James D. Ellis** (jdellis@ufl.edu), Univ. of Florida, Gainesville, FL

3:45 **3231** New technologies and opportunities for managing filth flies. **Alec Gerry** (alec.gerry@ucr.edu), Univ. of California, Riverside, CA

4:00 **3232** Of flies and beetles: Adapting gene drives  
to address global pest problems. **Nathaniel Grubbs** (npgrubbs@ncsu.edu), Fu-Chyun Chu, and  
Marcé Lorenzen, North Carolina State Univ., Raleigh, NC

4:15 **3233** It’s a trap! New traps for mosquito and bed bug control. **Roberto Pereira** (rpereira@ufl.edu), Univ. of Florida, Gainesville, FL

4:30 **3234** Insect control discovery at Evogene, Inc. **James Presnail** (james.presnail@evogene.com), Evogene, Inc., Saint Louis, MO

**Symposium: Effect of Global Climate Change on Vector-Borne Disease Transmission**

***Room W240 B (Convention Center)***

**Moderators and Organizers:** Ephantus J. Muturi1, Allison Parker1, and Paul A. Weston2, 1Univ. of Illinois, Champaign, IL,  
2Charles Sturt Univ., Wagga Wagga, Australia

1:30 **3235** An overview of the potential impact of climate change on mosquitoes. **Ephantus Muturi** (emuturi2@ illinois.edu), Univ. of Illinois, Champaign, IL

1:45 **3236** Research update on pathogenic landscape  
of Chagas and Lyme disease in the U.S.-Mexico transboundary region. **Teresa Arroyo** (teresa.feriaarroyo@ utrgv.edu)1, Maria Esteve-Gassent2, Ivan Castro-Arellano3, Guadalupe Gordillo-Perez4, Ramiro Patino1, and Adalberto Pérez de León5, 1The Univ. of Texas, Edinburg, TX, 2Texas A&M Univ., College Station, TX, 3Texas State Univ., San Marcos, TX, 4Research Unit

on Infectious Diseases, Distrito Federal, Mexico, 5USDA - ARS, Kerrville, TX

2:00 **3237** On the edge: Climatic influences on *Ae. aegypti* indices and dengue virus transmission in the Sonoran desert region. **Kacey Ernst** (kernst@email. arizona.edu)1, Corey Morin1, Kathleen R. Walker1, Andy Monaghan2, Mary Hayden2, Pablo Reyes-Castro1, Teresa Joy1, Mecedes Gameros3, Steve Haenchen1, Eileen Guttierez-Jeffrey1, Yves Carrière1, and

Michael A. Riehle1, 1Univ. of Arizona, Tucson, AZ, 2National Center for Atmospheric Research, Boulder, CO, 3Hospital General, Heroica Nogales, Mexico

2:15 **3238** Mechanistic modeling of the impact of climate variability and change on malaria transmission in Africa. **Elfatih Eltahir** (eltahir@mit.edu)1, Noriko Endo1, and Teresa Yamana2, 1Massachusetts Institute of Technology, Cambridge, MA, 2Columbia Univ.,

New York, NY

2:30 **3239** Climate change and emergence of Lyme disease in Canada: A local problem with global significance. **Nicholas Ogden** (nicholas.ogden@ phac-aspc.gc.ca), Public Health Agency of Canada, Saint-Hyacinthe, QC, Canada

2:45 **3240** Climate change effects on rangewide potential distributions and abundances of insect vectors of disease. **Lindsay Campbell** (lpcampbell@ku.edu) and A. Townsend Peterson, Univ. of Kansas, Lawrence, KS

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**3:00 BREAK**

3:15 **3241** Presentation withdrawn

3:30 **3242** How habitat and land-use modify the distribution of a diverse mosquito vector assemblage. **Michael Reiskind** (michael\_reiskind@ncsu.edu), North Carolina State Univ., Raleigh, NC

**Symposium: Neotropical Insect Galls**

***Room W224 A (Convention Center)***

**Moderators and Organizers:** Valéria Maia and Barbara do Nascimento, Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

1:30 **3243** Galls in the Brazilian Atlantic Forest.  
**Valéria Maia** (maiavcid@acd.ufrj.br), Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

1:45 **3244** Gall morphotypes in the Neotropics and the need to standardize them. **Rosy Mary Isaías** (rosy. isaias@gmail.com), Federal Univ. of Minas Gerais, Belo Horizonte, Brazil

2:00 **3245** Galls in Brazilian ferns and the chemical changes in galled and no-galled tissues. **Marcelo dos Santos** (marceloguerrasantos@gmail.com)1, Valéria Maia2, Bruno Oliveira1, Luis Tietbohl3, and Leandro Rocha3, 1State Univ. of Rio de Janeiro, São Gonçalo, Brazil, 2Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil, 3Federal Univ. of Fluminense, Niterói, Brazil

2:15 **3246** Presentation withdrawn

2:30 **3247** Galls from Brazilian tropical dry forest. **Jarcilene Almeida-Cortez** (jacortez@ufpe.br)1 and Sheila Fernandes-Carvalho2, 1Federal Univ. of Pernambuco, Recife, Brazil, 2Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

2:45 **3248** Insect galls from the Amazonian rainforest. **Barbara do Nascimento** (barbaraproenka@yahoo.com. br) and Valéria Maia, Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

* **SD3249**Network of monophagous and oligophagous galling insects (Diptera: Cecidomyiidae) and associated parasitoids. **Carolina Prauchner** (carol\_prauchner@ hotmail.com), Fernando Luz, and Milton Mendonça Júnior, Federal Univ. of Rio Grande, Porto Alegre, Brazil
* **SD3250**First report of *Mycodiplosis* Rübsaamen (Insecta: Diptera) in galls of *Schismatodiplosis lantanae* (Insecta: Diptera). Erick Siqueira, **Barbara do Nascimento** (barbaraproenka@yahoo.com.br), and Valéria Maia, Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

**3:00 BREAK AND POSTER SESSION**

**Symposium: Engaging the World of Arthropod Education in a Digital Age**

***Room W230 A (Convention Center)***

**Moderators and Organizers:** John Guyton1, Rebecca Baldwin2, and Andrine A. Shufran3, 1Mississippi State Univ., Mississippi State, MS, 2Univ. of Florida, Gainesville, FL, 3Oklahoma State Univ., Stillwater, OK

1:30 **3251** Presentation withdrawn

1:45 **3252** From fighting ants to collecting and teaching. **Wes Campana** (wescampana@yahoo.com)1,2 and John Guyton2, 1Potrerrillos, Panama, 2Mississippi State Univ., Mississippi State, MS

2:00 **3253** Using active learning to teach a practical use for insects. **James Kopco** (james.kopco@gmail. com)1, Alyssa McDonough2, and Deirdre Prischmann- Voldseth1, 1North Dakota State Univ., Fargo, ND, 2Minnesota State Univ., Moorhead, MN

2:15 **3254** Enabling entomology: How to design entomology education programming to serve audiences with disabilities. **Alyssa McDonough** (mcdonougal@ mnstate.edu), Minnesota State Univ., Moorhead, MN

2:30 **3255** Using modern technologies to improve entomology literacy and insect conservation practices: Case examples and research outcomes. **Douglas Golick** (dgolick2@unl.edu), Louise Lynch, and Derek Pruitt, Univ. of Nebraska, Lincoln, NE

2:45 **3256** Presentation withdrawn

**3:00 BREAK**

3:15 **3257** Coming on strong: Use bess beetles to ‘unplug’ our students while engaging them in scientific inquiry. **Robert Matthews** (rwmatthews@gmail.com), Univ. of Georgia, Athens, GA

3:30 **3258** The world of invertebrate exhibitory.  
**Jamie Sincage** (jamie.sincage@disney.com), Disney’s Animal Kingdom, Lake Buena Vista, FL

3:45 **3259** Chasing bugs from middle school to graduate school: The influences and the mentors. **Matthew Thorn** (mjt152@msstate.edu) and John Guyton, Mississippi State Univ., Mississippi State, MS

4:00 **3260** A world of curiosity from an undergraduate entomology student. **Breanna Lyle** (bl334@msstate. edu) and John Guyton, Mississippi State Univ., Mississippi State, MS

4:15 **3261** The Arthropod Project, sharing resources world-wide for entomological lessons, activities, and demonstrations. **John Guyton** (j.guyton@msstate.edu), Mississippi State Univ., Mississippi State, MS

4:30 **3262** Bug boxes for education and outreach. **Rebecca Baldwin** (baldwinr@ufl.edu), Univ. of Florida, Gainesville, FL

4:45 **3263** Introducing the Invertebrates in Education and Conservation Conference (IECC). **Andrine A. Shufran** (andrine@okstate.edu), Oklahoma State Univ., Stillwater, OK

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**Symposium: Entomologists without Borders: The Need for Collaboration Between Medical Professionals and Entomologists for the Betterment of Global Public Health**

***Room W230 C (Convention Center)***

**Moderators and Organizers:** Kyndall Dye, Jennifer Gordon, and Sydney Crawley, Univ. of Kentucky, Lexington, KY

1:30 **3264** The role of an entomologist in public health. **Mustapha Debboun** (mdebboun@hcphes.org), Harris County Public Health & Environmental Services, Houston, TX

1:45 **3265** Merging epidemiology and entomology to drive development of novel methods of vector control. **Tom Mascari** (thomas.m.mascari@gmail.com), S. C. Johnson & Son, Racine, WI

2:00 **3266** Entomology at CDC: Protecting the public from vector-borne diseases. **Janet McAllister** (jvm6@cdc. gov), Centers for Disease Control and Prevention,  
Fort Collins, CO

2:15 **3267** Comparison of US *Amblyomma*, *Dermacentor*, and *Rhipicephalus* ticks in their ability to transmit  
*R. rickettsii*. **Michael L. Levin** (mlevin@cdc.gov), Lindsay Killmaster, Alyssa Snellgrove, Lauren Schumacher, and Galina E. Zemtsova, Centers for Disease Control and Prevention, Atlanta, GA

2:30 **3268** Working with public health professionals: Why they need to know about insects and diseases. **Janet Hurley** (ja-hurley@tamu.edu), Texas A&M AgriLife Extension Service, Dallas, TX

2:45 **3269** Role of a state public health entomologist in global health. **Jerome Goddard** (jgoddard@entomology. msstate.edu), Mississippi State Univ., Mississippi State, MS

**3:00 BREAK**

3:15 **3270** Using online and real time monitoring  
dengue vector system to reduce dengue cases and  
its cost-benefit. **Alvaro Eiras** (alvaro.eiras@gmail. com), Chief Laboratory of Chemical Ecology and Insect Vectors, Pampuhla, Brazil

3:30 **3271** Cross-border transmission of onchocerciasis  
in Africa and its implications on 2025 elimination goal: Uganda case analysis. **Lakwo Thomson** (tlakwo@gmail. com), Ministry of Health, Kampala, Uganda

3:45 **3272** Plague epidemiology, ecology, and control in Uganda. **Ben Beard** (cbeard@cdc.gov), Martin Schreifer, Paul Mead, and Kenneth Gage, Centers for Disease Control and Prevention, Fort Collins, CO

4:00 **3273** Bridging the gap: Collaboration with traditional healers to expand surveillance for plague in northwest Uganda. **Mary Hayden** (mhayden@ucar.edu)1,  
Emily Zeilinksi-Gutierrez2, Apangu Titus3, Kevin Griffith2, Andy Monaghan1, Sean Moore1, Paul Mead2, Ben Beard2, and Rebecca Eisen2, 1National Center for Atmospheric Research, Boulder, CO, 2Centers for Disease Control and Prevention, Fort Collins, CO, 3Uganda Virus Research Institute, Entebbe, Uganda

4:15 **Open Table Discussion** 374

**Symposium: Insect Photography Symposium: Bringing the Small to the World**

***Room W230 B (Convention Center)***

**Moderators and Organizers:** Stephen Doggett1 and Thomas V. Myers2, 1Westmead Hospital, Westmead, Australia, 2All-Rite Pest Control, Lexington, KY

1:30 **3274** Field macro techniques. **Thomas V. Myers** (tomvmyers@gmail.com), All-Rite Pest Control, Lexington, KY

1:45 **3275** Capturing mosquitoes. **Stephen Doggett** (stephen.doggett@health.nsw.gov.au), Westmead Hospital, Westmead, Australia

2:00 **3276** The art and science of high speed flash photography. **John C. Abbott** (jcabbott@mail.utexas. edu), St. Edward’s Univ., Austin, TX

2:15 **3277** Managing light for better insect photographs. **Alexander L. Wild** (alexwild@illinois.edu), Univ. of Illinois, Champaign, IL

2:45 **3278** The secrets behind 3D printing. **Richard Naylor** (richard@bedbugfoundation.org), CimexStore, Monmouthshire, United Kingdom

**3:00 BREAK**

3:15 **3279** Cognysis: Capture the hidden world.  
Paul DeZeeuw1 and **Roy Dunn** (hsfpix@gmail.com)2, 1Cognisys, Inc., Traverse City, MI, 2Cognisys, Inc., Westlake Village, CA

3:30 **3280** Zerene systems: The art of successful stacking. **Rik Littlefield** (rj.littlefield6@gmail.com), Zerene Systems, Richland, WA

3:45 **3281** High resolution imaging and 3D modeling of the massive to minuscule: Photomacrography. **Mark Smith** (mark@macroscopicsolutions.com), Macroscopic Solutions, Chicago, IL

**Symposium: International Graduate Student Showcase**

***Room W340 B (Convention Center)***

**Moderators and Organizers:** Paul Abram1, Chandra Moffat2, Carey Minteer3, Mervat Mahmoud4, and Boyd Mori5, 1Univ. of Montréal, Montréal, QC, Canada, 2Univ. of New Brunswick, Fredericton, NB, Canada, 3USDA - ARS, Ft. Lauderdale, FL, 4South Valley Univ., Qena, Egypt, 5Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

1:30 **3282** Dominance hierarchies in the carpenter bee *Xylocopa virginica*: Establishing, maintaining, and changing reproductive strategies. **Jess Vickruck** (jvickruck@gmail.com), Brock Univ., St. Catharines, ON, Canada

2:00 **3283** It takes a village: Insights into how termites and symbionts collaborate physiologically. **Brittany Peterson** (peter137@purdue.edu), Purdue Univ., West Lafayette, IN

2:15 **3284** Is sex allocation in mountain pine beetles, *Dendroctonus ponderosae*, a response to male-biased mortality? **Leanna Lachowsky** (leanna.lachowsky@ gmail.com), Univ. of Calgary, Toronto, ON, Canada

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2:30 **3285** Novel constitutive and inducible antimicrobial activities against multidrug resistant bacterial pathogens in the eastern subterranean termite, *Reticulitermes flavipes.* **Yuan Zeng** (yzz0015@auburn. edu), Auburn Univ., Auburn, AL

2:45 **3286** How to escape parasitic manipulation? **Christoph Kurze** (christoph.kurze@zoologie.uni-halle. de), Martin Luther Univ., Halle, Germany

**3:00 BREAK**

3:15 **3287** Revising arbovirus ecology in South Australia: What spatial scale can tell us about human risk of infection. **Emily Flies** (emilyj77@gmail.com), Univ. of South Australia, Adelaide, Australia

3:30 **3288** The role of wolf spiders (Araneae: Lycosidae) on the biological control of the bollworm, *Helicoverpa* (Lepidoptera: Noctuidae), in cotton crops. **Dalila Rendon** (rendonda@gmail.com), Macquarie Univ., Sydney, Australia

3:45 **3289** When things are getting hot: Consequences of exposure to high temperatures on a parasitoid-host relationship. **M. Lukas Seehausen** (ml.seehausen@ mail.utoronto.ca), Univ. of Toronto, Toronto, ON, Canada

**Symposium: Orthopteroids Without Borders**

***Room W231 C (Convention Center)***

**Moderators and Organizers:** Derek Woller1 and  
Alexandre V. Latchininsky2, 1Texas A&M Univ., College Station, TX, 2Univ. of Wyoming, Laramie, WY

1:30 **3290** The science of natural history. **Piotr Naskrecki** (p.naskrecki@conservation.org), Harvard Univ., Cambridge, MA

2:00 **3291** Orthopteroid insects: A perfect group to investigate ecology, conservation, and biogeography.

**Paolo Fontana** (paolo\_api.fontana@fmach.it), Edmund Mach Foundation, Pergine Valsugana, Italy

2:15 **3292** Ecological factors affecting grasshopper outbreaks in Wyoming. **Douglas Smith** (dsmith59@ uwyo.edu) and Alexandre Latchininsky, Univ. of Wyoming, Laramie, WY

2:30 **3293** Ultrafast, ultrashort, and ultrasonic — the ecological and evolutionary implications of an enigmatic acoustic communication system in a bush cricket. **David Robinson** (david.robinson@open.ac.uk)1, Patricia Ash2, Marion Hall1, and Jürgen Rheinlaender3, 1The Open Univ., Milton Keynes, United Kingdom,

2The Open Univ. in the South, Oxford, United Kingdom, 3Nordkirchen, Germany

2:45 **3294** Indicator plants in solitary phase and migration behavior of *Schistocerca piceifrons* in Yucatán, México. **Mario Poot Pech** (mpootpech@gmail.com),  
Esaú Ruíz Sánchez, and Horacio Ballina Gómez,

Conkal Technological Institute, Conkal, Mexico

**3:00 BREAK**

3:15 **3295** Transcriptomic profiling of the chemosensory organs in grasshoppers with diverse feeding strategies. **Tyler Raszick** (tjraszick@gmail.com) and Hojun Song, Texas A&M Univ., College Station, TX

3:30 **3296** Presentation withdrawn

3:45 **3297** Characterization of the nano-fiber silk of Embioptera. **Janice S. Edgerly** (jedgerlyrooks@scu. edu)1, Grace Stokes1, and Jeff Yarger2, 1Santa Clara Univ., Santa Clara, CA, 2Arizona State Univ., Tempe, AZ

4:00 **3298** Effects of precipitation manipulation and biotic factors on grasshopper populations: Implications for responses to climate change. **David Branson** (dave. branson@ars.usda.gov), USDA - ARS, Sidney, MT

4:15 **3299** Bushcricket genitalia: Morphology, function, and their role in species isolation and female choice (Orthoptera: Ensifera). **Gerlind Lehmann** (gerlind. lehmann@t-online.de), Humboldt Univ., Berlin, Germany

4:30 **3300** Phylogeny of neotropical Phalangopsidae (Ensifera, Grylloidea). **Pedro Souza-Dias** (pedrogdias@ gmail.com), Univ. of São Paulo, São Paulo, Brazil

4:45 **3301** Cockroaches (Blattodea) of southern Louisiana: Morphology, diversity, and life histories. **Forest Huval** (lavuh07@yahoo.com), Louisiana State Univ., Baton Rouge, LA

**Symposium: Sericigenous Insects and 3F’s: Fibre, (Human) Food and Feed-Global Status, and Future Role in Resolving Global Challenges**

***Room W224 F (Convention Center)***

**Moderators and Organizers:** Motoyuki Sumida1 and  
C. J. Prabhakar2,3, 1Mahasarakham Univ., Maha Sarakham, Thailand, 2Central Silk Board, Bangalore, India, 3Independent Sericulture Consultant, Bangalore, India

1:30 **3302** Enconomic and environmental impacts  
of endemic silkworm farming in Madagascar.  
**Catherine Craig** (craig@cpali.org)1,2,3, Mamy Ratsimbazafy4, Maminirina Randrianandrasana5, May R. Berenbaum5, Kerry Oneill6, and Lalaina Raharindimby4, 1Washington State Univ., Pullman, WA, 2Harvard Univ., Cambridge, MA, 3Conservation through Poverty Alleviation, International, Walla Walla, WA, 4SEPALI Madagascar, Maroantsetra, Madagascar, 5Univ. of Illinois, Champaign, IL, 6CPALI, Ann Arbor, MI

1:45 **3303** Silk production and consumption trends - world scenario. **T. V. Maruthi** (sales@hanumanweaving.com), The Indian Silk Export Promotion Council, Mumbai, India

2:00 **3304** Silkworm as edible and medicinal resources for humans in China. **Jiping Liu** (liujiping@scau.edu.cn), South China Agricultural Univ., Guangzhou, China

2:15 **3305** Introduction of silkworms as livelihood option in new areas of Mid-India — experience of Madhya Pradesh, India. **Ajay Kumar Chaubey** (drakchaubey75@ gmail.com)1, Satyanand2, Ravindra Singh3, and

Ram Krishn Tiwari4, 1Government College, Mundi, India, 2Government of Madhya Pradesh, Bhopal, India, 3Dept. of Sericulture, Hoshangabad, India, 4K. N. Government P.G. College, Gyanpur, India

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**THURSDAY**

**Thursday, September 29 • AFTERNOON •**

2:30 **3306** Northeastern India — an epicenter of silkworm as food practice. **Tourangbam Shantibala** (shantibro@ yahoo.co.in)1, R. K. Lokeshwari1 and Manisha Choudhury2, 1Institute of Bioresources & Sustainable Development, Imphal, India, 2Regional Resource Centre for North Eastern States, Guwahati, India

2:45 **3307** Silkworm use for 3F’s: A new dimension for the future. **C. J. Prabhakar** (prabhakarcj@gmail.com), Korada Mohan Rao, P. Jayarama Raju, and Periasamy Kumareshan, Central Silk Board, Bangalore, India

**Symposium in Honor of the 2016 Recipients of Certificates of Distinction**

***Room W224 G (Convention Center)***

**Moderators and Organizers:** Walter S. Leal1, Alvin M. Simmons2, Adriana Costero3, Wendell L. Roelofs4, and Patricia Scaraffia5, 1Univ. of California, Davis, CA, 2USDA - ARS, Charleston, SC, 3National Institutes of Health, Bethesda, MD, 4Cornell Univ., Geneva, NY, 5Tulane Univ., New Orleans, LA

* 1:30  **3308** Introductory Remarks. **Walter S. Leal** (wsleal@ ucdavis.edu), Univ. of California, Davis, CA
* 1:31  **3309** Moderator Introduction. **Adriana Costero** (acostero@niaid.nih.gov), National Institutes of Health, Bethesda, MD

1:35 **3310** Malaria in Africa: Towards elimination. **Maureen Coetzee** (maureen.coetzee@wits.ac.za), Univ. of the Witwatersrand, Johannesburg, South Africa

2:00 **3311** Moderator Introduction. **Wendell L. Roelofs** (wlr1@cornell.edu), Cornell Univ., Geneva, NY

2:05 **3312** Finding sources of wind-borne odor in moths and mosquitoes: Known mechanisms and outstanding issues. **Ring T. Cardé** (ring.carde@ucr.edu), Univ. of California, Riverside, CA

2:30 **3313** Moderator Introduction. **Patricia Scaraffia** (pscaraff@tulane.edu), Tulane Univ., New Orleans, LA

2:35 **3314** Biopesticides targeting voltage-gated ion channels: Efficacy and biosafety. **Angharad M. R. Gatehouse** (a.m.r.gatehouse@ncl.ac.uk), Newcastle Univ., Newcastle upon Tyne, United Kingdom

**Symposium: Insect Sex Determination**

***West Hall F3 (WF3) (Convention Center)***

**Moderators and Organizers:** Leo Beukeboom1, Daniel Bopp2, Richard Meisel3, and Aaron Tarone4, 1Univ. of Groningen, Groningen, Netherlands, 2Univ. of Zürich, Zürich, Switzerland, 3Univ. of Houston, Houston, TX, 4Texas A&M Univ., College Station, TX

1:30 **3315** Diversity of insect sex determination mechanisms. **Leo Beukeboom** (l.w.beukeboom@rug. nl), Univ. of Groningen, Groningen, Netherlands

2:00 **3316** Lessons from Hymenoptera species: Insights into the evolutionary dynamics of sex-determining genes. **Martin Hasselmann** (martin.hasselmann@ uni-hohenheim.de), Univ. of Hohenheim, Stuttgart, Germany

2:15 **3317** The evolution of doublesex in two parasitic wasp genera: *Nasonia* and *Muscidifurax*.  
**Eveline Verhulst** (e.c.verhulst@gmail.com), Wageningen Univ. and Research Centre, Wageningen, Netherlands

2:30 **3318** Sex determination in the house fly: Variations on a common theme. **Daniel Bopp** (daniel.bopp@imls. uzh.ch), Univ. of Zürich, Zürich, Switzerland

2:45 **3319** Sex chromosomes and sex determination in muscid flies. **Richard Meisel** (rpmeisel@uh.edu), Univ. of Houston, Houston, TX

3:00 **3320** Development and evaluation of male-only strains of the New World screwworm. **Max Scott** (max\_scott@ncsu.edu), North Carolina State Univ., Raleigh, NC

**SD3321** Towards the identification of the *M*-factor in the housefly, *Musca domestica*. **Akash Sharma** (a.sharma@ rug.nl)1, Svenia Heinze2, Yanli Wu3, Ernst Wimmer3, Mark Robinson2, Leo Beukeboom1, and Daniel Bopp2, 1Univ. of Groningen, Groningen, Netherlands, 2Univ.

of Zürich, Zürich, Switzerland, 3Georg August Univ., Göttingen, Germany

**SD3322** RNA metabolic labeling in XX versus XX/XY embryos of *Ceratitis capitata* and RNAseq differential analysis as a tool to identify male-specific early zygotic genes. **Angela Meccariello** (angela.meccariello@unina.it) and Giuseppe Saccone, Univ. of Napoli Federico II, Napoli, Italy

**3:00 BREAK AND POSTER SESSION**

3:30 **3323** Genes to behavior: Genomic studies of *Drosophila melanogaster* sex differences.  
**Michelle Arbeitman** (michelle.arbeitman@med.fsu. edu), Florida State Univ., Tallahassee, FL

3:45 **3324** Genetics of sex determination in the Mediterranean fruit fly: From basic to applied research. **Giuseppe Saccone** (giuseppe.saccone@unina.it), Univ. of Napoli Federico II, Napoli, Italy

4:00 **3325** Phylogenetic distribution and evolutionary dynamics of the “axis” sex determination genes *doublesex* and *transformer* in insects. **Elzemiek Geuverink** (e.geuverink@rug.nl), Univ. of Groningen, Groningen, Netherlands

4:15 **3326** Sex and the control of mosquito-borne infectious diseases. **Jake Tu** (jaketu@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

4:30 **3327** The splice is right: Probing the evolutionary origins of an insect sexual differentiation pathway based on alternative RNA splicing. **Judy Wexler** (jrwexler@ ucdavis.edu), Univ. of California, Davis, CA

4:45 **3328** Role of sex chromosomes in sex determination of moths and butterflies. **Frantisek Marec** (marec@ entu.cas.cz), Czech Academy of Sciences,  
České Budějovice, Czech Republic

5:00 **3329** Sex determination pathways in lepidopteran insects. **Susumu Katsuma** (katsuma@ss.ab.a.u-tokyo. ac.jp), The Univ. of Tokyo, Tokyo, Japan

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5:15 **3330** Evolution of new sex chromosomes by lateral genome transfer of bacterial symbiont in pillbug. **Richard Cordaux** (richard.cordaux@univ-poitiers.fr), National Center for Scientific Research, Poitiers, France

**Symposium: Insect Gut Microbe Interactions**

***Room W330 B (Convention Center)***

**Moderators and Organizers:** Bruno Lemaitre1 and Angela Douglas2, 1EPFL, Lausanne, Switzerland, 2Cornell Univ., Ithaca, NY

1:30 **3331** Interactions in the honey bee gut community. **Waldan Kwong** (waldan.kwong@yale.edu)1 and Nancy Moran2, 1Yale Univ., New Haven, CT, 2The Univ. of Texas, Austin, TX

1:45 **3332** Interplay between gut and systemic immune response in *Drosophila*. Bruno Lemaitre and  
**Jan Dudzic** (jan.dudzic@epfl.ch), EPFL, Lausanne, Switzerland

2:00 **3333** Matrix reloaded: Structure and function of the peritrophic matrix in the midgut of the model beetle *Tribolium castaneum*. **Hans Merzendorfer** (hans.merzendorfer@biologie.uni-osnabrueck), Univ. of Osnabrück, Osnabrück, Germany

2:15 **3334** Host immune responses in *Riptortus-Burkholderia* gut symbiotic system. **Bok-Luel Lee** (brlee@pusan. ac.kr), Pusan National Univ., Busan, South Korea

2:30 **3335** The life stage of *Yersinia pestis* in the digestive tract of its flea vector. **Joseph Hinnebusch** (jhinnebusch@ niaid.nih.gov), National Institute of Allergy and Infectious Diseases, Hamilton, MT

2:45 **3336** Gut check in *Drosophila*: How microbes alter intestinal homeostasis. **Nicolas Buchon** (nicolas.buchon@ cornell.edu), Cornell Univ., Ithaca, NY

**3:00 BREAK**

3:15 **3337** Factors shaping complex gut microbiota in insects: What can we learn from cockroaches?  
**Aram Mikaelyan** (arammikaelyan@gmail.com)1,2, Niclas Lampert2, Claire Thompson2, and Andreas Brune1,2, 1LOEWE-Center for Synthetic Microbiology, Marburg, Germany, 2Max Planck Institute for Terrestrial Microbiology, Marburg, Germany

3:30 **3338** The gut microbiota and host function in *Drosophila*. **Angela Douglas** (aes326@cornell.edu), Cornell Univ., Ithaca, NY

**Symposium: Trade-offs and Immunity: Physiology, Life-History, and Evolution**

***Room W230 D (Convention Center)***

**Moderators and Organizers:** Nicole Gerardo1 and  
Seth M. Barribeau2, 1Emory Univ., Atlanta, GA, 2East Carolina Univ., Greenville, NC

1:30 **3339** Polyphenism determines the cost of immunity in pea aphids. **Benjamin Parker** (benjamin.j.parker@ gmail.com)1 and Seth Barribeau2, 1Emory Univ., Atlanta, GA, 2East Carolina Univ., Greenville, NC

1:45 **3340** A *Daphnia’s* experience of infection: From immune cells to epidemic. **Stuart Auld** (s.k.auld@stir. ac.uk), Univ. of Stirling, Stirling, United Kingdom

2:00 **3341** ‘Manipulation,’ but not as we know it: Altered feeding behavior of mosquitoes is not dependent on infection with malaria parasites. Lauren Cator1 and **Courtney Murdock** (cmurdock@uga.edu)2, 1Imperial College London, London, United Kingdom, 2Univ. of Georgia, Athens, GA

2:15 **3342** Transgenerational effects of biopesticide products in the Indian meal moth. **Joanne Littlefair** (j.e.littlefair@qmul.ac.uk), Alice Laughton, and  
Rob Knell, Queen Mary Univ. of London, London, United Kingdom

2:30 **3343** The influence of immune and stress genes in pathogen-induced trade-offs: What doesn’t kill you makes you fitter, but sicker. **Colin McClure** (cdm28@ bath.ac.uk), Univ. of Bath, Bath, United Kingdom

**2:45 BREAK**

3:00 **3344** Does immunity trade off with sex in Wellington tree weta? **Clint Kelly** (clintdkelly@icloud.com), Univ. of Québec, Montréal, QC, Canada

3:30 **3345** Taxes of a different state: Costs associated with insect immune priming. **Ben Sadd** (bmsadd@ilstu.edu), Illinois State Univ., Normal, IL

**Symposium: Ant-Plant Interactions in a Changing World**

***Room W224 H (Convention Center)***

**Moderators and Organizers:** Suzanne Koptur1 and Paulo S. Oliveira2, 1Florida International Univ., Miami, FL, 2State Univ. of Campinas, Campinas, Brazil

1:30 **3346** Ecology of leaf-cutting ants in human-modified landscapes. **Marcelo Tabarelli** (mtrelli@ufpe.br)1,  
Inara Leal1, and Rainer Wirth2, 1Federal Univ. of Pernambuco, Recife, Brazil, 2Univ. of Kaiserslautern, Kaiserslautern, Germany

1:45 **3347** Climate change and ant-mediated seed dispersal in temperate North America. **Robert Warren** (warrenrj@ buffalostate.edu), State Univ. of New York, Buffalo, NY

2:00 **3348** Ant-fruit/seed interactions in fragmented Atlantic rainforest and Cerrado savanna. **Paulo S. Oliveira** (pso@unicamp.br)1, Alexander Christianini2, and  
Ana Gabriela Bieber3, 1State Univ. of Campinas, Campinas, Brazil, 2Federal Univ. of São Carlos, Sorocaba, Brazil, 3State Univ. of Southwest Bahia, Itapetinga, Brazil

2:15 **3349** Myrmecochory in Brazilian Caatinga and its response to chronic anthropogenic disturbance.  
**Inara Leal** (irleal@ufpe.br)1, Laura Leal1, Gabriela Arcoverde1, and Alan N. Andersen2, 1Federal Univ. of Pernambuco, Recife, Brazil, 2CSIRO, Winnellie, Australia

2:30 **3350** Diversity and specificity of ant-plant interactions in canopy communities of a primary and secondary tropical rainforest. **Petr Klimes** (peta. klimes@gmail.com), Czech Academy of Sciences, České Budějovice, Czech Republic

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2:45 **3351** Mutualistic ant-plant symbioses and habitat change in tropical forests. **Tom Fayle** (tmfayle@gmail. com)1, Chua Wanji1, Ed Turner2, and Kalsum Yusah1, 1Univ. of Malaysia, Sabah, Malaysia, 2Univ. of Cambridge, Cambridge, United Kingdom

**3:00 BREAK**

3:15 **3352** Plasticity and effectiveness of defense strategies against herbivory in ant-visited plants growing in variable abiotic habitat conditions. **Akira Yamawo** (yamawo.aki@gmail.com), Hirosaki Univ., Hirosaki, Japan

3:30 **3353** Interhabitat variation in the ecology of extrafloral nectar production and associated ant assemblages in Mexican landscapes. **Cecilia Díaz-Castelazo** (diazcastelazogm@gmail.com)1 and Victor Rico-Gray2, 1Institute of Ecology, Xalapa, Mexico, 2Veracruzana Univ., Xalapa, Mexico

3:45 **3354** Urban ants and plants: Ant visitation to extrafloral nectaries and antiherbivore defense? **Suzanne Koptur** (kopturs@fiu.edu)1, Ian Jones1, Andrea Salas1, Hong Liu1, Hipólito Paulino-Neto2, Maria Rodriguez1, and Carl Weekley3, 1Florida International Univ., Miami, FL, 2Univ. of São Paulo, Ribeirão Preto, Brazil, 3Archbold Biological Station, Venus, FL

4:00 **3355** Invasion biology and ant-plant systems in Australia. **Lori Lach** (lori.lach@jcu.edu.au), James Cook Univ., Cairns, Australia

4:15 **3356** The complexity and variable nature of ant- *Acacia* mutualisms in the African savanna. **Todd Palmer** (tmp@ufl.edu), Univ. of Florida, Gainesville, FL

4:30 **3357** Services and disservices of ant communities in tropical agroforestry. **Yann Clough** (yclough@gwdg. de)1, Stacy M. Philpott2, and Teja Tscharntke3, 1Lund Univ., Lund, Sweden, 2Univ. of Toledo, Toledo, OH, 3Georg August Univ., Göttingen, Germany

4:45 **3358** Ant-plant-herbivore interactions in northern neotropical agroecosystems. **Inge Armbrecht** (inge. armbrecht@correounivalle.edu.co)1 and Ivette Perfecto2, 1Univ. of Valle, Cali, Colombia, 2Univ. of Michigan,

Ann Arbor, MI

5:00 **3359** Changing light conditions in pine rockland habitats affect the outcome of ant-plant interactions. **Ian Jones** (ijone002@fiu.edu)1, Suzanne Koptur1,  
Hilma R. Gallegos1, Joseph P. Tardanico1, Patricia A. Trainer1, and Jorge E. Peña2, 1Florida International Univ., Miami, FL, 2Univ. of Florida, Homestead, FL

**Symposium: Combining Insect Life Table, Con- sumption Rate, and Predation Rate for IPM and Biological Control**

***Room W224 C (Convention Center)***

**Moderators and Organizers:** Remzi Atlıhan1, Chow-Yang Lee2, Ayhan Gökçe3, Aurang Kavousi4, and Hsin Chi5, 1Univ. of Yuzuncu Yil, Van, Turkey, 2Univ. of Science , Penang, Malaysia, 3Nigde Univ., Nigde, Turkey, 4Univ. of Zanjan, Zanjan, Iran, 5National Chung Hsing Univ. (Retired), Taichung, Taiwan

1:30 **3360** Biological control based on the age-stage, two-sex life table, predation rate, and population projection. **Hsin Chi** (hsinchi@dragon.nchu.edu.tw)1, Jih-Zu Yu2, De-Fen Mou3, Chih-Chung Lee3, and  
Cecil L. Smith4, 1National Chung Hsing Univ. (Retired), Taichung, Taiwan, 2Taiwan Agricultural Research Institute, Taichung, Taiwan, 3National Chung Hsing Univ., Taichung, Taiwan, 4Georgia Museum of Natural History, Athens, GA

1:45 **3361** Demography and predation rate of *Chrysoperla carnea* (Neuroptera: Chrysopidae) fed on *Hyalopterus pruni* (Hemiptera: Aphididae). **Remzi Atlihan** (ratlihan@yyu.edu.tr) and Hazhar Abdulrahman,

Univ. of Yuzuncu Yil, Van, Turkey

2:00 **3362** Life table of *Lasioderma serricorne* (F.) (Coleoptera: Anobiidae). Chiew-Liang Liew and **Chow-Yang Lee** (chowyang@usm.my), Univ. of Science, Penang, Malaysia

2:15 **3363** Presentation withdrawn

2:30 **3364** Combining insect life table and predation rate for IPM and biological control: A study of *Chrysoperla carnea* (Stephen) (Neuroptera: Chrysopidae) fed on *Myzus persicae* (Sulzer) (Homoptera: Aphididae). **Evin Polat Akköprü** (polatevin@gmail.com) and Remzi Atlihan, Univ. of Yuzuncu Yil, Van, Turkey

2:45 **3365** Ecological impacts of secondary bacteria symbionts on *Sitobion avenae* (Fabricius) (Hemiptera: Aphididae). **Zu-Qing Hu** (huzuqing@nwsuaf.edu.cn), Chen Luo, and Huiyan Zhao, Northwest A&F Univ., Yangling, China

**3:00 BREAK**

3:15 **3366** Effects of a bacterial symbiont on the competitive ability and fitness of host whitefly.  
**Dong Chu** (chinachudong@qau.edu.cn), Wen-Ping Zhang, Hong-Ran Li, and Yi-Wei Fang, Qingdao Agricultural Univ., Qingdao, China

3:30 **3367** Effects of quinoa (Chenopodioideae) on some biological traits of *Drosophila melanogaster*. **Eda Özel Güneş** (dnapolimeraz@gmail.com), Univ. of Necmettin Erbakan, Konya, Turkey

3:45 **3368** Comparison of life history traits of two closely related predatory mites, *Neoseiulus womersleyi* and  
*N. longispinosus* (Acari: Phytoseiidae), found in Taiwan. **Tetsuo Gotoh** (tetsuo.gotoh.acari@vc.ibaraki.ac.jp)1,

R. Sugawara1, and Chyi-Chen Ho2, 1Ibaraki Univ., Ibaraki, Japan, 2Taiwan Agricultural Research Institute, Taichung, Taiwan

4:00 **3369** Use of life tables in aphid ecological studies  
on environmental stress factors. **Huiyan Zhao** (zhaohy@nwsuaf.edu.cn), Zu-Qing Hu, and Xiangshun Hu, Northwest A&F Univ., Yangling, China

4:15 **3370** Timing of control of *Frankliniella occidentalis* (Pergande) using *Beauveria bassiana* based on life table and stage-specific mortality. **Haihong Wang** (wanghaihong2020@sina.com) and Zhongren Lei, Chinese Academy of Agricultural Sciences, Beijing, China

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4:30 **3371** Influence of different hazelnut cultivars on some demographic characteristics of filbert aphid, *Myzocallis coryli* (Goeze). **Ali Güncan** (guncan.ali@ gmail.com)1 and Ebru Gümüş2, 1Ordu Univ., Ordu, Turkey, 2Hazelnut Research Institute, Giresun, Turkey

4:45 **3372** Life table and functional and numerical responses of *Aphelinus paramali* (Zehavi and Rosen) (Hymenoptera: Aphelinidae) reared on *Aphis gossypii* Glover (Hemiptera: Aphididae). **Yunus Bayram** (ybayram@hotmail.com)1 and Erol Bayhan2, 1General Directorate of Food and Control, Ankara, Turkey, 2Dicle Univ., Diyarbakir, Turkey

5:00 **3373** Demographic effect of arrhenotokous parthenogenesis and bisexual reproduction of *Frankliniella occidentalis.* **Bin Zhang** (binzhang@qau. edu.cn), Bing-Qi Liu, and Chang-Ying Zheng, Qingdao Agricultural Univ., Qingdao, China

5:15 **3374** Age-dependent life table of *Myzus persicae* (Sulz.) (Hemiptera: Aphididae) from five different pepper varieties, *Capsicum annuum*, reared under laboratory conditions. **Mehmet Özgökçe** (msozgokce@ gmail.com), Hilmi Kara, and Muhbet Oran, Univ. of Yuzuncu Yil, Van, Turkey

**Symposium: From Genes to Grains: The Current Sugarcane Aphid Outbreak on Sorghum in the Southern U.S.**

***Room W224 B (Convention Center)***

**Moderators and Organizers:** Xinzhi Ni1, Karen Harris-Shultz1, and Phillip Wadl2, 1USDA - ARS, Tifton, GA, 2USDA - ARS, Charleston, SC

1:30 **3375** Genome sequencing of the sugarcane aphid  
for microsatellite development and endosymbiont detection. **Phillip Wadl** (phillip.wadl@ars.usda.gov)1, Karen Harris-Shultz2, Xinwang Wang3, and Xinzhi Ni2, 1USDA - ARS, Charleston, SC, 2USDA - ARS, Tifton, GA, 3USDA - ARS, College Station, TX

1:45 **3376** Genetic diversity in *Melanaphis sacchari* and host-plant resistance in sugarcane. **Samuel Nibouche** (samuel.nibouche@cirad.fr), Hélène Delatte,  
Laurent Costet, and Bernard Reynaud, CIRAD, Saint-Pierre, France

2:00 **3377** Population genetics of the sugarcane aphid, *Melanaphis sacchari* (Zehntner), in the continental US. **Jocelyn Holt** (holtjocelyn@tamu.edu)1, J. Scott Armstrong2, Kyle Harrison1, and Raul Medina1, 1Texas A&M Univ., College Station, TX, 2USDA - ARS, Stillwater, OK

2:15 **3378** Endosymbionts of *Melanaphis sacchari*. **Adrian Pekarcik** (ajp0042@tigermail.auburn.edu)1, Scott Santos1, David Kerns2, Gregg Nuessly3, and  
Alana Jacobson1, 1Auburn Univ., Auburn, AL, 2Louisiana State Univ. AgCenter, Winnsboro, LA, 3Univ. of Florida, Belle Glade, FL

2:30 **3379** Sugarcane aphid resistance in sorghum and its potential bioenergy grass hosts. **Karen Harris-Shultz** (karen.harris@ars.usda.gov), Xinzhi Ni, Joseph Knoll, Caitlin Cato, and William F. Anderson, USDA - ARS, Tifton, GA

2:45 **3380** Host plant defense against sugarcane aphid in sorghum and genetic mechanism of resistance to the new pest. **Yinghua Huang** (yinghua.huang@ars.usda. gov), USDA - ARS, Stillwater, OK

**3:00 BREAK**

3:15 **3381** Breeding for tolerance to the sugarcane aphid in sorghum. **Lloyd Mbulwe** (shinakalupupa@tamu.edu)1, Gary C. Peterson2, William Rooney1, and John Armstrong3, 1Texas A&M Univ., College Station, TX, 2Texas A&M AgriLife Research, Lubbock, TX, 3USDA - ARS, Stillwater, OK

3:30 **3382** Towards efficient multi-scale methods for monitoring sugarcane aphid infestations in sorghum. **Norman Elliott** (norman.elliott@ars.usda.gov)1,  
Tom Royer2, Michael Brewer3, Nicholas Seiter4,

Kris Giles2, Allen Knutson5, Brian McCornack6, and Georges Backoulou2, 1USDA - ARS, Stillwater, OK, 2Oklahoma State Univ., Stillwater, OK, 3Texas A&M AgriLife Research, Corpus Christi, TX, 4Univ. of Arkansas, Monticello, AR, 5Texas A&M Univ., Dallas, TX, 6Kansas State Univ., Manhattan, KS

3:45 **3383** Season-long management of sugarcane aphid, *Melanaphis sacchari*, on sorghum in the state of Georgia. Phillip M. Roberts1 and **G. David Buntin** (gbuntin@uga.edu)2, 1Univ. of Georgia, Tifton, GA, 2Univ. of Georgia, Griffin, GA

4:00 **3384** Strategies of sugarcane aphid management in sweet and grain sorghum. **Joseph Knoll** (joe.knoll@ ars.usda.gov)1, Xinzhi Ni1, G. David Buntin2,  
William F. Anderson1, and Karen Harris-Shultz1, 1USDA - ARS, Tifton, GA, 2Univ. of Georgia, Griffin, GA

4:15 **3385** Developing integrated pest management practices for the sugarcane aphid in Arkansas. **Nicholas Seiter** (nseiter@uaex.edu), Univ. of Arkansas, Monticello, AR

4:30 **3386** Management of sugarcane aphid in Mississippi grain sorghum: What we’ve learned. **Angus Catchot** (acatchot@entomology.msstate.edu)1, Jeff Gore2,  
Don Cook2, and Brittany Lipsey1, 1Mississippi State Univ., Mississippi State, MS, 2Mississippi State Univ., Stoneville, MS

4:45 **3387** Impacts of host, temperature, and fertilization on sugarcane aphid population dynamics. **Blake E. Wilson** (bwils26@lsu.edu)1, Monique de Souza2, Jeffrey Davis2, Julien M. Beuzelin2, Francis Reay-Jones3, Thomas E. Reagan2, Lloyd T. Wilson4, and Yubin Yang4, 1Louisiana State Univ. AgCenter, Baton Rouge, LA, 2Louisiana State Univ., Baton Rouge, LA, 3Clemson Univ., Florence, SC, 4Texas A&M AgriLife Research, Beaumont, TX

5:00 **3388** Variation in sorghum hybrid sensitivity and natural enemy activity provides opportunities for integrated management of sugarcane aphid.  
**Michael Brewer** (mjbrewer@ag.tamu.edu)1, Erin Maxson2, John Gordy3, Robert Bowling4, and James Woolley2, 1Texas A&M AgriLife Research, Corpus Christi, TX, 2Texas A&M Univ., College Station, TX, 3Texas A&M AgriLife Extension Service, Rosenberg, TX, 4Texas A&M AgriLife Extension Service, Corpus Christi, TX

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**Symposium: Impact of Native and Invasive Alien True Bug Species in Agro-Ecosystems: Range Expansion, Pest Status, and Control Tactics**

***Chapin Theater (Convention Center)***

**Moderators and Organizers:** Antonino Cusumano1 and  
Raul Medina2, 1Wageningen Univ. and Research Centre, Wageningen, Netherlands, 2Texas A&M Univ., College Station, TX

1:30 **3389** Chemical ecology of egg parasitoids associated with heteropterans: Implication for crop protection. **Stefano Colazza** (stefano.colazza@unipa.it), Univ. of Palermo, Palermo, Italy

1:45 **3390** Exploitation of insect and plant semiochemicals as tools for real-time control and detection of pests  
in crops. **Maria Blassioli-Moraes** (carolina.blassioli@ embrapa.br), Mirian Michereff, Miguel Borges, and

R. A. Laumann, Embrapa Genetic Resources and Biotechnology, Brasília, Brazil

2:00 **3391** Pheromones of Pentatomoidea: New discoveries for application to pest management. **Donald C. Weber** (don.weber@ars.usda.gov)1, Ashot Khrimian1, Maria Blassioli-Moraes2, and Jocelyn G. Millar3, 1USDA - ARS, Beltsville, MD, 2Embrapa Genetic Resources and Biotechnology, Brasília, Brazil, 3Univ. of California, Riverside, CA

2:15 **3392** Asymmetry in seasonal response of female *Riptortus pedestris* to synthetic pheromone.  
**Un Taek Lim** (utlim@andong.ac.kr) and M. Rahman, Andong National Univ., Andong, South Korea

2:30 **3393** An improved method for cuticular hydrocarbon profiling in *Murgantia histrionica* and other stink bugs. Michael Riedel1, **Michael Rostas** (michael.rostas@lincoln.ac.nz)2, Antonino Cusumano3, Ezio Peri4, and Stefano Colazza4, 1Julius von Sachs Institute for Biological Sciences, Würzburg, Germany, 2Lincoln Univ., Canterbury, New Zealand, 3Wageningen Univ. and Research Centre, Wageningen, Netherlands, 4Univ. of Palermo, Palermo, Italy

2:45 **3394** Understanding the feeding behavior of some heteropteran crop pests. **Paula Mitchell** (mitchellp@ winthrop.edu)1 and Francesca Stubbins2, 1Winthrop Univ., Rock Hill, SC, 2Clemson Univ., Blackville, SC

**3:00 BREAK**

3:15 **3395** Understanding local dispersal to improve pest management. **Michael Toews** (mtoews@uga.edu)1, Ta-i Huang2, Ishakh Pulakkatu-Thodi3, and Rajagopalbabu Srinivasan1, 1Univ. of Georgia, Tifton, GA, 2Dow AgroSciences, Taipei, Taiwan, 3Univ. of Hawai’i, Honolulu, HI

3:30 **3396** Multifunctional strategies for management of stink bugs based on the ecology and biology of these pests and their natural enemies. **Glynn Tillman** (glynn. tillman@ars.usda.gov), USDA - ARS, Tifton, GA

3:45 **3397** Pest management impact of the brown marmorated stink bug, *Halyomorpha halys*, on field and vegetable crops in the Mid-Atlantic US.  
**Thomas P. Kuhar** (tkuhar@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

4:00 **3398** When generalists specialize: Patterns of host utilization by *Halyomorpha halys* in the invaded range. **Michael J. Raupp** (mraupp@umd.edu)1, Holly Martinson1, P. Dilip Venugopal2, Erik J. Bergmann1, and

Paula M. Shrewsbury1, 1Univ. of Maryland, College Park, MD, 2U.S. Environmental Protection Agency, Washington, DC

4:15 **3399** Impact of *Megacopta cribraria* (Hemiptera: Plataspidae) in the soybean agro-ecosystem.  
**Joni L. Blount** (jonilb@uga.edu)1, G. David Buntin1, Phillip M. Roberts2, Michael Toews2, and

Wayne Gardner1, 1Univ. of Georgia, Griffin, GA, 2Univ. of Georgia, Tifton, GA

4:30 **3400** Integrating multiple strategies for *Lygus lineolaris* management in cotton. **Fred Musser** (fm61@msstate.edu)1, Scott Graham2, Angus Catchot1, Jeff Gore3, and Don Cook3, 1Mississippi State Univ., Mississippi State, MS, 2Univ. of Tennessee, Jackson, TN, 3Mississippi State Univ., Stoneville, MS

4:45 **3401** Invasion, predictive distribution, and management of *Bagrada hilaris* in North America. **Thomas M. Perring** (thomas.perring@ucr.edu)1, John Palumbo2, Monica Papes3, and Darcy Reed1, 1Univ. of California, Riverside, CA, 2Univ. of Arizona, Yuma, AZ, 3Oklahoma State Univ., Stillwater, OK

5:00 **3402** Redbanded stink bug: Range expansion, pest status, and control tactics in US. **Suhas Vyavhare** (suhas.7@tamu.edu), Texas A&M AgriLife Research, Beaumont, TX

5:15 **3403** Towards identification of cotton boll rot genes utilized by stink bug-transmitted bacterial phytopathogens using a genomics approach.

**Enrique Medrano** (gino.medrano@ars.usda.gov) and Alois Bell, USDA - ARS, College Station, TX

**Symposium: Innovative Application Technologies for Pest Management**

***Room W331 B (Convention Center)***

**Moderators and Organizers:** Anil Menon, Kenneth Brown, and Rebecca Willis, BASF, Research Triangle Park, NC

1:30 **3404** Assessment of field efficacy of an intelligent variable rate sprayer in Oregon nursery production. **Robin Rosetta** (robin.rosetta@oregonstate.edu)1, Heping Zhu2, Derek Wells1, and Adam Clark2, 1Oregon State Univ., Aurora, OR, 2USDA - ARS, Wooster, OH

1:45 **3405** A new paradigm in termiticide application technology. **Kyle Jordan** (kyle.jordan@basf.com), BASF, Research Triangle Park, NC

2:00 **3406** Advances in closed-handling systems for the safe application of agro-chemicals. **Ram Ramalingam** (ram.ramalingam@syngenta.com), Syngenta, Greensboro, NC

2:15 **3407** Precision pest management — next-generation pest management using field sensors and Cloud-based computing platforms. **Johnny Park** (johnny.park@ spensatech.com) and Chad Aeschliman, Spensa Technologies, Inc., West Lafayette, IN

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2:30 **3408** AgMusa: A new collaborative technology to optimize seedling health, transplanting and protection of sugarcane. **Walter Dias** (walter-henrique.dias@basf. com), BASF, Research Triangle Park, NC

2:45 **3409** Drift reduction technologies in 3-D crops using nozzles and formulation technology. **Jerome Schleier** (jjschleieriii@dow.com), Dow AgroSciences, Indianapolis, IN

**3:00 BREAK**

3:15 **3410** High-efficiency, targeted application technology for tephritid management.

**H. Alejandro Arevalo** (alejandro.arevalo@basf.com), Siddharth Tiwari, and Richard Tyler, BASF, Research Triangle Park, NC

3:30 **3411** Assessing efficacy, exposure, and risk for pesticide drift reduction technologies. **Collin Preftakes** (cjpreftakes@gmail.com), Montana State Univ., Bozeman, MT

3:45 **3412** Interceptor G2: A new paradigm in public health. **James W. Austin** (james.austin@basf.com), BASF, Research Triangle Park, NC

**Symposium: Approaches for Modeling Insect Pest Potential Distribution and Spread**

***Room W331 C (Convention Center)***

**Moderators and Organizers:** Sunil Kumar1 and Lisa Neven2, 1Colorado State Univ., Fort Collins, CO, 2USDA - ARS, Wapato, WA

1:30 **3413** Uncovering human-mediated pathways of invasive species introductions: New approaches for modeling spread and cost-effective surveillance. **Denys Yemshanov** (denys.yemshanov@nrcan-rncan. gc.ca)1, Frank Koch2, Robert G. Haight3, Robert Venette3, Bo Lu1, Ronald Fournier1, and Jean Turgeon1, 1Natural Resources Canada, Sault Ste. Marie, ON, Canada, 2USDA - Forest Service, Research Triangle Park, NC, 3USDA - Forest Service, St. Paul, MN

1:45 **3414** Modeling the spread of the pine processionary moth in relation with climate change and human activities. **Christelle Robinet** (christelle.robinet@ orleans.inra.fr), Jérôme Rousselet, Mathieu Laparie, and Alain Roques, INRA, Orléans, France

2:00 **3415** Mapping global potential risk of establishment of apple maggot (*Rhagoletis pomonella*) using CLIMEX and MaxEnt niche models. **Sunil Kumar** (sunil.kumar@ colostate.edu)1, Wee Yee2, and Lisa Neven2, 1Colorado State Univ., Fort Collins, CO, 2USDA - ARS, Wapato, WA

2:15 **3416** Presentation withdrawn

2:30 **3417** Assessing damage severity of plant hopper  
and leaf folder in rice using hyperspectral remote sensing and multinomial logistic regression models. **Mathyam Prabhakar** (mprabhakar@crida.in)1, Yenumula Prasad1, Chintalapati Padmavathi2, V. Laxmi2, G. Katti2, M. Thirupathi1, G. Rao1, and V. Sailaja1, 1Central Research Institute for Dryland Agriculture, Hyderabad, India, 2Directorate of Rice Research, Hyderabad, India

2:45 **3418** Presentation withdrawn **3:00 BREAK**

3:15 **3419** Potential dispersion and establishment of  
red palm mite in Brazil using MaxEnt model. **Elisangela Fidelis de Morais** (elisangela.morais@ embrapa.br)1 and George Amaro2, 1Brazilian Agricultural Research Corporation, Boa Vista, Brazil, 2Embrapa Roraima, Boa Vista, Brazil

3:30 **3420** Global prediction of invasion risk zones for the western corn rootworm *Diabrotica virgifera virgifera*: Integrating distribution models and fitness components. **Pedro Aragon** (paragon@mncn.csic.es)1, Andrés Baselga2, and Jorge Lobo1, 1National Museum of Natural Sciences, Madrid, Spain, 2Univ. of Santiago de Compostela, Santiago de Compostela, Spain

3:45 **3421** Accounting for climate-change-related uncertainty in projected suitable ranges of invasive species. **Frank Koch** (fhkoch@fs.fed.us)1,  
Denys Yemshanov2, Robert Venette3, and

Kevin M. Potter4, 1USDA - Forest Service, Research Triangle Park, NC, 2Natural Resources Canada,  
Sault Ste. Marie, ON, Canada, 3USDA - Forest Service, St. Paul, MN, 4North Carolina State Univ., Research Triangle Park, NC

4:00 **3422** Potential distribution and cost estimation of the damage caused by *Cryptotermes brevis* (Isoptera: Kalotermitidae) in the Azores. **Orlando Guerreiro** (orlandogue@gmail.com)1, Pedro Cardoso2,3,

João Ferreira4, Maria Ferreira2, and Paulo Borges2, 1Univ. of the Azores, Azores, Portugal, 2Centre for Ecology, Evolution and Environmental Changes, Açores, Portugal, 3Univ. of Helsinki, Helsinki, Finland, 4Univ. of Porto, Porto, Portugal

4:15 **3423** Modeling the spread of invasive species via human transport networks. **Dean Paini** (dean.paini@ csiro.au)1 and Paul Mwebaze2, 1CSIRO, Canberra, Australia, 2CSIRO, Brisbane, Australia

4:30 **Panel Discussion**

**Symposium: International Perspectives Contribute Towards a Clearer Understanding of *Drosophila suzukii***

***Room W231 A (Convention Center)***

**Moderators and Organizers:** Vaughn Walton1, Gianfranco Anfora2, Nik G. Wiman3, and Ashfaq Sial4, 1Oregon State Univ., Corvallis, OR, 2Edmund Mach Foundation Foundation, San Michele all’Adige, Italy, 3Oregon State Univ., Aurora, OR, 4Univ. of Georgia, Athens, GA

1:30

**3424** Overwintering and seasonal dynamics of spotted wing drosophila, *D. suzukii*, in the Okanagan- Columbia River basins, 2010-2014. **Howard Thistlewood** (howard.thistlewood@agr.gc.ca)1, Paramjit Gill2, Elizabeth Beers3, Peter Shearer4, Douglas Walsh5, Brigitte Rozema1, Susanna Acheampong1,  
Steve Castagnoli4, Peter Smytheman3, Alix Whitener3, and Wee Yee6, 1Agriculture and Agri-Food Canada, Summerland, BC, Canada, 2The Univ. of British Columbia, Kelowna, BC, Canada, 3Washington State Univ., Wenatchee, WA, 4Oregon State Univ., Hood River, OR, 5Washington State Univ., Pullman, WA, 6USDA - ARS, Wapato, WA



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1:45 **3425** Detangling behavioral responses to semiochemicals in the spotted wing drosophila, *Drosophila suzukii*. **Paul Becher** (paul.becher@slu.se)1, Boyd Mori1, Santosh Revadi1, Teun Dekker1,

Elizabeth H. Beers2, and Peter Witzgall1, 1Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, 2Washington State Univ., Wenatchee, WA

2:00 **3426** Can multiple tactics stop *Drosophila suzukii*? **L. D. Stringer** (lloyd.stringer@plantandfood.co.nz)1, Jacqueline Beggs2, Rory Maclellan3, John Kean4, and D. Max Suckling1, 1The New Zealand Institute for Plant and Food Research, Ltd., Christchurch, New Zealand, 2Univ. of Auckland, Auckland, New Zealand, 3Ministry for Primary Industries, Wellington, New Zealand,

4Ag Research, Christchurch, New Zealand

2:15 **3427** *Drosophila suzukii* physiology and yeast associations. **Kelly Hamby** (kahamby@umd.edu), Univ. of Maryland, College Park, MD

2:30 **3428** Seasonal phenology and research approaches for managing spotted wing drosophila in Central Europe. Felix Briem1, **Astrid Eben** (astrid.eben@julius-kuehn.de)1, Corinna Wallinger2, Michael Traugott2, Jürgen Gross1, and Heidrun Vogt1, 1Julius Kühn Institute, Dossenheim, Germany, 2Univ. of Innsbruck, Innsbruck, Austria

2:45 **3429** *Drosophila suzukii* impact on blueberry in Japan and pathogens for management. **Madoka Nakai** (madoka@cc.tuat.ac.jp), Tokyo Univ. of Agriculture and Technology, Tokyo, Japan

**3:00 BREAK**

3:15 **3430** *Drosophila suzukii* and its potential impact to wine grapes in Italy and Oregon. **Claudio Ioriatti** (claudio.ioriatti@fmach.it)1, Rupinder Guzzon2, Gianfranco Anfora2, and Vaughn Walton3, 1Centre

for Technology Transfer, San Michele all’Adige, Italy, 2Edmund Mach Foundation, San Michele all’Adige, Italy, 3Oregon State Univ., Corvallis, OR

3:30 **3431** A synthesis of SWD host susceptibility: To oviposit or not. **Jana C. Lee** (jana.lee@ars.usda.gov), USDA - ARS, Corvallis, OR

3:45 **3432** *Drosophila suzukii* resistance against often used pesticides. **Ashfaq Sial** (ashsial@uga.edu)1, Ruchir Mishra1, Joanna Chiu2, and Michael Adang1, 1Univ. of Georgia, Athens, GA, 2Univ. of California, Davis, CA

4:00 **3433** *Drosophila suzukii* alternate host and spatial distribution and improvement of pesticide efficacy. **Gregory M. Loeb** (gme1@cornell.edu)1 and Richard Cowles2, 1Cornell Univ., Geneva, NY, 2Connecticut Agricultural Experiment Station, Windsor, CT

4:15 **3434** Can we use integrated pest management to control *Drosophila suzukii*?: Current UK practice.  
Jerry Cross1, **Michelle Fountain** (michelle.fountain@ emr.ac.uk)1, David Buss1, Andreja Dobrovin-Pennington1, Alison Dolan2, Dudley I. Farman3, David R. Hall3, Adrian Harris1, Ralph Noble1, and Bethan Shaw1,

1East Malling Research, Kent, United Kingdom, 2The James Hutton Institute, Invergowrie, United Kingdom, 3Univ. of Greenwich, Kent, United Kingdom

4:30 **3435** *Drosophila suzukii* in South Korea. **Hoonbok Yi** (yih@swu.ac.kr), Seoul Women’s Univ., Seoul, South Korea

**Symposium: Arthropod Saliva: From Basic Science to Practical Applications**

***Room W331 D (Convention Center)***

**Moderators and Organizers:** Eric Calvo and Jesus G. Valenzuela, National Institute of Allergy and Infectious Diseases, Rockville, MD

1:30 **3436** Structural and functional diversity in genes encoding putative effectors in the gall midge *Mayetiola destructor*. **Ming-Shun Chen** (ming-shun.chen@ars. usda.gov)1, Jeffrey J. Stuart2, Xuming Liu3, and R.

Jeff Whitworth3, 1USDA - ARS, Manhattan, KS, 2Purdue Univ., West Lafayette, IN, 3Kansas State Univ., Manhattan, KS

1:45 **3437** A novel high molecular weight salivary protein from *Aedes aegypti* selectively kills lymphocytes by apoptosis. **Anderson Sa-Nunes** (sanunes@usp.br)1, Bruna Bizzarro1, Eliane Esteves1, Jose Ramirez2, Margareth Capurro1, Jose Ribeiro2, Andrea Fogaca1, and Eric Calvo2, 1Univ. of São Paulo, São Paulo, Brazil, 2National Institute of Allergy and Infectious Diseases, Rockville, MD

2:00 **3438** Role of skin immune cells and mosquito saliva on the host susceptibility to Dengue virus. **Dorothee Misse** (dorothee.misse@ird.fr), Research Institute for Development, Montpellier, France

2:15 **3439** Functional analyses of aphid saliva proteins that modulate plant processes. **Saskia A. Hogenhout** (saskia.hogenhout@jic.ac.uk), Claire Drurey,  
Thomas Vincent, Friederike Bernsdorff, Yazhou Chen, David Prince, Christine Wilson, and Sam Mugford, The John Innes Centre, Norwich, United Kingdom

2:30 **3440** Protein structure and the mechanism of salivary components from blood feeding arthropods. **John Andersen** (john.andersen@nih.gov), National Institute of Allergy and Infectious Diseases, Bethesda, MD

2:45 **3441** Sand fly salivary proteins as markers of host exposure to leishmaniasis vectors. **Petr Volf** (volf@cesnet.cz), Tatiana Kostalova, Tereza Lestinova, Michal Sima, and Petra Sumova, Charles Univ., Prague, Czech Republic

**3:00 BREAK**

3:15 **3442** The salivary repertoires of anopheline mosquitoes: Functions, evolution, and potential applications. **Bruno Arca** (bruno.arca@uniroma1.it)1, Claudio Struchiner2, Fabrizio Lombardo1, and Jose Ribeiro3, 1Sapienza Univ., Rome, Italy, 2Oswaldo Cruz Foundation, Rio de Janeiro, Brazil, 3National Institute of Allergy and Infectious Diseases, Rockville, MD

3:30 **3443** Host-vector-pathogen interaction studies provide new data to block transmission of arboviral diseases. **Valerie Choumet** (valerie.choumet@pasteur. fr)1, Alain Le Coupanec1, Vincent Legros1, and Dorothee Misse2, 1Pasteur Institute, Paris, France, 2Research Institute for Development, Montpellier, France

3:45 **3444** Modulators of blood feeding success in mosquitoes. **Eric Calvo** (ecalvo@niaid.nih.gov), National Institute of Allergy and Infectious Diseases, Rockville, MD

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**Symposium: Mosquito Host Detection**

***Room W330 C (Convention Center)***

**Moderator and Organizer:** Matthew DeGennaro, Florida International Univ., Miami, FL

1:30 **3445** Genetic analysis of ionotropic receptor function in *Aedes aegypti*. **Matthew DeGennaro** (mdegenna@ fiu.edu), Florida International Univ., Miami, FL

1:45 **3446** Chemicals that produce anosmia in mosquitoes. **Ulrich R. Bernier** (uli.bernier@ars.usda.gov), USDA - ARS, Gainesville, FL

2:00 **3447** Chemosensory basis of malaria transmission. **Conor McMeniman** (cmcmeni1@jhu.edu), Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

2:15 **3448** Myriad of phytochemicals: Which ones are informative to plant-host-seeking mosquitoes and  
to us? **Woodbridge Foster** (foster.13@osu.edu)1 and Babak Ebrahimi2, 1The Ohio State Univ., Columbus, OH, 2Florida International Univ., Miami, FL

2:45 **3449** In-flight integration of dynamic visual stimuli in *Aedes aegypti*. **Jamie Theobald** (theobald@fiu.edu), Michael Perez, and Matthew DeGennaro, Florida International Univ., Miami, FL

**3:00 BREAK**

3:15 **3450** Genetic and neural analysis of preference for human scent in evolutionarily divergent forms of the dengue fever mosquito *Aedes aegypti*. **Carolyn McBride** (csm7@princeton.edu), Princeton Univ., Princeton, NJ

3:30 **3451** When the bite is right: *Aedes aegypti* feeding patterns in nature. **Laura Harrington** (lch27@cornell. edu), Cornell Univ., Ithaca, NY

3:45 **3452** Terabytes and mosquito bites: The genomics and molecular biology of olfaction in disease vector mosquitoes. **Laurence J. Zwiebel** (l.zwiebel@vanderbilt. edu), Vanderbilt Univ., Nashville, TN

**Symposium: Ecology and Systematics of Elateridae (Coleoptera)**

***Room W224 E (Convention Center)***

**Moderators and Organizers:** Frank Etzler1 and Hume Douglas2, 1Montana State Univ., Bozeman, MT, 2Agriculture and Agri-Food Canada, Ottawa, ON, Canada

1:30 **3453** Elateridae of the southeastern United States. **Blaine Mathison** (bmathison1972@gmail.com), Georgia Museum of Natural History, Atlanta, GA

1:45 **3454** Presentation withdrawn

2:00 **3455** Matrix key to the elaterid genera of Canada and USA. **Hume Douglas** (humedgl@gmail.com), Canadian Food Inspection Agency, Ottawa, ON, Canada

2:15 **3456** On the importance of Gondwanan coleopteran taxa, particularly the Elateridae, and their importance in Chilean biodiversity conservation. **Elizabeth T. Arias** (etarias.bohart@berkeley.edu)1 and Mario Elgueta2, 1Univ. of California, Berkeley, CA, 2Museum of Natural History, Santiago, Chile

2:30 **3457** Presentation withdrawn

2:45 **3458** Revisiting the neoteny in Lycidae: A preliminary study of case in Leptolycini (Lycidae: Lycinae).  
**Vinicius Ferreira** (vinicius.sfb@gmail.com), Montana State Univ., Bozeman, MT

**3:00 BREAK**

3:15 **3459** Systematics of the genus *Hemicrepidius* (Coleoptera: Elateridae) of the World. **Frank Etzler** (etzler.frank@gmail.com), Montana State Univ., Bozeman, MT

3:30 **3460** Systematics of the genus *Scaptolenus* (Elateridae: Cebrioninae). **Erick Omar Martínez Luque** (erickmtzluque@gmail.com), Autonomous Univ. of Querétaro, Santiago de Querétaro, Mexico

3:45 **3461** Development of microsatellite markers using next-generation sequence data for assessing the spatio-temporal distribution of wireworms.  
**Carly Benefer** (carly.benefer@plymouth.ac.uk), Plymouth Univ., Plymouth, United Kingdom

4:00 **3462** Wireworms of economic importance in Canada: Identification, distribution, and behaviour. **Wim Van Herk** (wim.vanherk@agr.gc.ca), Pacific Agri-Food Research Station, Agassiz, BC, Canada

4:15 **3463** Presentation withdrawn

**Symposium: Evolution of a Megadiverse Group: The Ichneumonoid Wasps (Hymenoptera: Braconidae, Ichneumonidae)**

***Room W222 A (Convention Center)***

**Moderators and Organizers:** Andrew D. Austin1 and  
Jose Fernandez-Triana2, 1Univ. of Adelaide, Adelaide, Australia, 2Agriculture and Agri-Food Canada, Ottawa, ON, Canada

1:30 **3464** Preliminar phylogeny of Metopiinae (Hymenoptera: Ichneumonidae). **Mabel Alvarado** (mag2199@hotmail.com), Univ. of Kansas, Lawrence, KS

1:45 **3465** Systematics and biology of the endemic Australian gall-forming mesostoine wasps (Hymenoptera: Braconidae: Mesostoinae s.str.). **Andrew D. Austin** (andy.austin@adelaide.edu.au) and Erin Fagan-Jeffries, Univ. of Adelaide, Adelaide, Australia

2:00 **3466** Systematics and the evolution of host use in Ichneumonidae. **Andrew Bennett** (andrew.bennett@ agr.ga.ca), Agriculture and Agri-Food Canada, Ottawa, ON, Canada

2:15 **3467** Evolution of host range in Aphidiinae (Braconidae) and impacts on diversification. Barbara Sharanowski1 and **Amber Bass** (umbassa@ myumanitoba.ca)2, 1Univ. of Central Florida, Orlando, FL, 2Univ. of Manitoba, Winnipeg, MB, Canada

2:30 **3468** Systematics of Microgastrinae wasps (Braconidae): An overview and proposal for worldwide studies. **Jose Fernandez-Triana** (jose.fernandez@agr.gc.ca), Agriculture and Agri-Food Canada, Ottawa, ON, Canada

2:45 **3469** Evolution of convergent adaptations in cryptine ichneumonid wasps: A morphospace approach. **Bernardo Santos** (bsantos@amnh.org), American Museum of Natural History, New York, NY

**3:00 BREAK**

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3:15 **3470** Life, the Universe, and *Ophion*: Systematics and diversity of a little-known ichneumonid genus. **Marla Schwarzfeld** (marla.schwarzfeld@unbc.ca)1 and Felix Sperling2, 1Univ. of Northern British Columbia, Prince George, BC, Canada, 2Univ. of Alberta, Edmonton, AB, Canada

3:30 **3471** Host-parasitoid trophic interactions (Lepidoptera - Ichneumonoidea - Tachinidae) revealed through high-throughput sequencing in eastern North America. **Michael J. Sharkey** (msharkey@uky.edu), Sarah Meierotto, and Eric G. Chapman, Univ. of Kentucky, Lexington, KY

3:45 **3472** New World *Aleiodes/*Aleiodini (Hymenoptera, Braconidae, Rogadinae) species-groups concepts revision. **Eduardo Shimbori** (shimbori@gmail.com)1, Scott R. Shaw2, Angelica Penteado-Dias1, and Alejandro Zaldívar-Riverón3, 1Federal Univ. of São Carlos, São Carlos, Brazil, 2Univ. of Wyoming, Laramie, WY, 3National Autonomous Univ. of México, Mexico City, Mexico

4:00 **3473** The Euphorinae (Braconidae), a messy group to deal with. **Julia Stigenberg** (julia.stigenberg@nrm. se), Swedish Museum of Natural History, Stockholm, Sweden

4:15 **3474** Presentation withdrawn  
4:30 **3475** Phylogeny of Microgastrinae: Taxon sampling

in the age of NGS. **James Whitfield** (jwhitfie@life.uiuc. edu), Univ. of Illinois, Champaign, IL

2:30

**3480** Ecological specialization and speciation in the pea aphid complex, *Acyrthosiphon pisum* (Hemiptera, Aphididae. **Jean-Christophe Simon** (jean-christophe. simon@rennes.inra.fr)1, Pierre Nouhaud1,

Julie Jaquiery1, and Jean Peccoud2, 1INRA, Le Rheu, France, 2Univ. of Poitiers, Poitiers, France

4:45 **3476** Phylogeny and biogeography of two cosmopolitan braconid wasp radiations: The doryctine tribes Rhaconotini and Spathiini. **Alejandro Zaldívar- Riverón** (azaldivar@ib.unam.mx)1, Sergey Belokobylskij2, and Rubi Meza-Lázaro1, 1National Autonomous Univ. of México, Mexico City, Mexico, 2Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia

**Symposium: Synthesis in Sternorrhyncha Systematics**

***Room W222 B (Convention Center)***

**Moderator and Organizer:** Colin Favret, Univ. of Montréal, Montréal, QC, Canada

1:30 **3477** The fossil record of Sternorrhyncha. **Bo Wang** (bowang@nigpas.ac.cn)1 and Jacek Szwedo2, 1Chinese Academy of Sciences, Beijing, China, 2Univ. of Gdańsk, Gdańsk, Poland

2:00 **3478** Evolution of the diversity of phytophagous insects: Using aphids as good models. Jing Chen, Yuan Wang, Lin Liu, Rui Chen, Li-Yun Jiang, and **Ge-Xia Qiao** (qiaogx@ioz.ac.cn), Chinese Academy of Sciences, Beijing, China

2:15 **3479** Leaving angiosperms to diversify on conifers in aphid — a case in Lachninae. **Rui Chen** (chrui11@live. cn)1, Colin Favret2, Jing Chen1, Li-Yun Jiang1, and Ge-Xia Qiao1, 1Chinese Academy of Sciences, Beijing, China, 2Univ. of Montréal, Montréal, QC, Canada

**SD3482**

**SD3483**

**SD3484 SD3485**

**SD3486**

**SD3487**

**SD3488**

**SD3489**

Laura Kubatko8, and Laura Boykin9, 1Univ. of Western Australia, Perth, Australia, 2Mikocheni Agriculture Research Institute, Dar es Salaam, Tanzania, 3CSIRO, Brisbane, Australia, 4Zhejiang Univ., Hangzhou, China, 5National Agricultural Research Organisation, Kampala, Uganda, 6Univ. of Greenwich, Chatham, United Kingdom, 7Bvumbwe Research Station, Limbe, Malawi, 8The Ohio State Univ., Columbus, OH, 9Univ. of Western Australia, Crawley, Australia

The systematics of the jumping plant-louse family Phacopteronidae (Hemiptera: Psylloidea).  
**Igor Malenovsky** (imalenovsky@mzm.cz)1 and  
Daniel Burckhardt2, 1Masaryk Univ., Brno, Czech Republic, 2Natural History Museum, Basel, Switzerland

Use of four genes in revision of the genus *Essigella* Del Guercio, 1909 (Sternorrhyncha: Aphididae: Lachninae). **Thomas Théry** (thomasjcthery@gmail.com) and  
Colin Favret, Univ. of Montréal, Montréal, QC, Canada

Presentation withdrawn

Aphid-endosymbiont interactions: Incongruent evolutionary patterns across taxonomic levels.  
**Jing Chen** (chenjing@ioz.ac.cn), Lin Liu, Li-Yun Jiang, and Ge-Xia Qiao, Chinese Academy of Sciences, Beijing, China

Investigating cryptic speciation among lineages  
of hemlock adelgids (Hemiptera: Adelgidae).  
**Hana Aronowitz** (haronowi@uvm.edu)1,  
Kimberly F. Wallin1, Nathan Havill2, and Robert Foottit3, 1Univ. of Vermont, Burlington, VT, 2USDA - Forest Service, Hamden, CT, 3Agriculture and Agri-Food Canada, Ottawa, ON, Canada

Acoustic divergence of closely related psylloid species (Hemiptera: Psylloidea). **Yi-Chang Liao** (b0910528106@hotmail.com) and Man-Miao Yang, National Chung Hsing Univ., Taichung, Taiwan

Sound producing behavior of psylloids (Hemiptera: Psylloidea): Functional morphology and mechanisms. **Zong-Ze Wu** (abcde621621@yahoo.com.tw), Yi-Chang Liao, and Man-Miao Yang, National Chung Hsing Univ., Taichung, Taiwan

Diversity of scale insects (Hemiptera: Coccomorpha) on oak trees in Israel. **Malkie Spodek** (malkiespodek@ gmail.com)1, Yair Ben-Dov2, and Zvi Mendel2, 1The Steinhardt Museum of Natural History, Tel Aviv, Israel, 2Agricultural Research Organisation, Bet-Dagan, Israel

2:45 **3481** Systematics of the *Bemisia tabaci* species complex. **Tonny Kinene** (tonny.kinene@research.uwa. edu.au)1, Peter Sseruwagi2, James Wainaina1,  
Paul de Barro3, Hua-Ling Wang4, Xiao-Wei Wang4, Shu-Sheng Liu4, Christopher Omongo5, Habibu Mugerwa6, Susan Seal6, John Colvin6, Donald Kachigamba7,

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**THURSDAY**

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**SD3490** Digitules, they’re not just for scale insects anymore! **Gary L. Miller** (gary.miller@ars.usda.gov)1, Mark Metz2, Aaron Dickey3, Gary R. Bauchan4, and Douglass Miller4, 1USDA - ARS, Belstville, MD, 2USDA - ARS, Washington, DC, 3USDA - ARS, Clay Center, NE, 4USDA - ARS, Beltsville, MD

**3:00 BREAK AND POSTER SESSION**

3:15 **3491** Systematics of the invasive Mediterranean species of the *B. tabaci* complex. **Sona Vyskocilova** (s.vyskocilova@greenwich.ac.uk)1, Susan Seal2, Tonny Kinene3, Laura Boykin4, and John Colvin2, 1Univ. of Greenwich, Kent, United Kingdom, 2Univ.  
of Greenwich, Chatham, United Kingdom, 3Univ. of Western Australia, Perth, Australia, 4Univ. of Western Australia, Crawley, Australia

3:30 **3492** Psylloidea phylogenomics: Resolving the psyllid tree. **Diana Percy** (d.percy@nhm.ac.uk)1,  
Alex Crampton-Platt1, Saemundur Sveinsson2,  
David Ouvrard1, and Daniel Burckhardt3, 1The Natural History Museum, London, United Kingdom, 2Agricultural Univ. of Iceland, Hvanneyri, Iceland, 3Natural History Museum, Basel, Switzerland

3:45 **3493** Current state of scale insect systematics, and challenges for the future. **Lyn Cook** (l.cook@uq.edu. au)1, Penny Gullan2, Nate Hardy3, and Alicia Toon1, 1Univ. of Queensland, Brisbane, Australia, 2The Australian National Univ., Acton, Australia, 3Auburn Univ., Auburn, AL

4:00 **3494** Four hundred genera, zero percent 18S sequence divergence: Systematics of the explosive radiation of armored scale insects. **Benjamin Normark** (bnormark@ent.umass.edu), Scott Schneider,

Daniel Peterson, and Akiko Okusu, Univ. of Massachusetts, Amherst, MA

4:15 **3495** Sternorrhyncha online taxonomic databases: From information to research. **David Ouvrard** (d.ouvrard@nhm.ac.uk)1, Colin Favret2, Mayrolin García Morales3, and Nate Hardy3, 1The Natural History Museum, London, United Kingdom, 2Univ. of Montréal, Montréal, QC, Canada, 3Auburn Univ., Auburn, AL

4:30 **3496** Synthesis in Sternorrhyncha systematics.  
**Colin Favret** (colinfavret@aphidnet.org)1, Nate Hardy2, Diana Percy3, Christopher H. Dietrich4, Hugh M. Robertson4, Kimberly K. O. Walden4, and Kevin P. Johnson4, 1Univ. of Montréal, Montréal, QC, Canada, 2Auburn Univ., Auburn, AL, 3The Natural History Museum, London, United Kingdom, 4Univ. of Illinois, Champaign, IL

**Symposium: Wings and Powered Flight: Core Novelties in Insect Evolution**

***Room W315 A (Convention Center)***

**Moderators and Organizers:** Günther Pass1 and Robert Dudley2, 1Univ. of Vienna, Vienna, Austria, 2Univ. of California, Berkeley, CA

1:30 **3497** A century and a half of research on the evolution of insect flight. **David Alexander** (dalexander@ ku.edu), Univ. of Kansas, Lawrence, KS

1:45 **3498** Directed aerial descent in wingless canopy arthropods. **Stephen Yanoviak** (steve.yanoviak@ louisville.edu)1 and Robert Dudley2, 1Univ. of Louisville, Louisville, KY, 2Univ. of California, Berkeley, CA

2:15 **3499** Reconstructing the flight behaviour of ancient insects from fossil evidence. **Robin Wootton** (r.j.wootton@exeter.ac.uk), Univ. of Exeter, Exeter, United Kingdom

2:30 **3500** How the wings of insects, birds, bats, and seeds generate similar leading edge vortices to avoid stall. **David Lentink** (dlentink@stanford.edu), Stanford Univ., Palo Alto, CA

2:45 **3501** Imaging the insect flight motor. **Simon Walker** (simon.walker@zoo.ox.ac.uk), Univ. of Oxford, Oxford, United Kingdom

**3:00 BREAK**

3:15 **3502** The oldest winged insects (Insecta: Pterygota). **Jakub Prokop** (jprokop@natur.cuni.cz)1 and Thomas Hörnschemeyer2, 1Charles Univ., Prague, Czech Republic, 2Georg August Univ., Göttingen, Germany

3:30 **3503** The origin and early diversification of pterygotes. **Arnold Staniczek** (arnold.staniczek@ smns-bw.de) and Günter Bechly, State Musuem of Natural History, Stuttgart, Germany

3:45 **3504** Presentation withdrawn

4:15 **3505** Insect wing circulatory organs: Prime examples for the origin of evolutionary novelties. **Günther Pass** (guenther.pass@univie.ac.at)1, Markus Tögel1, Harald Krenn1, and Achim Paululat2, 1Univ. of Vienna, Vienna, Austria, 2Univ. of Osnabrück, Osnabrück, Germany

4:30 **3506** Evo-devo study of insect wing and its serial homologs: From apterygotes to pterygotes.  
**Takahiro Ohde** (ohdet@nibb.ac.jp) and Teruyuki Niimi, Nagoya Univ., Nagoya, Japan

4:45 **3507** The molecular mechanisms underlying diversified wing venation among insects. **Osamu Shimii** (osamu.shimmi@helsinki.fi)1 and Mtsatsugu Hatakeyama2, 1Univ. of Helsinki, Helsinki, Finland, 2National Institute of Agrobiological Sciences, Tsukuba, Japan

5:00 **3508** Lobes or gills: Exploring the origin of insect wings from an evo-devo perspective. **Yoshinori Tomoyasu** (tomoyay@miamioh.edu), Miami Univ., Oxford, OH

**Symposium: Cold Physiology in a Warming World**

***Room W231 B (Convention Center)***

**Moderators and Organizers:** Kendra Greenlee1, Julia Bowsher1, Joseph P. Rinehart2, and George D. Yocum2, 1North Dakota State Univ., Fargo, ND, 2USDA - ARS, Fargo, ND

1:30 **3509** Is winter coming? How climate warming disrupts the diapause response **Scott Hayward** (s.a.hayward@bham.ac.uk), Univ. of Birmingham, Birmingham, United Kingdom

2:00 **3510** Surviving climate change on the Antarctic peninsula: Cold and desiccation tolerance in the southernmost insect. **Richard E. Lee** (leere@miamioh. edu)1 and David L. Denlinger2, 1Miami Univ., Oxford, OH, 2The Ohio State Univ., Columbus, OH

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2:15 **3511** Increasing low temperature variability and its implications for arthropod populations. **Steven Chown** (steven.chown@monash.edu), Monash Univ., Victoria, Australia

2:30 **3512** Struggling against entropy: Why the ability to maintain ion and water homeostasis strongly impacts insect chilling tolerance. Heath MacMillan1 and **Johannes Overgaard** (johannes.overgaard@biology. au.dk)2, 1York Univ., Toronto, ON, Canada, 2Aarhus Univ., Aarhus, Denmark

2:45 **3513** Ice fraction formation during extracellular freezing in the larvae of two drosophilids, *Drosophila melanogaster* and *Chymomyza costata*. **Vladimir Kostal** (kostal@entu.cas.cz), Jan Rozsypal, and Tomas Stetina, Czech Academy of Sciences, České Budějovice, Czech Republic

**3:00 BREAK**

**Symposium: Mechanisms Affecting the Efficiency of RNA Interference in Insects**

***Room W331 A (Convention Center)***

**Moderators and Organizers:** Kun Yan Zhu1, Subba Reddy Palli2, and Jianzhen Zhang3, 1Kansas State Univ., Manhattan, KS, 2Univ. of Kentucky, Lexington, KY, 3Shanxi Univ., Taiyuan, China

1:30 **3522** Core machinery and mechanisms of RNAi in *Diabrotica virgifera virgifera*. **Elane Fishilevich** (efishilevich@dow.com)1, Ana Vélez2, Huarong Li1, Andrew Bowling1, Chitvan Khajuria2, Haichuan Wang2, Kenneth Narva1, and Blair Siegfried3, 1Dow AgroSciences, Indianapolis, IN, 2Univ. of Nebraska, Lincoln, NE, 3Univ. of Florida, Gainesville, FL

1:45 **3523** Insights on the mechanisms of systemic RNAi in the desert locust. **Niels Wynant** (niels.wynant@bio. kuleuven.be), Dulce Cordeiro dos Santos, and  
Jozef Vanden Broeck, Catholic Univ., Leuven, Belgium

3:15 **3514** Climate, insects, and cryopreservation.  
**Arun Rajamohan** (arun.rajamohan@ars.usda.gov), 2:00 USDA - ARS, Fargo, ND

3:30 **3515** A forty-year history of subzero tolerance  
studies of the beetle *Dendroides canadensis*.  
**John Duman** (duman.1@nd.edu) and Henry Vu, Univ. 2:15 of Notre Dame, South Bend, IN

4:00 **3516** Insect eco-immunology in the cold: How will  
biotic interactions at low temperatures shape success  
in a warming world? **Laura Ferguson** (lfergus9@uwo.  
ca) and Brent J. Sinclair, Univ. of Western Ontario,  
London, ON, Canada 2:30

4:15 **3517** Applying stress physiology to a pollinator crisis. **Joseph P. Rinehart** (joseph.rinehart@ars.usda.gov), USDA - ARS, Fargo, ND

4:30 **3518** Characterizing cold tolerance of an important pollinator, the alfalfa leafcutting bee, *Megachile rotundata*. **Meghan Bennett** (meghan.bennett@ndsu. edu)1, Joseph P. Rinehart2, George Yocum2, and  
Kendra Greenlee1, 1North Dakota State Univ., Fargo, ND, 2USDA - ARS, Fargo, ND

**3524** Understanding barriers to environmental RNAi in recalcitrant insect species. **Jeremy Kroemer** (jeremy. alan.kroemer@monsanto.com), Monsanto Company, Chesterfield, MO

**3525** Differential expression of miRNAs in response to dsRNA of various target genes in Noctuidae.  
**R. Asokan** (asokaniihr@gmail.com)1, K. B. Rebijith1, and N. K. Krishna Kumar2, 1Indian Institute of Horticultural Research, Bangalore, India, 2Indian Council of Agricultural Research, New Delhi, India

**3526** Enhanced RNAi efficiency of silkworm through overexpression of Ago2. **Zhiqian Li** (zqli@sippe. ac.cn)1,2, Baosheng Zeng1, Lin Ling1, Jun Xu1, Lang You1, Abu Aslam1, Anjiang Tan1, and Yongping Huang1, 1Chinese Academy of Sciences, Shanghai, China, 2Chinese Academy of Sciences, Beijing, China

4:45 **3519** Characterization of temperature stress  
response mechanisms in the alfalfa leafcutting bee, **3:00** *Megachile rotundata*. **Alex Torson** (alex.s.torson@ 3:15 ndsu.edu), North Dakota State Univ., Fargo, ND

5:00 **3520** Pre-wintering conditions and post-winter  
performance in a solitary bee. Jordi Bosch1,  
**William Kemp** (william.kemp@ars.usda.gov)2,  
Fabio Sgolastra3, Theresa Pitts-Singer4, Xavier Arnan5,6,  
and Stefano Maini3, 1Autonomous Univ. of Barcelona, Cerdanyola del Vallès, Spain, 2USDA - ARS, Fargo, ND, 3:30 3Univ. of Bologna, Bologna, Italy, 4USDA - ARS, Logan,

**BREAK**

**3528** Identifying factors that facilitate double- stranded RNA uptake and cell-to-cell transmission in mosquitoes and other dipteran insects. **Steve Whyard** (steve.whyard@umanitoba.ca), Aditi Partridge,  
Parker Lachance, David Giesbrecht, Cassidy Erdelyan, and David Boguski, Univ. of Manitoba, Winnipeg, MB, Canada

**3529** Presentation withdrawn

2:45 **3527** Mechanism of cellular uptake of double-stranded RNA in insects. **Kun Yan Zhu** (kzhu@ksu.edu)1,  
Xiao Da1,2, Young Ho Kim1, and Anastasia Cooper1, 1Kansas State Univ., Manhattan, KS, 2China Agricultural Univ., Beijing, China

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UT, 5CREAF, Bellaterra, Spain, 6Federal Univ. of Pernambuco, Recife, Brazil

5:15 **3521** Historical changes in thermoregulatory traits of alpine butterflies: Environmental variability limits adaptive responses to recent climate change.  
**Heidi MacLean** (hmaclean@live.unc.edu), Aarhus Univ., Aarhus, Denmark

3:45 **3530** Factors affecting dsRNA uptake and RNAi efficiency in Asian citrus psyllid, *Diaphorina citri* (Hemiptera: Liviidae). **Nabil Killiny** (nabilkilliny@ufl. edu), Univ. of Florida, Lake Alfred, FL

4:00 **3531** Identification of key players in RNA interference. **June-Sun Yoon** (june.yoon@uky.edu), Zhongjun Gong, Jayendra Shukla, and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY



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4:15 **3532** Effect of dsRNase on the efficiency of RNA interference. **Jianzhen Zhang** (zjz@sxu.edu.cn)1, Huifang Song1, Enbo Ma1, and Kun Yan Zhu2, 1Shanxi Univ., Taiyuan, China, 2Kansas State Univ., Manhattan, KS

4:30 **3533** The challenges of RNAi-mediated insect pest control and the search for novel dsRNA delivery methods. **Olivier Christiaens** (olchrist.christiaens@ ugent.be)1, Luc Swevers2, and Guy Smagghe1,

1Ghent Univ., Ghent, Belgium, 2Institute of Biosciences & Applications, Athens, Greece

**Symposium: Invasive Disease Vectors in Urban Environments: Current Challenges and Future Solutions**

***Room W414 D (Convention Center)***

**Moderators and Organizers:** Ary Hoffmann1, Brendan Trewin2, and Jill Ulrich3, 1The Univ. of Melbourne, Parkville, Australia, 2CSIRO, Brisbane, Australia, 3QIMR Berghofer Medical Research Institute, Brisbane, Australia

1:30 **3534** Changing paradigms of dengue control: A view from a dengue control veteran. **Scott Ritchie** (scott. ritchie@jcu.edu.au), James Cook Univ., Cairns, Australia

2:00 **3535** Characteristics of a successful *Wolbachia* release. **Ary Hoffmann** (ary@unimelb.edu.au), The Univ. of Melbourne, Parkville, Australia

2:15 **3536** *Aedes* species: Silent global spread and sustainable control options. **Raman Velayudhan** (velayudhanr@who.int), World Health Organisation, Geneva, Switzerland

2:30 **3537** Spatial surveillance and control strategies for *Aedes albopictus* in California: Is eradication feasible? **Christopher M. Barker** (cmbarker@ucdavis.edu), Univ. of California, Davis, CA

2:45 **3538** Challenges to mitigate dengue outbreaks  
using traditional vector control strategies: Do we need something else? **Rafael Maciel-de Freitas** (freitas@ioc. fiocruz.br), Oswaldo Cruz Foundation, Rio de Janeiro, Brazil

**3:00 BREAK**

3:15 **3539** Presentation withdrawn

3:30 **3540** Estimating serotype interaction and temporal variation in dengue transmission using longitudinal serological data. **Robert Reiner** (rcreiner@indiana.edu), Indiana Univ., Bloomington, IN

3:45 **3541** Movement of mosquito vectors between permanent water storage containers: The role of urban landscape features. **Brendan Trewin** (brendan.trewin@ csiro.au)1,2, 1CSIRO, Brisbane, Australia; QIMR Berghofer Medical Research Institute, Brisbane, Australia,

2Univ. of Queensland, Brisbane, Australia

4:00 **3542** Presentation withdrawn

4:15 **3543** The need for self-dispersing mosquito control technologies in urban areas: Update on releases of genetically modified male mosquitoes for suppression  
of *Ae. aegypti* in the Florida Keys. Michael Doyle and **Andrea L. Leal** (aleal@keysmosquito.org), Florida Keys Mosquito Control District, Key West, FL

4:30 **3544** Drivers and trends in the future of mosquito- borne disease control. **Jill Ulrich** (jill.ulrich@qimrberghofer. edu.au), QIMR Berghofer Medical Research Institute, Brisbane, Australia

4:45 **Panel Discussion**

**Symposium: Invasive Termite Species: Where Are They From, Where Are They Now, and Where Will They Be?**

***Room W240 D (Convention Center)***

**Moderators and Organizers:** Nan-Yao Su1, Thomas Chouvenc1, and Hou-Feng Li2, 1Univ. of Florida, Davie, FL, 2National Chung Hsing Univ., Taichung, Taiwan

1:30 **3545** Urbanization and the spread of the western drywood termite. **Michael K. Rust** (michael.rust@ucr. edu), Univ. of California, Riverside, CA

1:45 **3546** The West Indian drywood termite, from enigmatic origin to dominant household pest.  
**Rudolph H. Scheffrahn** (rhsc@ufl.edu), Univ. of Florida, Ft. Lauderdale, FL

2:00 **3547** New insights into the where and how of invasions of *Reticulitermes flavipes*. **Edward Vargo** (ed.vargo@tamu.edu)1, Anne-Genevieve Bagnere2, Franck Dedeine3, Elfie Perdereau2, Simon Dupont2, and Mark Janowiecki1, 1Texas A&M Univ., College Station, TX, 2Univ. of Tours, Tours, France, 3National Center for Scientific Research, Tours, France

2:15 **3548** Invasion of *Coptotermes gestroi* (Wassmann) from Asia. **Shawn Cheng** (shawn@frim.gov.my)1, Dinaiz Thinagaran2, and Seyedeh Zeinab Mohanna3, 1Forest Research Institute, Malaysia, 2The Univ. of Melbourne, Victoria, Australia, 3Univ. Malaya, Kuala Lumpur, Malaysia

2:30 **3549** Naturalization of the Asian subterranean termite in Taiwan. **Hou-Feng Li** (houfeng@nchu.edu.tw)1, Chun-I Chiu1, Hsin-Ting Yeh2, and Ming-Jer Tsai2,3,

1National Chung Hsing Univ., Taichung, Taiwan, 2National Taiwan Univ., Chu-Shan, Taiwan, 3National Taiwan Univ., Taipei, Taiwan

2:45 **3550** Origin and invasion history of *Coptotermes formosanus* in Japan. Akinori Yamada1, Kunio Tsunoda2, and **Tsuyoshi Yoshimura** (tsuyoshi@rish.kyoto-u.ac.jp)2, 1Nagasaki Univ., Nagasaki, Japan, 2Kyoto Univ., Uji, Japan

**3:00 BREAK**

3:15 **3551** Conquest of the Formosan subterranean termite. **Claudia Husseneder** (chusseneder@agcenter. lsu.edu)1 and Chinmay Tikhe2, 1Louisiana State Univ., Baton Rouge, LA, 2Louisiana State Univ. AgCenter, Baton Rouge, LA

3:30 **3552** Formosan and Asian subterranean termite invasions in Hawaii. **J. Kenneth Grace** (kennethg@ hawaii.edu), Univ. of Hawai’i, Honolulu, HI

3:45 **3553** Hybridization between two termite invaders, *Coptotermes formosanus* and *C. gestroi*: Opportunities for gene flow between species. **Thomas Chouvenc** (tomchouv@ufl.edu) and Nan-Yao Su, Univ. of Florida, Davie, FL

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**Graduate Student Oral Competition: Morphology, Systematics, and Phylogeny: Hymenoptera**

***Room W232 C (Convention Center)***

**Moderators:** Barbara Sharanowski1 and Jennifer Zaspel2, 1Univ. of Central Florida, Orlando, FL, 2Purdue Univ., West  
Lafayette, IN

4:15 **3564** Phylogenetic relationships among species in *Aphelinus* (Hymenoptera: Aphelinidae). **Xanthe Shirley** (xanthe23@tamu.edu)1, Keith R. Hopper2, Kristen Kuhn2, and James Woolley1, 1Texas A&M Univ., College Station, TX, 2USDA - ARS, Newark, DE

4:30 **3565** Color variation does matter when delimitating species: Lessons learned from Tribe Cirrospilini (Hymenoptera: Eulophidae). **Ryan Perry** (rperr003@ ucr.edu), Univ. of California, Riverside, CA

4:45 **3566** The Wing Interference Patterns (WIPs) of *Parapanteles* (Braconidae: Microgastrinae) wasps: A powerful and accessible tool for species-level

identification of small winged insects. **Kyle Parks** (kparks4@illinois.edu), James Whitfield, and Shuyang Jin, Univ. of Illinois, Champaign, IL

5:00 **3567** Revision and phylogeny of *Lytopylus* (Hymenoptera: Braconidae: Agathidinae). **Ilgoo Kang** (ilgoo.kang@uky.edu) and Michael J. Sharkey, Univ. of Kentucky, Lexington, KY

5:15 **3568** Australian microgastrine parasitoid wasps: Systematics meets citizen science. **Erinn Fagan-Jeffries** (erinn.fagan-jeffries@adelaide.edu.au)1, Andrew Austin1, and Steven Cooper1,2, 1The Univ. of Adelaide, Adelaide, Australia, 2South Australian Museum, Adelaide, Australia

**Contributed Papers: Apidology, Sericulture, and Social Insects: Behavior**

***Room W225 A (Convention Center)***

**Moderators:** Sandra Rehan1 and Lilia I. de Guzman2, 1Univ. of Pennsylvania, Philadelphia, PA, 2USDA - ARS, Baton Rouge, LA

1:30 **3569** Comparing the flight activities of two stocks of honey bees (*Apis mellifera*) using radio-frequency identification (RFID) technology. **Lilia I. de Guzman** (lilia.deguzman@ars.usda.gov), Amanda M. Frake, and Michael Simone-Finstrom, USDA - ARS, Baton Rouge, LA

1:45 **3570** Social cues and diet restriction may act through similar mechanisms to affect aggressive behavior in the honey bee (*Apis mellifera*). **Clare Rittschof** (clare. rittschof@uky.edu)1, Gene E. Robinson2, and

Christina M. Grozinger3, 1Univ. of Kentucky, Lexington, KY, 2Univ. of Illinois, Champaign, IL, 3Pennsylvania State Univ., University Park, PA

2:00 **3571** *Vespa soror* in Vietnam: Biological insights based on behavioral observations, and landmark morphometric and microsatellite analyses of workers and gynes. **Gard W. Otis** (gotis@uoguelph.ca)1, Maggie Bain2, Adrien Perrard3, Heather Mattila4, and Lien Nguyen5, 1Univ. of Guelph, Guelph, ON, Canada, 2Univ. of Guelph, Puslinch, ON, Canada, 3American Museum of Natural History, New York, NY, 4Wellesley College, Wellesley, MA, 5Institute of Ecology and Biological Resources, Hanoi, Vietnam

2:15 **3572** Do kin selection and inter-colony distance mediate helping behavior in weaver ants?  
**Floria Mora-Kepfer Uy** (floriamk@bio.miami.edu), Univ. of Miami, Coral Gables, FL



1:30 **3554**  
kinematics of miniature trap-jaw ant (*Strumigenys* spp.) mandible strikes. **Josh Gibson** (jcgibso2@illinois. edu)1, Doug Booher2, and Andrew Suarez1, 1Univ. of Illinois, Champaign, IL, 2Univ. of California, Los Angeles, CA

1:45 **3555** Defensive traits exhibit an evolutionary trade-off and drive diversification in ants.  
**Benjamin Blanchard** (bblanchard@fieldmuseum.org) and Corrie Moreau, The Field Museum of

Natural History, Chicago, IL

2:00 **3556** Ultraconserved elements as a tool for species delimitation in *Sericomyrmex* fungus-farming ants (Hymenoptera: Formicidae). **Ana Jesovnik** (jesovnika@ si.edu)1 and Ted Schultz2, 1Univ. of Maryland, College Park, MD, 2Smithsonian Institution National Museum of Natural History, Washington, DC

2:15 **3557** Taxonomic study of the Japanese subfamilies of Calosotinae and Neanastatinae (Hymenoptera, Eupelmidae). **Taisuke Kawano** (pseudoidatenankafu@ gmail.com) and Toshiharu Mita, Kyushu Univ., Fukuoka, Japan

2:30 **3558** Revision of Nearctic *Dendrocerus* (Hymenoptera, Megaspilidae): An integrative taxonomic approach. **Kyle Burks** (kyleburks@gmail.com), Pennsylvania State Univ., University Park, PA

2:45 **3559** The magnificent Megaspilidae: *Conostigmus* spp. (Hymenoptera: Megaspilidae) of the Nearctic. **Carolyn Trietsch** (carolyntrietsch@gmail.com), István Mikó, and Andrew Deans, Pennsylvania State Univ., University Park, PA

**3:00 BREAK**

3:15 **3560** Evolution of communication: a comparison across behaviourally diverse halictid bees. **Bernadette Wittwer** (wittwerb@unimelb.edu.au)1, Abraham Hefetz2, Mark Elgar1, Naomi E. Pierce3, and Sarah Kocher4, 1The Univ. of Melbourne, Parkville, Australia, 2Tel Aviv Univ., Tel Aviv, Israel, 3Harvard Univ., Cambridge, MA, 4Princeton Univ., Princeton, NJ

3:30 **3561** Presentation withdrawn

3:45 **3562** Systematics of mid-Mesozoic Apocrita (Hymenoptera) from northeastern China. **Longfeng Li** (fenger4499@163.com)1, Chungkun Shih1,2, and  
Dong Ren1, 1Capital Normal Univ., Beijing, China, 2Smithsonian Institution National Museum of Natural History, Washington, DC

4:00 **3563** Evolution and phylogeny of the parasitoid subfamily Scelioninae (Hymenoptera: Platygastroidea). **Huayan Chen** (huayanc@gmail.com)1, Norman Johnson1, and Andrew Austin2, 1The Ohio State Univ., Columbus, OH, 2The Univ. of Adelaide, Adelaide, Australia

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2:30 **3573** Context dependency of bumble bee nectar robbing. **Elinor Lichtenberg** (elinor@email.arizona. edu)1, Rebecca E. Irwin2, and Judith L. Bronstein1, 1Univ. of Arizona, Tucson, AZ, 2North Carolina State Univ., Raleigh, NC

2:45 **3574** Effects of Cry1Ie toxin on survival, behavior, and midgut bacteria of honey bee, *Apis mellifera*. **Pingli Dai** (daipingli@caas.cn)1,2, Huiru Jia1, Qingyun Diao1, Jie Zhang1, and James D. Ellis2, 1Chinese Academy of Agricultural Sciences, Beijing, China,

2Univ. of Florida, Gainesville, FL

**3:00 BREAK**

3:15 **3575** Polymorphism in the red imported fire ant *Solenopsis invicta*: A closer look at task performance in digging and foraging behavior. **Jason Carbaugh** (jcarbaugh@tamu.edu) and S. Bradleigh Vinson, Texas A&M Univ., College Station, TX

3:30 **3576** A bee on the brink of eusociality: How maternal manipulation leads to the formation of social hierarchies in the subsocial bee *Ceratina calcarata* (Hymenoptera: Apidae). **Sarah P. Lawson** (sarah.lawson@unh.edu) and Sandra Rehan, Univ. of New Hampshire, Durham, NH

3:45 **3577** The benefits of specialization in groups: Task switching, managing risk, and individual efficiency. **Anna Dornhaus** (dornhaus@email.arizona.edu), Univ. of Arizona, Tucson, AZ

4:00 **3578** Insulin receptor substrate (IRS) gene knock- down impacts complex behavior and shortens lifespan in honey bee workers. **Kate Ihle** (kateihle@gmail.com), Univ. of Zürich, Zürich, Switzerland

4:15 **3579** Variation in learning performance and its effect on foraging behaviour in the bumble bee *Bombus terrestris*. **Lisa Evans** (lisa.evans@plantandfood.co.nz)1, Karen Smith2, and Nigel E. Raine3, 1The New Zealand Institute for Plant & Food Research, Ltd., Hamilton, New Zealand, 2Royal Holloway, Univ. of London, Egham, United Kingdom, 3Univ. of Guelph, Guelph, ON, Canada

4:30 **3580** The queen is not aggressive in the paper wasp *Polistes jokahamae*, but monopolistically or dominantly oviposits. **Hideto Yoshimura** (mieu510601@gmail.com), Jun’ichi Yamada, and Yoshihiro Yamada, Mie Univ., Tsu, Japan

4:45 **3581** Identification of stop signaling in foraging honey bee (*Apis mellifera* L.) colonies. **Parry Kietzman** (pmkietzm@ncsu.edu) and David Tarpy, North Carolina State Univ., Raleigh, NC

5:00 **3582** Snap, trap, and chop: Comparative morphology and kinematics of spring-loaded mandibles in the ant genera *Myrmoteras*, *Mystrium*, and *Odontomachus*. **Fredrick Larabee** (larabeef@si.edu)1, Adrian A. Smith2, and Andrew Suarez3, 1Smithsonian Institution National Museum of Natural History, Washington, DC, 2North Carolina Museum of Natural Sciences, Raleigh, NC, 3Univ. of Illinois, Champaign, IL

**Contributed Papers: Apidology, Sericulture, and Social Insects: Ecology**

***Room W225 B (Convention Center)***

**Moderators:** Jinmei Wu1 and Callum Kingwell2, 1Jiangsu Univ. of Science and Technology, Zhenjiang, China, 2Cornell Univ., Ithaca, NY

1:30 **3583**  
(*Apis mellifera*) and Talh trees (*Acacia gerrardii*) under the extreme hot-dry weather conditions. **Awad Hassan** (awad.univ@gmail.com)1,2 and Abdulaziz Alqarni2, 1South Valley Univ., Qena, Egypt, 2King Saud Univ., Riyadh, Saudi Arabia

1:45 **3584** Ethological approach to reveal why only *Apis cerana japonica* suffers from the tracheal mite in Japan. **Yoshiko Sakamoto** (sakamoto.yoshiko@nies.go. jp)1, Taro Maeda2, Mikio Yoshiyama3, and Jeffrey Pettis4, 1National Institute for Environmental Studies, Tsukuba, Japan, 2National Institute of Agrobiological Sciences, Tsukuba, Japan, 3National Institute of Livestock and Grassland Science, Tsukuba, Japan, 4USDA - ARS, Beltsville, MD

2:00 **3585** The evolutionary origins of social insect queen pheromones: Honesty and dynamics of fertility signal production in a socially polyphenic halictid bee. **Callum Kingwell** (callumkingwell@gmail.com)1,

Beryl Jones2, and William Wcislo3, 1Cornell Univ., Ithaca, NY, 2Univ. of Illinois, Champaign, IL, 3Smithsonian Tropical Research Institute, Panama City, Panama

2:15 **3586** Role of forage availabilty and diversity for pollinator health in orchard landscapes. Meghan Milbrath, Rufus Isaacs and **Sarah Scott** (sbscott429@gmail.com), Michigan State Univ., East Lansing, MI

2:30 **3587** Honey bee neurogenomic responses to affiliative and agonistic social interactions. **Hagai Shpigler** (hagaishp@illinois.edu), Michael Saul, Emma Murdoch, Frida Corona, Amy Cash-Ahmed, and Gene E. Robinson, Univ. of Illinois, Champaign, IL

2:45 **3588** A meta-analysis of the role of the western honey bee (*Apis mellifera*) in plant-pollinator interaction networks worldwide. **Keng-Lou Hung** (kenglou.hung@ gmail.com)1, Matthias Albrecht2, Jennifer Kingston1, David Holway1, and Joshua Kohn1, 1Univ. of California, La Jolla, CA, 2Agroscope, Zürich, Switzerland

**3:00 BREAK**

3:15 **3589** Chemical analysis of the Brazilian pepper, clover, and citrus honeys produced by the honey bee workers, *Apis mellifera* L. (Hymenoptera: Apidae). Othman Zaghloul1, Nagda El-Sayed1, **Nadia Hassona** (nadia.hassona@yahoo.com)1, Mohamed Moursi2, and Maher Abou-Lila2, 1Alexandria Univ., Alexandria, Egypt, 2Agriculture Research Station, Alexandria, Egypt

3:30 **3590** Floral trait variation affects bee foraging behaviors in cultivated sunflowers. **Rachel Mallinger** (rachel.mallinger@ars.usda.gov) and Jarrad Prasifka, USDA - ARS, Fargo, ND

Ecological interactions between honey bees



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**THURSDAY**

**Thursday, September 29 • AFTERNOON •**

3:45 **3591** Colonies are people too: Personality and fitness in paper wasps (*Polistes fuscatus*). **Jennifer M. Jandt** (jjandt2@gmail.com)1, Colby Behrens2, Sarah Bengston3, and Amy L. Toth2, 1Univ. of Otago, Dunedin, New Zealand, 2Iowa State Univ., Ames, IA, 3Univ. of Rochester, Rochester, NY

4:00 **3592** The impact of different combinations of *Varroa destructor* (Anderson and Trueman) and viruses on honey bee, *Apis mellifera* (L.), colony survival in winter. **Rob Currie** (rob.currie@umanitoba.ca)1, Graham Parsons2, and Zoe Rempel1, 1Univ. of Manitoba, Winnipeg, MB, Canada, 2Saskatchewan Beekeepers Association, Prince Albert, SK, Canada

4:15 **3593** Mason bees and mud: Does nesting material provide an alternative mode of pesticide exposure in *Osmia lignaria*? **Andi Kopit** (andikopit16@gmail.com)1, Theresa Pitts-Singer2, and Ricardo Ramirez1, 1Utah State Univ., Logan, UT, 2USDA - ARS, Logan, UT

4:30 **3594** Pollinator gardens: An aesthetic approach for conservation of pollinators and enhancing ecosystem services in urban habitats. **Timalapur Shivalingaswamy** (shivalinga.swamytm@icar.gov.in), Raghavendra Anjanappa, Ankita Gupta, Shylesha Arakalagud,

Sushil Jalali, and Abraham Verghese, National Bureau of Agricultural Insect Resources, Bangalore, India

4:45 **3595** Who are the ‘lazy’ ants? Inter-worker variation gives insight into potential functions of inactivity. **Daniel Charbonneau** (charbonneau.daniel@gmail.com) and Anna Dornhaus, Univ. of Arizona, Tucson, AZ

5:00 **3596** Sex and asex in termite societies.  
**Toshihisa Yashiro** (yashiro1@kais.kyoto-u.ac.jp) and Kenji Matsuura, Kyoto Univ., Kyoto, Japan

**Contributed Papers: Arthropod Vectors of Animal and Plant Diseases: Plant-Insect- Pathogen Interactions**

***Room W240 A (Convention Center)***

**Moderators:** Ki Kim1 and Deepak Shrestha2, 1Univ. of Florida, Lake Alfred, FL, 2Univ. of Florida, Gainesville, FL

1:30 **3597** Phylogeny and natural host range of the whitefly *Bemisia tabaci* (Hemiptera: Aleyrodidae) sibling species group in western Ecuador.  
**Jorge Paredes-Montero** (jrparedes@email.arizona.edu) and Judith K. Brown, Univ. of Arizona, Tucson, AZ

1:45 **3598** Molecular analysis of thrips diversity and thrips-transmitted *Iris yellow spot virus* (Tospovirus: Bunyaviridae) from Pakistan. **Romana Iftikhar** (rmniftikhar299@gmail.com)1, Muhammad Ashfaq2, Paul Hebert2, and Hanu Pappu3, 1Pakistan Institute of Engineering and Applied Sciences, Islamabad, Pakistan, 2Univ. of Guelph, Guelph, ON, Canada, 3Washington State Univ., Pullman, WA

2:00 **3599** Identification of an aphid protein involved in *Turnip yellows virus* transmission by *Myzus persicae*. Michael Mulot1, Sylvaine Boissinot1, Baptiste Monsion2, Maryam Rastegar3, Monique Erdinger1, Nicole Bochet1, and **Veronique Brault** (veronique.brault@colmar.inra. fr)1, 1INRA, Colmar, France, 2INRA, Montpellier, France, 3Shiraz Univ., Shiraz, Iran

2:15 **3600** The roles of autophagy in the interactions of a whitefly with a plant virus it transmits. **Xin-Ru Wang** (wangxinru002@163.com), Lan-Lan Wang, Shu-Sheng Liu, and Xiao-Wei Wang, Zhejiang Univ., Hangzhou, China

2:30 **3601** Transovarial transmission of a begomovirus by its whitefly vector. Jing Wei, **Ya-Zhou He** (heyazhou@ zju.edu.cn), Qi Guo, Shu-Sheng Liu, and Xiao-Wei Wang, Zhejiang Univ., Hangzhou, China

2:45 **3602** Potyvirus transmission and vector-virus interactions in cucurbit production systems. **Kiran Gadhave** (krg@uga.edu), Bhabesh Dutta, Jason M. Schmidt, and Rajagopalbabu Srinivasan, Univ. of Georgia, Tifton, GA

**3:00 BREAK**

3:15 **3603** Mungbean yellow mosaic India virus strains and weed begomoviruses transmitted by *Bemisia tabaci* in central India. **Hiroaki Noda** (noda@sun.cims. jp)1, Takashi Wada2, Rakesh Kumar Singh3,

Parveen Ansari3, Rakesh Marabi4, and Niraj Tripathi4, 1Japan International Cooperation Agency, Tsukuba, Japan, 2Japan International Cooperation Agency, Kumamoto, Japan, 3Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Indore, India, 4Jawaharlal Nehru Agricultural University, Jabalpur, India

3:30 **3604** Factors affecting transmission rates of ‘*Ca*. Liberibacter asiaticus’ by Asian citrus psyllid (*Diaphorina citri*). **David Hall** (david.hall@ars.usda. gov)1, Eldesouky Ammar1, and Michelle Cilia2, 1USDA - ARS, Ft. Pierce, FL, 2USDA - ARS, Ithaca, NY

3:45 **3605** Host-mediated effect of squash vein  
yellowing virus on whitefly biology and development. **Deepak Shrestha** (dshrestha@ufl.edu), Susan Webb, and Heather J. McAuslane, Univ. of Florida, Gainesville, FL

4:00 **3606** Sequential transmission of Potato virus  
Y strains by *Myzus persicae*. **Shaonpius Mondal** (sm2536@cornell.edu)1 and Stewart Gray2, 1Cornell Univ., Ithaca, NY, 2USDA - ARS, Ithaca, NY

4:15 **3607** The role of *Lygus* sp. in the epidemiology of BLTVA in potatoes in the Pacific Northwest. **Josephine Antwi** (josephine.antwi@oregonstate.edu), Silvia Rondon, Kenneth E. Frost, Aymeric Goyer, and Robert Cating, Oregon State Univ., Hermiston, OR

4:30 **3608** Implications of *Candidatus Liberibacter solanacerum* infection for management and ecology of potato psyllids. **Sean Prager** (sean.prager@ucr.edu), Michael Jones, and John T. Trumble, Univ. of California, Riverside, CA

4:45 **3609** Trunk injection of imidacloprid for the control of Asian citrus psyllid (Hemiptera: Liviidae). **Ki Kim** (ki@pacificaggroup.com), Florida Ag Research, Thonotosassa, FL

5:00 **3610** Thrips as vectors of an emerging maize disease: A case study of maize chlorotic mottle virus. **Johnson Nyasani** (jnyasani@icipe.org), Elizabeth Kusia, Regina Malit, and Sevgan Subramanian, International Centre of Insect Physiology and Ecology, Nairobi, Kenya

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**THURSDAY**

**Thursday, September 29 • AFTERNOON •**

**Contributed Papers: Biodiversity, Biogeography, and Conservation of Arthropods: Coleoptera**

***Room W414 A (Convention Center)***

**Moderators:** Mukti N. Ghimire1 and Margaret Thayer2, 1USDA - APHIS, Buzzards Bay, MA, 2The Field Museum of Natural History, Chicago, IL

4:00 **3620** Fine-scale forest structure as a driver for spider and carabid distribution and composition. **Jaime Pinzon** (jpinzon@ualberta.ca), Linhao Wu, John Spence, and Fangliang He, Univ. of Alberta, Edmonton, AB, Canada

4:15 **3621** Molecular evidence for ecological speciation in the Amazon basin: A case study using Lachnophorini ground beetles (Coleoptera: Carabidae). **Laura Zamorano** (lzamorano@calacademy.org), California Academy of Sciences, San Francisco, CA

4:30 **3622** Habitat complexity mediates intraguild antagonism among predatory carabids*.* **Joseph Taylor** (joseph.m.taylor@wsu.edu) and William E. Snyder, Washington State Univ., Pullman, WA

4:45 **3623** The Pselaphinae (Coleoptera: Staphylinidae) of New Zealand and Australia: A comparison of faunas. **Donald Chandler** (donald.chandler@unh.edu), Univ. of New Hampshire, Durham, NH

**Contributed Papers: Biological Control and Insect Pathology: Unique Studies II**

***West Hall F1 (WF1) (Convention Center)***

**Moderators:** Kelsey Schall1, Nader Sallam2, and  
Yelitza Colmenarez3, 1Univ. of California, Riverside, CA, 2Sugar Research Australia, Gordonvale, Australia, 3CABI, Botucatu, Brazil

1:30 **3624** Use of parasitoids as a biocontrol agent in  
the Neotropical region: Challenges and potential. **Yelitza Colmenarez** (y.colmenarez@cabi.org)1,  
Marcus Sampaio2, and Simone Jahnke3, 1CABI, Botucatu, Brazil, 2Federal Univ. of Uberlândia, Uberlândia, Brazil, 3Federal Univ. of Rio Grande, Porto Alegre, Brazil

1:45 **3625** Molecular characterization of the harmful effect of *Nesidiocoris tenuis* to tomato. **Milena Chinchilla- Ramirez** (chinchilla\_mil@gva.es)1, Alberto Urbaneja1, Víctor Flors2, and Meritxell Pérez-Hedo2, 1Valencian Institute of Agricultural Research, Moncada, Spain, 2Univ. Jaume I, Castelló de la Plana, Spain

2:00 **3626** Studies on *Adelina* sp., pathogen of the greyback canegrub, *Dermolepida albohirtum*, in Queensland canefields, Australia. **Nader Sallam** (nsallam@sugarresearch.com.au)1, Sean Marshall2, and Lisa Derby1, 1Sugar Research Australia, Gordonvale, Australia, 2AgResearch, Ltd., Christchurch, New Zealand

2:15 **3627** Baculovirus IE2 stimulates the expression of heat shock proteins in insect and mammalian cells to facilitate its proper functioning. **Yu-Chan Chao** (mbycchao@imb.sinica.edu.tw) and Hsuan Tung, Academia Sinica, Taipei, Taiwan

2:30 **3628** Occurence of baculovirus infecting the soybean looper, *Crysodeixis includens* (Walker) (Lepidoptera: Noctuidae), in Brazil. **Fernando Valicente** (fernando. valicente@embrapa.br)1, Caio Luiz2, Mariana Alves2, Eloiso Campos2, Victor Costa3, and Francisco Andrés Rodríguez-Dimate4, 1Embrapa Corn and Sorghum,

Sete Lagoas, Brazil, 2Federal Univ. of São João del-Rei, Sete Lagoas, Brazil, 3Federal Univ. of Lavras, Lavras, Brazil, 4Federal Univ. of Viçosa, Sete Lagoas, Brazil



1:30 **3611**  
biological patterns of narrow endemicity *versus* high connectivity across major landscapes. **Athena Lam** (athenawai@gmail.com)1,2, Matthew Van Dam2, Johannes Bergsten3, and Michael Balke2, 1Univ. of California, Berkeley, CA, 2Bavarian State Collection of Zoology, Munich, Germany, 3Swedish Museum of Natural History, Stockholm, Sweden

1:45 **3612** Size- and context-dependent nest-staying behavior of males of the Japanese dung beetle, *Copris acutidens* (Coleoptera, Scarabaeidae). **Mayumi Akamine** (acutidens2000@yahoo.co.jp), Nihon Univ., Fujisawa, Japan

2:00 **3613** The species versus subspecies conundrum in the Hercules beetles (genus *Dynastes*) and its biogeographic and conservation implications. **Jen-Pan Huang** (huangjp@umich.edu), Univ. of Michigan, Ann Arbor, MI

2:15 **3614** To the land beyond the end of the Earth, the rediscovery of the world’s largest flightless dung beetle in southeast Angola, *Scarabaeus cancer* (Arrow)

(Coleoptera: Scarabaeini). **Bruce D. Gill** (scarab57@ xplornet.com)1, T. Keith Philips2, and Shaun Forgie3, 1Rancho Uroxys, Woodlawn, ON, Canada, 2Western Kentucky Univ., Bowling Green, KY, 3Dung Beetle Innovations, Kumeu, New Zealand

2:30 **3615** Utilizing comparative genomic variation of two Appalachian litter beetles to assess land-use history effects on population structure. Michael Caterino and **Shelley Myers** (smyers2@clemson.edu), Clemson Univ., Clemson, SC

2:45 **3616** Niche and morphological evolution of the tortoise beetle tribe Dorynotini, within the context of geographical radiation (Coleoptera: Chrysomelidae: Cassidinae). **Marianna V. P. Simões** (marianna\_simoes1@ ku.edu), Univ. of Kansas, Lawrence, KS

**3:00 BREAK**

3:15 **3617** Response of carabid beetle assemblages to variable retention harvest in boreal mixedwood forest after 15 years. **Linhao Wu** (linhao1@ualberta.ca),  
John Spence, and Jaime Pinzon, Univ. of Alberta, Edmonton, AB, Canada

3:30 **3618** Nearly 500 genera and counting...an overview of Australian Staphylinidae (Coleoptera) and their distributions. **Margaret Thayer** (mthayer@fieldmuseum. org) and Alfred Newton, The Field Museum of Natural History, Chicago, IL

3:45 **3619** Does the spatial distribution of high-cut stumps matter for the red-listed beetle species *Peltis grossa* (L.) (Coleoptera: Tragossitidae)? **Line Djupström** (line.djupstrom@skogforsk.se), Uppsala Science Park, Uppsala, Sweden

Tropical stream beetles show clade idiosyncratic

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2:45 **3629** Implications of Argentine ant management for biological control of the Asian citrus psyllid and other citrus pests. **Kelsey Schall** (kscha008@ucr.edu) and Mark S. Hoddle, Univ. of California, Riverside, CA

**3:00 BREAK**

3:15 **3630** Arthropod predators of Asian citrus psyllid (*Diaphorina citri*) in southern California. **Aviva Goldmann** (agoldmann@gmail.com), Richard Stouthamer, and Paul F. Rugman-Jones, Univ. of California, Riverside, CA

3:30 **3631** Using population models as a predictive tool to guide biological control programs: Wheat stem sawfly as a case study. **Courtney Richmond** (richmond@rowan. edu)1 and Tatyana Rand2, 1Rowan Univ., Glassboro, NJ, 2USDA - ARS, Sidney, MT

3:45 **3632** Understanding arthropod trophic relationships in Mediterranean lettuce crops by DNA-based gut-

content analysis. **Nuria Agusti** (nuria.agusti@irta.cat), Priscila Gomez-Polo, Cristina Castañé, and  
Oscar Alomar, IRTA, Cabrils, Spain

4:00 **3633** Biological control with predaceous mites in open-field fruiting vegetable crops in Florida.  
**Jose Castillo** (jacastil@ufl.edu) and Philip A. Stansly, Univ. of Florida, Immokalee, FL

4:15 **3634** Characterization of the harmful effect of tomato on *Amblyseius swirskii*. **Angeliki Paspati** (paspati\_ang@gva.es)1, Alberto Urbaneja1, and Joel González-Cabrera2, 1Valencian Institute of Agricultural Research, Moncada, Spain, 2Univ. of València, Burjassot, Spain

4:30 **3635** Impact of the predator *Chrysoperla carnea* (Stephens) (Neuroptera: Chrysopidae) on *Zeuzera pyrina* (Linnaeus) (Lepidoptera: Cossidae) populations attacking reclaimed apple orchards at Nobareia region in Egypt. **Ahmed Merghem** (ahmedmerghem@yahoo. com), Plant Protection Research Institute, Giza, Egypt

**Contributed Papers: Ecology and Population Dynamics: Community**

***Room W315 B (Convention Center)***

**Moderators:** Grant De Jong1 and Cedric Alaux2, 1GEI Consultants, Inc., Denver, CO, 2INRA, Avignon, France

1:30 **3636** Coleoptera assemblages in apple orchards along pesticide disturbance and landscape gradients. **Viktor Markó** (viktor.marko@uni-corvinus.hu)1,  
Zoltán Elek2, Anikó Kovács-Hostyánszki3, Ádám Kőrösi2, László Somay3, Rita Földesi3, Ákos Varga1, Ágnes Iván1, and András Báldi3, 1Szent István Univ., Budapest, Hungary, 2Eötvös Loránd Univ., Budapest, Hungary, 3MTA Centre for Ecological Research, Vácrátót, Hungary

1:45 **3637** Integrating landscape ecology and insect physiology: The case of overwintering survival in honey bees. **Cedric Alaux** (cedric.alaux@avignon.inra. fr)1, Fabrice Allier2, and Mickael Henry1, 1INRA, Avignon, France, 2ITSAP Institute of the Bee, Avignon, France

2:00 **3638** Altitudinal and geographic effects on communities of euglossine bees (Hymenoptera: Apidae) in three different phytophysiognomies of  
the Atlantic Forest of São Paulo State, Brazil. **Claudineia Costa** (claudineia@usp.br) and Tiago Francoy, Univ. of São Paulo, São Paulo, Brazil

2:15 **3639** Dung beetle (Coleoptera: Scarabaeidae) community succession in an extreme coastal environment in Turkey. **Gregory Sullivan** (gregory.sullivan@uq.net. au)1, Sebahat Ozman-Sullivan2, Myron Zalucki1,  
Greg Baxter1, Unal Zeybekoglu2, and Jean-Pierre Lumaret3, 1Univ. of Queensland, Brisbane, Australia, 2Ondokuz Mayis Univ., Samsun, Turkey, 3Univ. of Montpellier, Montpellier, France

2:30 **3640** Comparing the evidence for range contractions versus range expansions in populations of the introduced Argentine ant (*Linepithema humile*) in northern California after 30-40 years. **Sean Menke** (menke@lakeforest.edu)1, Philip Ward2, and David Holway3, 1Lake Forest College, Lake Forest, IL, 2Univ. of California, Davis, CA, 3Univ. of California, La Jolla, CA

2:45 **3641** Patch heterogeneity, mutualists and predators drive metacommunity dynamics in an aphid-plant system. **Matthias Senft** (matthias.senft@tum.de)1, Mary Clancy2, Jörg-Peter Schnitzler2, Wolfgang Weisser1, and Sharon Zytynska1, 1Technical Univ., Freising, Germany, 2Helmholtz Center München, Neuherberg, Germany

**3:00 BREAK**

3:15 **3642** Spatial distribution of selected beetles and bugs on an exposed beach of the Great Salt Lake, Utah, USA. **Grant De Jong** (gdejong@geiconsultants.com)1, Shaun Roark1, Ann Neville2, Amanda Kovach1, and Larry Elkin2, 1GEI Consultants, Inc., Denver, CO,

2Rio Tinto Kennecott Corp., South Jordan, UT

3:30 **3643** Interannual variation in the impacts of nutrient pulses on an arthropod foodweb. **Shannon Murphy** (shannon.m.murphy@du.edu)1, Danny Lewis2, and Gina M. Wimp2, 1Univ. of Denver, Denver, CO, 2Georgetown Univ., Washington, DC

3:45 **3644** Climate constrains range expansion of a population diverging under allochrony: The case of  
the pine processionary moth. **Martin Godefroid** (martin.godefroid@gmail.com)1, Susana Rocha2, Helena Santos3, Maria Rosa Paiva3, Christian Burban4, Carole Kerdelhué1, Manuela Branco2, Jean-Yves Rasplus1, and Jean-Pierre Rossi1, 1INRA, Montferrier-sur-Lez, France, 2High Institute of Agronomy, Lisbon, Portugal, 3Univ. Nova, Caparica, Portugal, 4INRA, Cestas, France

4:00 **3645** Metacommunity structure and diversity of aquatic insects in temporary and permanent waters. **Masahiro Suzuki** (gblies.zukky@gmail.com),  
Nao Yamamoto, Norio Hirai, and Minoru Ishii, Osaka Prefecture Univ., Sakai, Japan

4:15 **3646** Spatial and temporal dynamics of natural enemies in winter wheat and canola agroecosystms. **Casi N. Jessie** (casi.jessie@okstate.edu)1, Kris Giles1, Timothy J. Kring2, Brian McCornack3, and James Hagler4, 1Oklahoma State Univ., Stillwater, OK, 2Univ. of Arkansas, Fayetteville, AR, 3Kansas State Univ., Manhattan, KS, 4USDA - ARS, Maricopa, AZ

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4:30 **3647** Presentation withdrawn

4:45 **3648** Linking the green and brown worlds through nonconsumptive predator effects. **Michael Sitvarin** (michaelsitvarin@uky.edu)1, Ann Rypstra2, and James Harwood1, 1Univ. of Kentucky, Lexington, KY, 2Miami Univ., Oxford, OH

**Contributed Papers: Physiology and Biochemistry: Neurophysiology and Hormone Regulation**

***Room W314 B (Convention Center)***

**Moderators:** Andrew Jones1 and Thomas Dykstra2, 1Oxford Brookes Univ., Oxford, United Kingdom, 2Dykstra Laboratories, Inc, Gainesville, FL

1:30 **3649** Diapause incidence of progeny in relation to photoperiod and temperature experienced by their parents in the cabbage beetle, *Colaphellus bowringi*. **Fangsen Xue** (xue\_fangsen@hotmail.com), Haijun Xiao, and Haimin He, Jiangxi Agricultural Univ., Nanchang, China

1:45 **3650** RNA A-to-I editing broadens the transcriptome and pharmacological diversity of the mosquito RDL GABA receptor. **Andrew Jones** (a.jones@brookes. ac.uk)1, Isabel Bermudez1, and Jennina Taylor-Wells2, 1Oxford Brookes Univ., Oxford, United Kingdom, 2Univ. of Florida, Gainesville, FL

2:00 **3651** Constancy and variability of identified glomeruli in the antennal lobe of heliothine moths. **Xin-Cheng Zhao** (xincheng@henau.edu.cn), Henan Agricultural Univ., Zhengzhou, China

2:15 **3652** Regulation of the ecdysone signaling in *Spodoptera litura*. **Lihua Huang** (huanglh@scnu.edu. cn), South China Normal Univ., Guangzhou, China

2:30 **3653** Two competing theories of insect olfaction must both be rejected. **Thomas Dykstra** (dykstralabs@ yahoo.com) and Drew Swaggerty, Dykstra Laboratories, Inc, Gainesville, FL

2:45 **3654** Regulation of ecdysteroid biosynthesis and action in the desert locust, *Schistocerca gregaria*. **Cynthia Lenaerts** (cynthia.lenaerts@bio.kuleuven.be), Elisabeth Marchal, Pieter Van Wielendaele, Paulien Peeters, Dorien Cools, Jolien Palmans, and

Jozef Vanden Broeck, Catholic Univ., Leuven, Belgium

**3:00 BREAK**

3:15 **3655** Morphology of the female reproductive system and physiological age-grading of *Megamelus scutellaris* (Hemiptera: Delphacidae), a biological control agent of water hyacinth. **Michael Grodowitz** (michael.grodowitz@ ars.usda.gov)1, Elizabeth Mattison2, Ted Center3, and Philip Tipping2, 1USDA - ARS, Stoneville, MS, 2USDA - ARS, Ft. Lauderdale, FL, 3USDA - ARS (Retired),

Ft. Lauderdale, FL

3:30 **3656** Metabolomic and lipidomic insights into photoperiodically induced diapause in the green-veined white (*Pieris napi*). **Philipp Lehmann** (philipp.lehmann@ zoologi.su.se)1, Karl Gotthard1, Vladimir Kostal2,  
Sören Nylin1, Peter Pruisscher1, and Christopher Wheat1, 1Stockholm Univ., Stockholm, Sweden, 2Czech Academy of Sciences, České Budějovice, Czech Republic

3:45 **3657** Presentation withdrawn

4:00 **3658** Neurobiology of self-defense: Multiple nerves and identified neurons control the defense glands of stick insects. Konrad Stolz, Christoph-Rüdiger von Bredow, Yvette von Bredow, Reinhard Lakes-Harlan, Tina Trenczek, and **Johannes Strauss** (johannes.strauss@physzool. bio.uni-giessen.de), Justus Liebig Univ., Gießen, Germany

4:15 **3659** *DINeR* — A Database for Insect Neuropeptide Research. **Aniruddha Pandit** (aniruddha.pandit@ glasgow.ac.uk), Joseph Yeoh, Shireen Davies, and Julian Dow, Univ. of Glasgow, Glasgow, United Kingdom

4:30 **3660** Function of lateral cell cluster projection neurons in moth olfactory processing. **Neil J. Vickers** (n.vickers@utah.edu)1, Christine Fogarty-Celestino2, Seong-Gyu Lee1, Christoph Kleineidam3, and Jeffrey Stagg1, 1Univ. of Utah, Salt Lake City, UT, 2Juan Diego Catholic High School, Draper, UT, 3Univ. of Konstanz, Konstanz, Germany

4:45 **3661** Role of octopamine in control of foregut contraction in the black field cricket (*Teleogryllus commodus*) and the Australian plague locust (*Chortoicetes terminifera*). **Paul D. Cooper** (paul.cooper@ anu.edu.au)1 and James Woodman2, 1The Australian National Univ., Canberra, Australia, 2Australian Government Dept. of Agriculture, Canberra, Australia

5:00 **3662** The physiological-developmental mechanisms regulating metamorphosis in solitary bees. **Bryan Helm** (bryan.r.helm@ndsu.edu)1, Joseph P. Rinehart2,  
George Yocum2, Kendra Greenlee1, and Julia Bowsher1, 1North Dakota State Univ., Fargo, ND, 2USDA - ARS, Fargo, ND

**Contributed Papers: Physiology and Biochemistry: Toxicology, Metabolism, and Nutrition**

***Room W223 B (Convention Center)***

**Moderators:** Juliana Rangel Posada1 and Rebecca Clark2, 1Texas A&M Univ., College Station, TX, 2Univ. of California, Berkeley, CA

1:30 **3663** Antioxidative enzyme expression in honey bee (*Apis mellifera*) queens as an assessment of reproductive quality. **Alejandra Gonzalez** (alejandracula@tamu.edu) and Juliana Rangel Posada, Texas A&M Univ., College Station, TX

1:45 **3664** Tissue nonautonomous effects of fat body methionine metabolism on epithelial repair in *Drosophila melanogaster*. **Fumiaki Obata** (fumiaki. obata@crick.ac.uk)1,2, Soshiro Kashio2, Liu Zhang2, Tomonori Katsuyama2,3, Takahiro Chihara2,3, and Masayuki Miura2,3, 1The Francis Crick Institute, London, United Kingdom, 2The Univ. of Tokyo, Tokyo, Japan, 3Agency for Medical Research and Development, Tokyo, Japan

2:00 **3665** Dietary rescue of phenotype: You are what you eat. **Margaret Allen** (meg.allen@ars.usda.gov), USDA - ARS, Stoneville, MS

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**THURSDAY**

**Thursday, September 29 • AFTERNOON •**

2:15 **3666** Characterization of two venom peptides of social wasp *Parapolybia varia*. **Kyungjae Yoon** (kongbob89@snu.ac.kr)1, Kyungmun Kim1, A-Young Kim2, Woo Young Bang3, ChangMu Kim3, Joo-Hong Yeo3, Young Ho Koh4, and Si Hyeock Lee1, 1Seoul National Univ., Seoul, South Korea, 2Hallym Univ., Anyang, South Korea, 3National Institute of Biological Resources, Incheon, South Korea, 4Hallym Univ., Chuncheon, South Korea

2:30 **3667** The GPCR/G-protein/Adenylyl Cyclase/Protein Kinase A pathway in insecticide resistance of the mosquito *Culex quinquefasciatus*. **Ting Li** (litingwinner@ gmail.com) and Nannan Liu, Auburn Univ., Auburn, AL

2:45 **3668** Nutrition physiology of the pear psylla, *Cacopsylla pyri*. **Guillaume Le Goff** (guillaume.legoff@ uclouvain.be)1, Olivier Lebbe1, Gertrude Lohaus2, Aurore Richel3, Nicolas Jacquet3, Virginie Byttebier3, and Thierry Hance1, 1Catholic Univ. of Louvain, Louvain-la-Neuve, Belgium, 2Bergische Univ., Wuppertal, Germany, 3Univ. of Liège, Gembloux, Belgium

**3:00 BREAK**

3:15 **3669** Mechanisms of spinosad resistance in European populations of the tomato leafminer. Madeleine Berger1, Mirel Puinean1, Pablo Bielza2,  
Rob Jacobson3, Lin Field1, Chris Bass4, and  
**Martin Williamson** (martin.williamson@rothamsted. ac.uk)1, 1Rothamsted Research, Harpenden, United Kingdom, 2Polytechnic Univ. Cartagena, Spain,

3RJC, Ltd., Yorkshire, United Kingdom, 4Univ. of Exeter, Penryn, United Kingdom

3:30 **3670** Food protein-carbohydrate content influences amino acid metabolism in the wing-dimorphic cricket *Gryllus firmus*. **Rebecca Clark** (r11clark@gmail.com)1, Spencer T. Behmer2, and Anthony J. Zera3, 1Univ. of California, Berkeley, CA, 2Texas A&M Univ., College Station, TX, 3Univ. of Nebraska, Lincoln, NE

3:45 **3671** A novel protein active from a *Pseudomonas* strain with unique mode of action against western corn rootworm, *Diaborica virgifera virgifera* (LeConte). Nuria Jiménez-Juárez1, **Mark Nelson** (mark.e.nelson@ pioneer.com)1, Jarred Oral2, Lu Liu2, Gusui Wu3, Priyesh Patel1, Claudia Pérez-Ortega1, and

Ute Schellenberger2,4, 1DuPont Pioneer, Wilmington, DE, 2DuPont Pioneer, Hayward, CA, 3DuPont Pioneer, Johnston, IA, 4OMT Therapeutics, Palo Alto, CA

4:00 **3672** Metabolic mechanisms mediating the miserable months: Metabolomics of periodic arousal in insect diapause. **Chao Chen** (chaochenjxau@126.com), Nicholas M. Teets, Thomas Powell, and Daniel Hahn, Univ. of Florida, Gainesville, FL

4:15 **3673** The structure, transcriptional regulation, and function of *Helicoverpa armigera* sterol carrier protein-2, an important insecticidal target from the cotton bollworm. **Rong Peng** (pengrong@mail.ccnu. edu.cn), Central China Normal Univ., Wuhan, China

4:30 **3674** Expressing a moth ABCC2 gene in transgenic *Drosophila* causes Bt Cry1Ac susceptibility without requiring a cadherin-like protein receptor. **Simon Baxter** (simon.baxter@adelaide.edu.au), Tristan Stevens, and Sisi Song, Univ. of Adelaide, Adelaide, Australia

4:45 **3675** Identification of a Cry2Ab receptor in four Lepidoptera. **John Mathis** (john.mathis@pioneer.com)1, Catherine Finke1, James Becker1, and Mark Nelson2, 1DuPont Pioneer, Johnston, IA, 2DuPont Pioneer, Wilmington, DE

5:00 **3676** Studies on locomotory behaviour of susceptible and insecticide-resistant populations of *Plutella xylostella* (Linnaeus). **Anureet Chandi** (anureetchandi@ pau.edu), Punjab Agricultural Univ., Ludhiana, India

**Contributed Papers: Biological Control and Insect Pathology: Utilizing Parasitoid Wasps II**

***Room W224 G (Convention Center)***

**Moderators:** Md. Habibullah Bahar1, Thierry Hance2, and Maryam Yazdani3, 1Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, 2Catholic Univ. of Louvain, Louvain-la- Neuve, Belgium, 3Univ. of Adelaide, Adelaide, Australia

3:30 **3677** Larval interspecific competition influences adult behaviour of two aphid parasitoids: *Aphidius rhopalosiphi* and *Aphidius ervi* (Hymenoptera: Aphidiinae). **Thierry Hance** (thierry.hance@uclouvain. be) and Isabelle Frère, Catholic Univ. of Louvain, Louvain-la-Neuve, Belgium

3:45 **3678** Comparison of two release methods for establishing *Oobius agrili* (Hymenoptera: Encyrtidae), the introduced egg parasitoid of *Agrilus planipennis* (Coleoptera: Buprestidae), in Michigan. **Toby R. Petrice** (tpetrice@fs.fed.us)1,2, Forrest Ravlin2, Leah S. Bauer1, Therese Poland1, Kenneth Raffa3, and  
Deborah G. McCullough2, 1USDA - Forest Service, Lansing, MI, 2Michigan State Univ., East Lansing, MI, 3Univ. of Wisconsin, Madison, WI

4:00 **3679** *Dolichogenidea tasmanica* (Hymenoptera: Braconidae) as a potential biocontrol agent of light brown apple moth (LBAM), *Epiphyas postvittana* (Lepidoptera: Tortricidae). **Maryam Yazdani** (maryam. yazdani@adelaide.edu.au) and Michael Keller, Univ. of Adelaide, Adelaide, Australia

4:15 **3680** Potential use of factitious and artificial hosts for mass rearing *Trichogramma* sp. in different countries. **Jureerat Rattanatip** (jureerat.rattanatip@uclouvain. be)1, Gregory Sempo2, and Thierry Hance1, 1Catholic Univ. of Louvain, Louvain-la-Neuve, Belgium, 2Free Univ. of Brussels, Brussels, Belgium

4:30 **3681** A three-year field study on the biological control of diamondback moth (*Plutella xylostella*)  
in Saskatchewan, Canada. **Md. Habibullah Bahar** (bablu91@yahoo.com)1,2, Juliana J. Soroka2, Owen Olfert2, and Chrystel Olivier2, 1AgQuest (Alta), Inc., Taber, AB, Canada, 2Agriculture and Agri-Food Canada, Saskatoon, SK, Canada

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**THURSDAY**

**Thursday, September 29 • AFTERNOON/EVENING •**

4:45 **3682** Parasitism rate, functional response, and preference of the endoparasitoid *Campoletis sonorensis* (Cameron, 1886) to native and invasive hosts.  
**Henry Murillo** (hmp6@alu.ua.es)1, Maria Angeles Marcos1 and Sherah VanLaerhoven2, 1Univ. of Alicante,

San Vicente del Raspeig, Spain, 2Univ. of Windsor, Windsor, ON, Canada

5:00 **3683** Biological characteristics and adaptability  
of larval parasitoids associated with *Liriomyza huidobrensis* (Blanchard) (Diptera: Agromyzidae) in exploiting their host. **I. Wayan Supartha** (yansupartha@ yahoo.com), Univ. of Udayana, Denpasar, Indonesia

**Thursday, September 29, 2016 • Evening**

**Wigglesworth Memorial Lecture Award Featuring Dr. John G. Hildebrand**

***Chapin Theater (Convention Center)***

**Moderators and Organizers:** Walter S. Leal1, Alvin M. Simmons2, and John Pickett3, 1Univ. of California, Davis, CA, 2USDA - ARS, Charleston, SC, 3Rothamsted Research, Harpenden, United Kingdom



6:00 **3684**  
rothamsted.ac.uk), Rothamsted Research, Harpenden, United Kingdom

6:05 **3685** How insects smell, and why we should care. **John Hildebrand** (jhildebr@email.arizona.edu), Univ. of Arizona, Tucson, AZ

**Poster Session 4: Agriculture and Forest Entomology, Part 2**

***West Hall C (Convention Center)***

* **D3738**Odor differences between brown rice plant hopper and health rice plant based on electronic nose. **Zhou Zhiyan** (zyzhou@scau.edu.cn), South China Agricultural Univ., Guangzhou, China
* **D3739**Fresh market green bean protection in Egypt’s upper Nile Valley: The USAID feed the future farmer to farmer initiative. **Thomas Anderson** (tom@entoniche.com)1 and Henry Van T. Cotter2, 1Entoniche Consulting LLC, Clayton, NC, 2North Carolina State Univ., Raleigh, NC
* **D3740**Flight parameters and the nutritive requirements for flight of *Drosophila suzukii*. **Jessica Wong** (wongjes@ oregonstate.edu)1, Adam Cave2, and Jana Lee2, 1Oregon State Univ., Corvallis, OR, 2USDA - ARS, Corvallis, OR
* **D3741**Relationship among strain of *Bacillus thuringiensis*, tannic acid and mid-gut protease with *Spodoptera exigua*. **Na-Young Jin** (dool12340@nate.com), You-Kyoung Lee, Yu-Seop Kim, Jun-Hack Jeon, Bo-Ram Lee, Hee Ji Kim, Young-Nam Youn, and Yong-Man Yu, Chungnam National Univ., Daejeon, South Korea

**D3742** Parasitism of silk moths by the tachinid *Compsilura concinnata* along forest compositional gradients. **Rea Manderino** (rmanderi@syr.edu)1, Patrick Tobin2, and Dylan Parry1, 1State Univ. of New York, Syracuse, NY, 2Univ. of Washington, Seattle, WA

**D3743** Tree-crop agroforestry systems promote natural control of the millet head miner, *Heliocheilus albipunctella*. **Thierry Brévault** (thierry.brevault@cirad. fr)1,2, Ahmadou Sow2,3, Ibrahima Thiaw4,5, Gérard Delvare1, and Valérie Soti1,4, 1CIRAD, Montpellier, France, 2BIOPASS, Dakar, Senegal, 3Univ. Cheikh Anta Diop, Dakar, Senegal, 4Center of Ecological Monitoring,

Dakar, Senegal, 5Gaston Berger Univ., Saint Louis, Senegal

**D3744** Acute toxicity of botanochemicals thymol and ginger oil against paddy leaf folder *Cnaphalocrocis medinalis* (Guenee) (Lepidoptera: Pyralidae). **Ayyasamy Regupathy** (ayyasamy.regu@gmail.com) and M. Sivasankari, Annamalai Univ., Chidambaram, India

**D3745** Effect of *Beauveria bassiana* Vuill. on nymphs of *Thaumastocoris peregrinus*. **Flávio Cechim** (flaviera@ gmail.com)1, Raquel Ribeiro2, Sidinei Dallacort3,  
Flavia Tedesco3, Everton Lozano3, and Michele Potrich3, 1Federal Institute of Paraná, Campus Quedas do Iguaçú, QuedassdosIguaçú, PR, Brazil, 2Federal Univ. of Technology of Paraná, Pato Branco, Brazil, 3Federal Univ. of Technology of Paraná, Dois Vizinhos, Brazil

**D3746** Indoor-rearing conditions of the fungus gnat, *Bradysia agrestis* (Diptera: Sciaridae), and their mortalities against several insecticides. **Hyun Ju Jang** (jangheunju@naver.com), Yong-Man Yu, and Young-Nam Youn, Chungnam National Univ., Daejeon, South Korea

**D3747** X-ray irradiation as a quarantine treatment for the control of six insect pests in cut flower boxes. **Wooseong Cho** (whiteckh916@naver.com)1, Hyun-Na Koo1, Seung-Hwan Yun1, Wonjin Kang1, Hyun Kyung Kim1, Jeong Oh Yang2, and Gil-Hah Kim1, 1Chungbuk National Univ., Cheongju, South Korea, 2Animal and Plant Quarantine Agency, Suwon, South Korea

**D3748** Eradication of the sweetpotato weevil, *Cylas formicarius* (Coleoptera: Curculionidae), from Kume Island, Okinawa, Japan by using a combination of the sterile insect technique and the male annihilation technique.

**Dai Haraguchi** (hrguchid@pref.okinawa.lg.jp)1, Takashi Matsuyama2, Yasutsune Sadoyama2,  
Tsuguo Kohama1, Kunio Kinjo1, Norikuni Kumano3, Keiko Ohno-Shiromoto4, and Takashi Kuriwada5, 1Okinawa Prefectural Agricultural Research Center, Itoman, Japan, 2Okinawa Prefectural Plant Protection Center, Naha, Japan, 3Obihiro Univ. of Agriculture and Veterinary Medicine, Obihiro, Japan, 4Ryukyu-Sankei Co., Ltd., Naha, Japan, 5Kagoshima Univ., Kagoshima, Japan

**D3749** Pest control effects according to low spray volume of pesticide in apple orchard. **Yong-Man Yu** (ymyu@cnu. ac.kr), Na-Young Jin, You-Kyoung Lee, Yu-Seop Kim, Jun-Hack Jeon, Bo-Ram Lee, Hee Ji Kim, and Young-Nam Youn, Chungnam National Univ., Daejeon, South Korea

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**FRIDAY**

**Friday, September 30 • MORNING •**

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* **D3750**Fastac® CS Insecticide: Alpha-cypermethrin in an inno- vative formulation. **Daniel O’Byrne** (daniel.obyrne@basf. com)1, Rebecca Willis1, Christa Ellers-Kirk1,  
  Rianna Guethling1, Claude Taranta2, Siddharth Tiwari1, and Richard Tyler1, 1BASF, Research Triangle Park, NC, 2BASF, Limburgerhof, Germany
* **D3751***Delia* species (Diptera: Anthomyiidae) and chlorpyrifos- resistance survey in brassica vegetable growing areas in Canada. **Josée Owen** (josee.owen@agr.gc.ca)1, Peggy Dixon2, Bob Vernon3, Renee Prasad4, and   
  Ian Scott5, 1Agriculture and Agri-Food Canada, Fredericton, NB, Canada, 2Agriculture and Agri-Food Canada, St. John’s, NF, Canada, 3Agriculture and Agri- Food Canada, Agassiz, BC, Canada, 4E.S. Cropconsult, Ltd., Surrey, BC, Canada, 5Agriculture and Agri-Food Canada, London, ON, Canada
* **D3752**Control of southern fire ant, *Solenopsis xyloni,* in tree nuts with AltrevinTM fire ant bait insecticide. **Anna Chapman** (anna.chapman@basf.com)1,  
  H. Alejandro Arevalo2, and Doug Haller1, 1BASF, Durham, NC, 2BASF, Research Triangle Park, NC
* **D3753**Presentation withdrawn
* **D3754**Effect of tobacco thrips on yield in different varieties of upland cotton. F. Bourland1, **Glenn Studebaker** (gstudebaker@uaex.edu)2 and Logan Towles1, 1Univ. of Arkansas, Keiser, AR, 2Univ. of Arkansas Cooperative Extension Service, Keiser, AR
* **D3755**Screening new genotypes of St. Augustine grass for resistance to southern chinch bug (Hemiptera: Blissidae). **Nicole B. Benda** (nbenda@ufl.edu), Kevin Kenworthy, and Kenneth Quesenberry, Univ. of Florida, Gainesville, FL
* **D3756**Expression of host plant resistance in melon to sweetpotato whitefly in the desert southwest United States. **Eric Natwick** (etnatwick@ucanr.edu)1,  
  James McCreight2, and William Wintermantel2, 1Univ. of California Cooperative Extension, Holtville, CA, 2USDA - ARS, Salinas, CA
* **D3757**Development and use of LED traps for monitoring the southern green stink bug, *Nezara viridula* (Heteroptera: Pentatomidae). **Nobuyuki Endo** (enobu@affrc.go.jp)1 and Mantaro Hironaka2, 1NARO Kyushu Okinawa Agricultural Research Center, Koshi, Japan, 2Hamamatsu Univ. School of Medicine, Shizuoka, Japan
* **D3758**Research on the occurrence and attraction traps development of *Chilo suppressalis* (Walker) in the bioenergy crop *Miscanthus sacchariflorus* cv. Geodae 1 in Korea. **Nakjung Choi** (njchoi@korea.kr) and June-Yeol Choi, National Institute of Crop Science, Wanju, South Korea
* **D3759**The United Kingdom suction trap network – a potential early warning system for the presence of new pests and diseases. **Fiona Highet** (fiona.highet@sasa.gsi.gov. uk)1, Mairi Carnegie1, Maria Sjölund1, Adrian Roberts2, James Bell3, and Jon Pickup1, 1Science and Advice for Scottish Agriculture, Edinburgh, United Kingdom, 2Biomathematics & Statistics Scotland, Edinburgh, Scotland, 3Rothamsted Research, Harpenden,   
  United Kingdom

**D3760** A binary (pheromone-host plant volatile) lure combined with acetic acid could enhance bisexual monitoring of codling moth (Lepidoptera: Tortricidae). **Esteban Basoalto** (esteban.basoalto@uach.cl)1, Valentina Mujica2, Liliana Cichón3, Eduardo Fuentes- Contreras4, Wilson Barros-Parada4, and Alan L. Knight5, 1Univ. Austral, Valdivia, Chile, 2National Institute of Agricultural Research, Rincón del Colorado, Uruguay, 3INTA, General Roca, Argentina, 4Univ. of Talca, Talca, Chile, 5USDA - ARS, Wapato, WA

**D3761** Monitoring, forecasting, and risk warning systems for field crop insects for the Canadian prairie ecoregion. **Jennifer Otani** (jennifer.otani@agr.gc.ca)1, Scott Meers2, Scott Hartley3, John Gavloski4, and Owen Olfert5, 1Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, 2Alberta Agriculture and Rural Development, Brooks, AB, Canada, 3Saskatchewan Agriculture, Regina, SK, Canada, 4Manitoba Agriculture, Food and Rural Initiatives, Carman, MB, Canada, 5Agriculture and Agri-Food Canada, Saskatoon, SK, Canada

**D3762** Influence of fire on ambrosia beetles (Curculionidae, Scolytinae and Platypodinae) in rubber tree plantations (*Hevea brasiliensis*) in southern Brazil. **Gabriela Pinheiro** (gabrielac.pinheiro95@gmail.com) and Carlos Flechtmann, São Paulo State Univ., Ilha Solteira, Brazil

**D3763** Flight response of the California fivespined ips, *Ips paraconfusus* Lanier (Coleoptera: Curculionidae), to lure treatments. **Todd Murray** (tmurray@wsu.edu)1, Nicholas C. Aflitto2, Elizabeth A. Willhite3, and  
David Wakarchuk4, 1Washington State Univ., Stevenson, WA, 2Cornell Univ., Ithaca, NY, 3USDA - Forest Service, Sandy, OR, 4Synergy Semiochemicals Corp, Burnaby, BC, Canada

**D3764** Conditional decisions to stay or disperse in cooperatively breeding beetles. **Jon Andreja Nuotclà** (jon.nuotcla@iee.unibe.ch) and Michael Taborsky, Univ. of Bern, Bern, Switzerland

**D3765** Damage of bark beetles on the establishment of radiata pine can be reduced through ethological control. **Miguel Angel Poisson** (mpoisson@arauco.cl),  
Rodrigo Ahumada, and Hernán Martínez, Bioforest S.A., Coronel, Chile

**D3766** Presentation withdrawn

**D3767** Microbial associates of the eusocial ambrosia beetle *Austroplatypus incompertus*. **Robert Mueller** (r.mueller@westernsydney.edu.au), Shannon Smith, and Markus Riegler, Western Sydney Univ., Richmond, Australia

**D3768** Landing rate of the walnut twig beetle, *Pityophthorus juglandis,* on two western North American walnut species, *Juglans californica* and *J. major*. **Irene Lona** (ilona1@mail.csuchico.edu)1, Donald Miller1,

Colleen Hatfield1, Richard Rosecrance1, and Steven Seybold2, 1California State Univ., Chico, CA, 2USDA - Forest Service, Davis, CA



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* **D3769**Gypsy moth (*Lymantria dispar* L.) mtDNA phylogeography in forests of Europe, a base to monitor the migration of potentially dangerous populations. **Nikola Lackovic** (nikolal@sumins.hr)1, Dimitrios Avtzis2, Milan Pernek1, Damjan Franjevic3, Andreas Linde4, and Christian Stauffer5, 1Croatian Forest Research Institute, Jastrebarsko, Croatia, 2Forest Research Institute, Thessaloniki, Greece, 3Univ. of Zagreb, Zagreb, Croatia, 4Univ. of Applied Sciences, Eberswalde, Germany, 5Univ. of Natural Resources & Applied Life Sciences, Vienna, Austria
* **D3770**An accurate detection of *Bursaphelenchus xylophilus* and *B. mucronatus*, caused by pine wilt disease, by Multiplex PCR using species-specific primers from *Monochamus alternatus* and *M. saltuarius* insect vectors. **Chansik Jung** (csjung@korea.kr),   
  Myeong Jin Jang, Sang-Tae Seo, Sun Keun Lee, and Kwang Sik Choi, National Institute of Forest Science, Seoul, South Korea
* **D3771**A systems approach towards understanding the underlying molecular and physiological biology of  
  the large pine weevil (*Hylobius abietis*) through transcriptomic analyses. Joseph Yeoh1, Richard Marley1, Daegan Inward2, **Anthony Dornan** (anthony.dornan@ glasgow.ac.uk)1, Shireen Davies1, and Julian Dow1,   
  1Univ. of Glasgow, Glasgow, United Kingdom, 2Forest Research, Farnham, United Kingdom
* **D3772**Comparison of different pheromone traps for the capture of adults of the processionary pine moth, *Thaumetopoea pityocampa* (Denis and Schiffermüller) (Lepidoptera: Thaumetopoeidae), and assessment of its control with mating disruption. Christos Athanassiou1, Nickolas Kavallieratos2, **Dimitris Kontodimas** (d.kontodimas@bpi.gr)3, Maria Boukouvala4, Anastassia Nikolaidou1, Dimitra Markoyiannaki Printziou5, Pasquale Trematerra6, Marco Colacci6, David Pardo Talavera7, Jose Sancho Sanchez8, and Santiago Galvez Settier8, 1Univ. of Thessaly, Nea Ionia, Greece, 2Agricultural Univ. of Athens, Attica, Greece, 3Benaki Phytopathological Institute, Athens, Greece, 4Agricultural Univ. of Athens, Athens, Greece, 5Benaki Phytopathological Institute, Kifissia, Greece, 6Univ. of Molise, Campobasso, Italy, 7Sansan Prodesing S.L., Valencia, Spain, 8Technological Institute of Plastics, Valencia, Spain
* **D3773**Interception strategies for managing ambrosia beetles (Coleoptera: Curculionidae) in tree nurseries. **Michael Reding** (mike.reding@ars.usda.gov)1, Christopher Ranger1, Peter B. Schultz2, and   
  Jason B. Oliver3, 1USDA - ARS, Wooster, OH, 2Virginia Polytechnic Institute and State Univ., Virginia Beach, VA, 3Tennessee State Univ., McMinnville, TN
* **D3774**Developing and improving survey methods for  
  emerald ash borer and other woodboring beetles. **Joseph Francese** (joe.francese@aphis.usda.gov)1, Benjamin Sorensen2, Nadeer Youssef3, Vanessa Lopez4, Jacek Hilszczañski5, Jason B. Oliver3, and David Lance1, 1USDA - APHIS, Buzzards Bay, MA, 2USDA - APHIS, Brighton, MI, 3Tennessee State Univ., McMinnville, TN, 4Xavier Univ., Cincinnati, OH, 5Forest Research Institute, Raszyn, Poland

**D3775** Buprestid and cerambycid trapping: The progression of 13 years of trapping. **Nadeer Youssef** (nyoussef@ blomand.net)1, Jason B. Oliver1, Donna Fare2,  
William Klingeman3, Joseph Francese4,

Joshua P. Basham1, Joseph Lampley1, Debbie Eskandarnia1, and Garrett Roper1, 1Tennessee State Univ., McMinnville, TN, 2U.S. National Arboretum, McMinnville, TN, 3Univ. of Tennessee, Knoxville, TN, 4USDA - APHIS, Buzzards Bay, MA

**D3776** Trapping forest Coleoptera: What works best? **Richard Redak** (richard.redak@ucr.edu)1 and Jeremy Allison2, 1Univ. of California, Riverside, CA, 2Natural Resources Canada, Sault Ste. Marie, ON, Canada

**D3777** Walnut twig beetle trapping yields insights for monitoring secondary pest Scolytinae in Tennessee. **William Klingeman** (wklingem@utk.edu)1, Alicia Bray2, Jason B. Oliver3, Christopher Ranger4, and

Debra Palmquist5, 1Univ. of Tennessee, Knoxville, TN, 2Central Connecticut State Univ., New Britain, CT, 3Tennessee State Univ., McMinnville, TN, 4USDA - ARS, Wooster, OH, 5USDA - ARS, Peoria, IL

**D3778** A 10-year evaluation of intellectual property in entomology. **Ronda L. Hamm** (rlhamm@dow.com) and Anne Gregg, Dow AgroSciences, Indianapolis, IN

**D3779** Diterpene resin acids in conifer interfere with insect juvenile hormone-mediated gene regulation in *Tribolium castaneum* and development in *Plodia interpunctella*. **Chan-Seok Yun** (godddung@kribb. re.kr)1, Alexander Raikhel2, Hyun-Woo Oh1,  
Doo-Sang Park1, Jun Hyoung Jeon1, and Sang Woon Shin2, 1Korea Research Institute of Bioscience and Biotechnology, Daejeon, South Korea, 2Univ. of California, Riverside, CA

**D3780** Agroforestry coffee system with rainforest alliance certification and insect biodiversity in Villa Rica, Peru. **Alfonso Lizárraga** (alizarraga@cientifica.edu.pe), Scientific Univ. of the South, Lima, Peru

**D3781** Forest Stewardship Council (FSC) pesticides policy and integrated pest management in certified plantations  
in Brazil. **Pedro Lemes** (pedroglemes@hotmail.com)1, José Zanuncio2, José Eduardo Serrão2, and

Simon Lawson3, 1Federal Univ. of Minas Gerais, Montes Claros, Brazil, 2Federal Univ. of Viçosa, Viçosa, Brazil, 3Univ. of the Sunshine Coast, Sippy Downs, Australia

**D3782** Arthropod Management Tests: Metamorphosis of an ESA journal. **Jon Babcock** (jmbabcock@dow.com)1, Eric Natwick2, and Lisa Junker3, 1Dow AgroSciences, Indianapolis, IN, 2Univ. of California, Holtville, CA, 3Entomological Society of America, Annapolis, MD

**D3783** Educating the next generation - funding opportunities in food, agricultural, natural resources and human sciences education. **Joyce Parker** (joyce.parker@nifa. usda.gov) and Siva Sureshwaran, USDA - NIFA, Washington, DC

**D3784** eFile: A new web-based platform for United States Department of Agriculture permits. **Wayne F. Wehling** (wayne.f.wehling@aphis.usda.gov), USDA - APHIS, Riverdale, MD

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* **D3785**Educational impact of NPDN taxonomic training videos. **Ariane McCorquodale** (amccorquodale@ufl. edu) and Amanda C. Hodges, Univ. of Florida, Gainesville, FL
* **D3786**‘Walnut Alert’, thousand cankers disease, and black walnut: Can outreach crack a tough nut?  
  **Jerome F. Grant** (jgrant@utk.edu)1, Frank Hale2,  
  Alan Windham2, Paris L. Lambdin1, Gregory J. Wiggins1, and Mark T. Windham1, 1Univ. of Tennessee, Knoxville, TN, 2Univ. of Tennessee, Nashville, TN

**Poster Session 4: Apidology, Sericulture, and Social Insects**

***West Hall C (Convention Center)***

* **D3787**Comparison of microbial communities in monogyne and polygyne *Solenopsis invicta* colonies by denaturing gradient gel electrophoresis. Charles Apperson, **Nicholas Travanty** (nvtravan@ncsu.edu), and Loganathan Ponnusamy, North Carolina State Univ., Raleigh, NC
* **D3788**Evidences of dear enemy phenomenon in a gen- eralist ant species, *Pheidole oxyops* (Hymenoptera: Formicidae)*.* **Diego Santana Assis** (santanaphoenix@ gmail.com) and Fabio Nascimento, Univ. of São Paulo, Ribeirão Preto, Brazil
* **D3789**Interaction and communication network among nestmates during nestsite selection and migration in *Temnothorax congruus*. **Kazutaka Syoji** (syoji-kazutaka@ed.tmu.ac.jp) and Katuyuki Eguchi, Tokyo Metropolitan Univ., Hachioji, Japan
* **D3790**Sharing nutrients of the queen black carpenter ant, *Camponotus japonicas*, between her own somatic maintenance and offspring production. **Naoto Idogawa** (spinyant@gmail.com), Tomoyuki Yokoi, and   
  Mamoru Watanabe, Univ. of Tsukuba, Tsukuba, Japan
* **D3791**Inhibiting worker reproduction in a queenless ant, *Dinoponera quadriceps*: The effects of pheromones and physical presence of a gamergate. **Ivelize Tannure- Nascimento** (itannure@uol.com.br) and Fabio Nascimento, Univ. of São Paulo, Ribeirão Preto, Brazil
* **D3792**Environmental and spatial heterogeneity effects on information flow in ant colonies: An agent-based model study. **Xiaohui Guo** (biogxh@gmail.com), Yun Kang, and Jennifer H. Fewell, Arizona State Univ., Tempe, AZ
* **D3793**The use of translucent larval skin mutants of the silkworm ”o06” as animal models of hyperuricemia. **Ryuichiro Tanaka** (tanaka-r@pharm.setsunan.ac.jp)1, Fumitoshi Sakazaki2, and Yutaka Banno3, 1Setsunan Univ., Osaka, Japan, 2Osaka Ohtani Univ., Osaka, Japan, 3Kyushu Univ., Fukuoka, Japan
* **D3794**Topochemistry and optical anisotropy of the cocoon of *Lithurgus chrysurus* (Hymenoptera: Megachilidae). **Maria Luiza Mello** (mlsmello@unicamp.br)1,  
  Eli Heber dos Anjos1, Benedicto Vidal1, and   
  Jerome Rozen Jr2, 1Univ. of Campinas, Campinas, Brazil, 2American Museum of Natural History, New York, NY

**D3795** Infrared microspectroscopy of the cocoon of *Lithurgus chrysurus* (Hymenoptera, Megachilidae). **Benedicto Vidal** (camposvi@unicamp.br)1, Jerome Rozen, Jr2, and  
Maria Luiza Mello1, 1Univ. of Campinas, Campinas, Brazil, 2American Museum of Natural History,

New York, NY

**D3796** *Lactobacillus plantarum* from the gut of indigenous honey bee of Saudi Arabia inhibit the growth and bio- film formation of *Candida albicans*. **Mohammad Ansari** (mjavedansari@gmail.com) and Ahmad Alghamdi, King Saud Univ., Riyadh, Saudi Arabia

**D3797** First report of the bee louse, *Braula coeca* (Diptera: Braulidae), in apiaries of ‘Los Chillos’ Valley, Province of Pichincha, Ecuador. **Nelson Zapata-Carvajal** (ndavidzc@hotmail.com)1, Estefanía Chérrez-Neacato1, Sarah Martín-Solano1, María Augusta Chávez-Larrea1, Claude Saegerman2, and Jorge Ron-Román1, 1Univ. of las Fuerzas Armadas, Sangiolquí, Ecuador, 2Univ. of Liège, Liège, Belgium

**D3798** Number of *Beauveria* spores picked up by *Varroa destructor* after walking on a treated surface for up to one minute. **Francisco Posada-Florez** (fjavierposada@ gmail.com), Asha Pawar, Ryan Schwarz, Miguel Corona, and Jay Evans, USDA - ARS, Beltsville, MD

**D3799** First molecular characterization of honey bee *Varroa* sp. (Acari: Varroidae) in ‘Los Chillos’ Valley, Ecuador. **Estefanía Chérrez-Neacato** (tefa\_9ch@hotmail.com)1, Sarah Martín-Solano1, Claude Saegerman2, and

Jorge Ron-Román1, 1Univ. of las Fuerzas Armadas, Sangiolquí, Ecuador, 2Univ. of Liège, Liège, Belgium

**D3800** Does landscape complexity affect forage resources and health of honey bees, *Apis mellifera* L.? **Ge Zhang** (gezhang@iastate.edu), Matt O’Neal, Amy L. Toth, Adam Dolezal, and Ashley St. Clair, Iowa State Univ., Ames, IA

**D3801** Bt and pesticides influence on the longevity of *Apis mellifera* workers. **Michele Potrich** (profmichele@gmail. com), Gabriela Libardoni, Fernanda Colombo,  
Alfredo Gouvea, Everton Lozano, and Fabiana Costa- Maia, Federal Univ. of Technology of Paraná, Dois Vizinhos, Brazil

**D3802** Acute toxicity and survivorship of *Apis mellifera* L. 1758 after exposure to sublethal doses of clothianidin. Jander Souza1, **Stephan Carvalho** (stephan.carvalho@ iciag.ufu.br)2 and César Carvalho1, 1Federal Univ. of Lavras, Lavras, Brazil, 2Federal Univ. of Uberlândia, Uberlândia, Brazil

**D3803** Modeling the complex biology of pesticide exposure in honey bees, *Apis mellifera*. Douglas Sponsler1,  
Michael Wransky2, and **Reed Johnson** (johnson.5005@ osu.edu)1, 1The Ohio State Univ., Wooster, OH, 2Udacity, Inc., Mountain View, CA

**D3804** Seasonal pattern of protective compounds in honey from *Apis mellifera* L. 1758 in Brazil. Maria Auxiliadora Jacob1, Stephan Carvalho2, Wilson Abreu1, Elisângela Carvalho1, and **César Carvalho** (cfcarvalho@den.ufla. br)1, 1Federal Univ. of Lavras, Lavras, Brazil, 2Federal Univ. of Uberlândia, Uberlândia, Brazil



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* **D3805**Pollination of the coconut tree, *Cocos nucifera* L., by Africanized honey bees, *Apis mellifera scutellata* Lepeletier 1836, in Brazil. **Gerbson Mendonca** (gerbson10@gmail.com), Federal Univ. of Rio Grande, Macaiba, Brazil
* **D3806**Blue orchard bees and honey bees in almonds: A nutty synergy. **Natalie Boyle** (nboyle@wsu.edu), Theresa Pitts-Singer, and Derek R. Artz, USDA - ARS, Logan, UT
* **D3807**Effect of photoperiod and temperature on the efficiency of queen mates of *Bombus atratus* (Hymenoptera: Apidae) under controlled conditions. **Andrea Plazas** (nplazas@gmail.com), Diego Riaño, Jose Ricardo Cure, and Laura Rojas, Nueva Granada Military Univ., Cajica, Colombia
* **D3808**Natural pollination is generally adequate for pumpkin and winter squash, *Cucurbita* spp., in Connecticut. **Kimberly Stoner** (kimberly.stoner@ct.gov), Connecticut Agricultural Experiment Station, New Haven, CT
* **D3809**Aggression between floral specialist bees enhances pollination of *Hibiscus* (section *Trionum*: Malvaceae). **Blair Sampson** (blair.sampson@ars.usda.gov)1,  
  Chris Werle2, and John Adamczyk1, 1USDA - ARS, Poplarville, MS, 2Louisiana State Univ., Baton Rouge, LA
* **D3810**Foraging behavior of honey bee, *Apis mellifera*, and the native bumblebee *Bombus atratus* in two cultivars of highbush blueberry, *Vaccinium corymbosum*, in Colombia. **Carlos Pinilla** (crlspcruz@gmail.com), Bogota, Colombia
* **D3811**Floral resource used by colonies of *Bombus atratus* (Hymenoptera: Apidae) on the campus of Nueva Granada Military University, Cajicá, Colombia. **Melissa Guerrero** (mel\_yvette2292@hotmail.com)1, Deicy Alarcon2, Diego Riaño1, and Jose Ricardo Cure1, 1Nueva Granada Military Univ., Cajica, Colombia, 2Nueva Granada Military Univ., Bogota, Colombia
* **D3812**Learning flights in a male insect. **Theo Robert** (tgr203@exeter.ac.uk)1, Elisa Frasnelli1, Thomas Collett2, and Natalie Hempel de Ibarra1, 1Univ. of Exeter, Exeter, United Kingdom, 2Univ. of Sussex, Brighton, United Kingdom
* **D3813**Foraging behavior of nectar robber bumblebee as a potential pollinator of red clover. **Tomoyuki Yokoi** (tomoyoko@envr.tsukuba.ac.jp)1, Jun Uto2, Naoko Tokuda1, Haruta Morizuka1, Rieko Fujinami3, and Mamoru Watanabe1, 1Univ. of Tsukuba, Tsukuba, Japan, 2Kyoto Univ., Kyoto, Japan, 3Japan Women’s Univ., Tokyo, Japan
* **D3814**Drought-tolerant plants provide supplemental food resources to honey bees, *Apis mellifera*, and habitat for local native pollinators. **Raksha Kuenen** (raksha. kuenen@bayer.com) and Andrew Palrang, Bayer Crop- Science, Fresno, CA
* **D3815**The dirt on apple pollinators: Incorporating soil survey data to predict ground-nesting bee distributions in central New York orchards. Julia Brokaw1, **Mia Park** (mia.park@und.edu)2, and Bryan N. Danforth3, 1Michigan State Univ., East Lansing, MI, 2Univ. of North Dakota, Grand Forks, ND, 3Cornell Univ., Ithaca, NY

**D3816** Molecular evolution of early insect societies: Genomics of the Australian small carpenter bee, *Ceratina australensis*. **Michael Steffen** (michael.steffen@unh. edu) and Sandra Rehan, Univ. of New Hampshire, Durham, NH

**D3817** Why do burrower bug embryos hatch synchronously? Maternal regulation mitigates risks of future cannibalism. **Hiromi Mukai** (mh.isa.8088@gmail.com)1, Mantaro Hironaka2, Sumio Tojo3, and Shintaro Nomakuchi3, 1Forestry and Forest Products Research Institute, Tsukuba, Japan, 2Hamamatsu Univ. School of Medicine, Shizuoka, Japan, 3Saga Univ., Saga, Japan

**Poster Session 4: Arthropod Vectors of Animal and Plant Disease**

***West Hall C (Convention Center)***

**D3818** Suppressive effect of the acetylated glyceride BEMIDETACHTM EC against tomato yellow leaf curl virus transmitted by sweetpotato whitefly,  
*Bemisia tabaci,* on tomato plants in a greenhouse. **Shohei Matsuura** (s-matsuura81314@pref.hiroshima. lg.jp)1, Takayuki Kashima2, Shinji Kajihara1,

Toshio Kitamura3, and Hiroshi Abe4, 1Hiroshima Prefectural Technology Research Institute, Hiroshima, Japan, 2Ishihara Sangyo Kaisha, Ltd., Kusatsu, Japan, 3NARO National Institute of Vegetable and Tea Science, Mie, Japan, 4RIKEN BioResource Center, Tsukuba, Japan

**D3819** Suppressive mechanism of the acetylated glyceride BEMIDETACHTM EC on tomato yellow leaf curl virus infection. **Takayuki Kashima** (t-kashima@iskweb. co.jp)1, Shohei Matsuura2, Kenkichi Kanmiya1, Kiyomitsu Yoshida1, Shigeru Mitani3, Toshio Kitamura4, Jun Ohnishi4, Hiroshi Abe5, and Yutaka Arimoto6, 1Ishihara Sangyo Kaisha, Ltd., Kusatsu, Japan, 2Hiroshima Prefectural Technology Research Institute, Hiroshima, Japan, 3Ishihara Sangyo Kaisha, Ltd., Shiga, Japan, 4NARO National Institute of Vegetable and

Tea Science, Mie, Japan, 5RIKEN BioResource Center, Tsukuba, Japan, 6RIKEN Institute, Wako, Japan

**D3820** Whitefly feeding behavior associated with the inoculation of the crinivirus tomato chlorosis virus by *Bemisia tabaci*. **Nathalie Maluta** (nathaliemaluta@usp. br)1, Elisa Garzo2, Joao R. S. Lopes1, Aranzazu Moreno2, Jesús Navas-Castillo3, Elvira Fiallo-Olivé3, and  
Alberto Fereres2, 1Univ. of São Paulo, Piracicaba, Brazil, 2Institute of Agricultural Sciences, Madrid, Spain, 3Institute of Subtropical and Mediterranean Horticulture, Málaga, Spain

**D3821** Egg maturation by the glassy-winged sharpshooter (Hemiptera: Cicadellidae): A vector of *Xylella fastidiosa*. **Mark Sisterson** (mark.sisterson@ars.usda.gov), Christopher Wallis, Rodrigo Krugner, and Drake Stenger, USDA - ARS, Parlier, CA

**D3822** The vector of Mungbean yellow mosaic India virus, *Bemisia tabaci*: Their COI sequences and symbionts. **Rakesh Kumar Singh** (rakesh0429@gmail.com)1, Parveen Ansari1, Gaurav Raghuwanshi1, Shruti Kaushik1, Ashok Krishna1, Takashi Wada2, and Hiroaki Noda3, 1Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya,



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Indore, India, 2Japan International Cooperation Agency, Kumamoto, Japan, 3Japan International Cooperation Agency, Tsukuba, Japan

* **D3823**Outbreak of yellow mosaic disease in legume crops  
  in central India: Field survey in summer and Kharif seasons. **Rakesh Marabi** (rsmarabi78@rediffmail.com)1, Shoumitrad Das1, Ashok Bhowmick1, Hiroaki Noda2, and Takashi Wada3, 1Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, India, 2Japan International Cooperation Agency, Tsukuba, Japan, 3Japan International Cooperation Agency, Kumamoto, Japan
* **D3824**Molecular characterization and localization of bacterial endosymbionts in cassava whiteflies in Colombia. **Mariela Lobo-Hernandez** (miloboh@unal.edu.co)1, Surapathrudu Kanakala2, James Montoya-Lerma3, Helena Brochero4, and Murad Ghanim2, 1National Univ. of Colombia, Cali, Colombia, 2Agricultural Research Organisation, Bet-Dagan, Israel, 3Univ. of Valle, Cali, Colombia, 4National Univ. of Colombia, Bogotá, Colombia
* **D3825**Effect of temperature on *Diaphorina citri* (Hemiptera: Liviidae) take-off. **Arthur Tomaseto** (arthur.tomaseto@ usp.br)1, Marcelo Pedreira Miranda2, Alberto Fereres3, and Joao R. S. Lopes1, 1Univ. of São Paulo, Piracicaba, Brazil, 2Citrus Defense Fund, Araraquara, Brazil, 3Institute of Agricultural Sciences, Madrid, Spain
* **D3826**Nematode populations associating with ambrosia beetles in Taiwan. **Chih-shun Chang** (r04633013@ntu. edu.tw)1, Guan-yi Yu1, Hsin-hui Shih2, Ching-shan Lin3, Sheng-shan Lu2, and Jiue-in Yang1, 1National Taiwan Univ., Taipei, Taiwan, 2Taiwan Forestry Research Institute, Taipei, Taiwan, 3Tsau-hu Elementary School, Taichung, Taiwan
* **D3827**Experimental transmission of the phytoplasma 16SrIX group associated with citrus Huanglongbing symptoms by the leafhopper *Scaphytopius marginelineatus* (Cicadellidae: Deltocephalinae). **Rodrigo Marques** (rodrigonmarques@gmail.com)1 and João R. S. Lopes2, 1Federal Univ. of São Carlos, Buri, Brazil, 2Univ. of São Paulo, Piracicaba, Brazil
* **D3828**Understanding data from large scale Asian citrus psyllid, *Diaphorina citri*, Huanglongbing, *Candidatus Liberibactor asiaticus*, survey efforts: Can we locate infected trees sooner? **David W. Bartels** (david.w.bartels@ aphis.usda.gov), USDA - APHIS, Edinburg, TX
* **D3829**Use of the ion torrent PGM for characterizing the microbiome of Oklahoma *Amblyomma americanum* (Ixodida: Ixodidae). Zachary C. Holmes1, Brian T. Shirey1, Maria L. Zambrano1, Gregory A. Dasch1, and   
  **Sallie A. Ruskoski** (ruskosks@nsuok.edu)2, 1Centers for Disease Control and Prevention, Atlanta, GA, 2Northeastern State Univ., Broken Arrow, OK
* **D3830**Multiple legumains in ixodid ticks. **David Hartmann** (hartmann@paru.cas.cz)1,2 and Radek Sima1, 1Czech Academy of Sciences, České Budějovice, Czech Republic, 2Univ. of South Bohemia, České Budějovice, Czech Republic
* **D3831**Bluetongue virus monitoring in *Culicoides* collected  
  in the Republic of Korea in 2013-2014. **Jee Yong Park** (parkjyyunesy@korea.kr)1, Su Bong Ha1, Hyeong Hwa Ha1, Hyun Ji Seo1, Ji Hye Lee1, Hye Young Jeoung1,

Yong Joo Kim1, and Heung Chul Kim2, 1Animal and Plant Quarantine Agency, Gimcheon, South Korea, 2U.S. Army, Seoul, South Korea

**D3832** Habitat use by *Culicoides* spp.: The role of habitat  
type and animal use in determining species composition in a Kansas prairie preserve. **Robert Pfannenstiel** (bob.pfannenstiel@ars.usda.gov)1 and Mark Ruder2, 1USDA - ARS, Manhattan, KS, 2Univ. of Georgia, Athens, GA

**D3833** A mechanical transmission of dengue virus infection in mice by mosquito *Aedes aegypti*. **Kuen-Nan Tsai** (kntsai@nhri.org.tw), National Health Research Institutes, Miaoli, Taiwan

**Poster Session 4: Biodiversity, Biogeography, and Conservation of Arthropods, Part 2**

***West Hall C (Convention Center)***

**D3834** Honduran fireflies (Coleoptera: Lampyridae). **Lynn Faust** (tnlfaust@gmail.com)1 and Hugh Faust2, 1Great Smoky Mountains Conservation Association, Knoxville, TN, 2Emory River Land Company, Strawberry Plains, TN

**D3835** Catalogue of West African Coccinellidae.  
**Kwevitoukoui Hounkpati** (bhounkpati@wacoccinellid. org) and Joseph V. McHugh, Univ. of Georgia, Athens, GA

**D3836** Longhorned beetles (Coleoptera: Cerambycidae) of Connecticut, U.S.A. **Chris Maier** (chris.maier@ct.gov), Connecticut Agricultural Experiment Station, New Haven, CT

**D3837** Wazzup? Canopy research of insect trophic interactions using aerial working platform. **Pavel Drozd** (pavel. drozd@osu.cz)1, Jan ŠIpoš2, Martin Volf3, Martin Sigut1, Petr Pyszko1, Nela Kotaskova1, Jiri Hodecek1,

David Kasprak1, Hana Platkova1, Ondrej Dornak1, Marketa Kirstova1, Lucie Vavrosova1, and Vojtech Novotny3,4, 1Univ. of Ostrava, Ostrava, Czech Republic, 2Czech Academy of Sciences, Brno, Czech Republic, 3Biological Centre ASCR, České Budějovice, Czech Republic,  
4New Guinea Binatang Research Center, Madang, Papua New Guinea

**D3838** Biodiversity and vertical stratification of Scolytinae and Platypodinae (Curculionidae) in an Amazonian forest fragment of Amapá, Brazil. Wilson Silva1 and **Carlos Flechtmann** (flechtma@bio.feis.unesp.br)2, 1Macaéá, Brazil, 2São Paulo State Univ., Ilha Solteira, Brazil

**D3839** Vertical stratification of bark and ambrosia beetles (Curculionidae: Scolytinae and Platypodinae) in two cerrado fragments in southern Brazil. **Fábio Leonel** (fabio3l@hotmail.com), Silvia Tanabe, and

Carlos Flechtmann, São Paulo State Univ., Ilha Solteira, Brazil

**D3840** Seasonal and vertical diversity of the family Elateridae (Coleoptera) in one region with tropical dry forest of the Mexican Pacific Slope. **Viridiana Vega Badillo** (vivebsemika@gmail.com), Martín Zurita García, and Santiago Zaragoza Caballero, National Autonomous Univ. of México, Mexico City, Mexico



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* **D3841**Backyard biodiversity: Unraveling life histories of the new fly species discovered by the BioSCAN Project. **Lisa Gonzalez** (lgonzale@nhm.org), Emily A. Hartop, and Brian V. Brown, Natural History Museum,   
  Los Angeles, CA
* **D3842**Progress in monarch butterfly conservation in Iowa. **Sue Blodgett** (sblodg@iastate.edu)1, Steven Bradbury1, Richard Hellmich2, Robert Hartzler1, Diane Debinski1, John Pleasants1, Teresa Blader1, Victoria Pocius1,   
  Tyler Grant1, Wendy Wintersteen1, and Mark Honeyman1, 1Iowa State Univ., Ames, IA, 2USDA - ARS, Ames, IA
* **D3843**Differential attraction to pollinators among landscape plants. **S. Kristine Braman** (kbraman@uga.edu), Univ. of Georgia, Griffin, GA
* **D3844**Survey of native bee communities within several top-tier Louisiana conservation priority habitats. **Eric Van Gorder** (eric.van@selu.edu) and  
  Janice L. Bossart, Southeastern Louisiana Univ., Hammond, LA
* **D3845**Using plant-pollinator networks to determine optimal forage mixes for pollinator conservation in farmland. **Julia Brokaw** (brokawju@msu.edu)1, Emily May2, Jason Gibbs1, and Rufus Isaacs1, 1Michigan State Univ., East Lansing, MI, 2The Xerces Society for Invertebrate Conservation, Portland, OR
* **D3846**The missing link: A case for increased consideration for plant-pollinator interactions for species at-risk recovery in Ontario, Canada. **Victoria MacPhail** (vmacphail@gmail.com)1, Carolyn Duthie2,   
  Sheila R. Colla2, and Shannon Ferguson1, 1Wildlife Preservation Canada, Guelph, ON, Canada, 2York Univ., Toronto, ON, Canada
* **D3847**Protura and Diplura of Kathara coal field area of Jharkhand, India and their ecological functions. **Amita Hembrom** (brajkishore58ranchi@gmail.com) and Braj Sinha, Ranchi Univ., Ranchi, India
* **D3848**Stream macroinvertebrate communities within an urbanized watershed: A multi-year structural and functional assessment. **Mollie McIntosh** (mcintoshm2@ xavier.edu), Meghan Burge, Trisha Makely,   
  Donielle Phillips, and Lauren Stock, Xavier Univ., Cincinnati, OH
* **D3849**Radioactive contamination of aquatic insects in stream impacted by the Fukushima nuclear power plant accident. **Mayumi Yoshimura** (yoshi887@ffpri. affrc.go.jp), Kansai Research Center, Kyoto, Japan
* **D3850**Evaluating differences in invertebrate communities between remnant and restored prairies in the Upper Osage Grasslands. **Joseph LaRose** (jlaroseph@gmail. com), Debbie Finke, and Elizabeth Webb, Univ. of Missouri, Columbia, MO
* **D3851**The impacts of grazing intensity and altered precipitation on grasshopper assemblage in a meadow steppe. **Hui Zhu** (zhuh824@nenu.edu.cn), Bingzhong Ren, Yinliang Wang, and Duo Zhang, Northeast Normal Univ., Changchun, China
* **D3852**Insect fauna on different types of green roofs in Japan: Biotope, herb and meadow green roofs. **Masashi Nomura** (nomuram@faculty.chiba-u.jp)1 and Ayako Nagase2, 1Chiba Univ., Matsudo, Japan, 2Chiba Univ., Chiba, Japan

**D3853** The impact of some agricultural practices on soil biodiversity in sunflower crop. **Maria Iamandei** (maria\_iamandei@yahoo.com) and Daniel Kurzeluk, Research - Development Institute for Plant Protection, Bucharest, Romania

**D3854** Distribution of Arthropoda at different vegetation  
on apple and pear orchard in Korea. **Jong-Ho Park** (jhpark75@korea.kr), National Academy of Agricultural Science, Wanju, South Korea

**D3855** The effect of agriculture and urbanization on predacious arthropod diversity of grasslands.  
**Bianca Greyvenstein** (Biagrey90@gmail.com), Johnnie van den Berg, and Stefan Siebert, North-West Univ., Potchefstroom, South Africa

**D3856** Effect of the distance between natural forest and acacia forest on termite diversity in acacia plantation forests. **Yoko Takematsu** (takematu@yamaguchi-u.ac.jp)1, Paulus Meleng2, Kok-Boon Neoh3, Tsuyoshi Yoshimura4, and Takao Itioka5, 1Yamaguchi Univ., Yamaguchi, Japan, 2Forest Dept. Sarawak, Kuching, Malaysia, 3National Chung Hsing Univ., Taichung, Taiwan, 4Kyoto Univ., Uji, Japan, 5Kyoto Univ., Kyoto, Japan

**D3857** Patterns of functional diversity of two trophic groups after canopy thinning in an abandoned coppice.  
**Jan Sipos** (jsipos@seznam.cz)1,2, Radim Hedl1,3, Vladimir Hula4, Markéta Chudomelová1, Ondrej Kosulic4, Jana Niedobová4, and Vladan Riedl1,5, 1Czech Academy of Sciences, Brno, Czech Republic, 2Univ. of Ostrava, Ostrava, Czech Republic, 3Palacký Univ., Olomouc, Czech Republic, 4Mendel Univ., Brno, Czech Republic, 5Nature Conservation Agency of the Czech Republic, Brno, Czech Republic

**D3858** Prescribed burning impacts on invertebrate communities in longleaf pine ecosystems. **Sara Simmons** (sara.simmons@selu.edu) and Jancie Bossart, Southeastern Louisiana Univ., Hammond, LA

**D3859** Response of ground-dwelling insects to maritime forest disturbance. **C. Tate Holbrook** (cholbrook@ccga. edu) and Sarah McInnis, College of Coastal Georgia, Brunswick, GA

**Poster Session 4: Ecology of Pesticides, Resistance, Toxicology, and Genetically Modified Crops, Part 2**

***West Hall C (Convention Center)***

* **D3860**Aminopeptidase N1 is one of functional receptors  
  of Cry1Ac toxin in *Chilo suppressalis*. **Shuwen Wu** (swwu@njau.edu.cn), Haonan Zhang, and Yihua Yang, Nanjing Agricultural Univ., Nanjing, China
* **D3861**Characterization of PhABCC4 involved in ivermectin tolerance. **Ju Hyeon Kim** (jhkim35@umass.edu)1, Kyle Gellatly2, Edwin Murenzi1, Kyong Sup Yoon3, and John M. Clark1, 1Univ. of Massachusetts, Amherst, MA, 2Univ. of Massachusetts, Worcester, MA, 3Southern Illinois Univ., Edwardsville, IL
* **D3862**Overexpression of P450 genes in a buprofezin-resistant strain of the brown planthopper, *Nilaparvata lugens*. **Shun-fan Wu** (wusf@njau.edu.cn), Xi-Chao Mu, and Cong-Fen Gao, Nanjing Agricultural Univ., Nanjing, China



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* **D3863**Alanine to valine substitutions in the pore helix IIIP1 and linker helix IIIL45 confer cockroach sodium channel resistance to DDT and pyrethroids. **Mengli Chen** (chenml@msu.edu)1,2, Yuzhe Du1, Yoshiko Nomura1, Guonian Zhu2, Boris S. Zhorov3, and Ke Dong1, 1Michigan State Univ., East Lansing, MI, 2Zhejiang Univ., Hangzhou, China, 3McMaster Univ., Hamilton, ON, Canada
* **D3864**Molecular and functional characterization of a voltage-gated sodium channel from the bumble bee *Bombus impatiens*. **Shaoying Wu** (wsy6000@msu. edu)1,2, Yuzhe Du2, Yoshiko Nomura2, and Ke Dong2, 1Henan Agriculture Univ., Zhengzhou, China, 2Michigan State Univ., East Lansing, MI
* **D3865**Temephos resistance and esterase activity in the mosquito *Aedes aegypti* in Havana, Cuba changed dramatically between 2006 and 2013. **Maria Rodriguez** (mrodriguez@ipk.sld.cu) and Juan Bisset, Institute of Tropical Medicine Pedro Kourí, Havana, Cuba
* **D3866**Molecular and functional characterization of knockdown resistance to pyrethroids in *Aedes aegypti*.  
  **Xiangrui Tian** (15850578760@139.com)1, Yuzhe Du1, Yoshiko Nomura1, Jianya Su2, and Ke Dong1, 1Michigan State Univ., East Lansing, MI, 2Nanjing Agricultural Univ., Nanjing, China
* **D3867**New opportunities to investigate insecticide and acaricide chloride channel targets through their differential interactions with diverse chemical classes. **Sofia Iqbal** (sofia.iqbal@rothamsted.ac.uk)1,   
  Martin Williamson1, T. G. Emyr Davies1, Mirel Puinean1, Lin Field1, and Ian Mellor2, 1Rothamsted Research, Harpenden, United Kingdom, 2Univ. of Nottingham, Nottingham, United Kingdom
* **D3868**Studies on the mechanism of action of matrine, an insecticidal natural product. **Yuxin Li** (liyx128@nankai. edu.cn)1 and Jeffrey Bloomquist2, 1Nankai Univ., Tianjin, China, 2Univ. of Florida, Gainesville, FL
* **D3869**Unintended impacts of the transgenic American chestnut (Fagales: Fagaceae) on lepidopteran biopesticide efficacy and parasitoid success. Dylan Parry and **Aaron Brown** (abrown02@syr.edu), State Univ. of   
  New York, Syracuse, NY
* **D3870**Discovery of insecticidal activity from bacteria associated with soil and plants. Narendra Palekar, **Mary Kroner**, (mkroner@agbiome.com),  
  Brooke Bissinger, Jacob Pearce, Marie Encarnacion, Rebekah Kelly, Amy Shekita, Dylan Kraus,   
  Elka Armstrong, and Amber McGuire, AgBiome, Inc., Durham, NC
* **D3871**Presentation withdrawn
* **D3872**Simulating prey removal, natural enemy abundance, and bicontrol in Bt maize. **Christopher Brown** (christopher.r.brown@monsanto.com) and  
  Robert K. D. Peterson, Montana State Univ., Bozeman, MT
* **D3873**Characterization of two *Bacillus thuringiensis* Vip3 proteins against lepidopteran insect pests. **Sek Yee Tan** (stan5@dow.com), Ted J. Letherer, Wendy Lo,  
  Todd Glancy, Sarah Worden, Andrew Worden,   
  Jeff Beringer, Stephen Foulk, Shannon Whitlock,  
  Aaron Woosley, Ryan Lee, Marc Zack, and Kenneth Narva, Dow AgroSciences, Indianapolis, IN

**D3874** Modifications of *Bacillus thuringiensis* Cry3Aa toxicity by cadherin fragments. **Moataz Moustafa** (moataz. moustafa79@gmail.com)1 and František Sehnal2, 1Cairo Univ., Giza, Egypt, 2Czech Academy of Sciences, České Budějovice, Czech Republic

**D3875** Effects of pollen contamination on the dominance  
of resistance to Bt maize in fall armyworm. **Fei Yang** (fyang@agcenter.lsu.edu)1, David L. Kerns2,  
Sebe Brown2, and Fangneng Huang1, 1Louisiana State Univ., Baton Rouge, LA, 2Louisiana State Univ., Winnsboro, LA

**D3876** Selection with Cry2Ab confers broad-spectrum resistance to Bt Cry toxins in cotton bollworm, *Helicoverpa armigera*. **Yihua Yang** (yhyang@njau.edu. cn), Laipan Liu, and Yidong Wu, Nanjing Agricultural Univ., Nanjing, China

**D3877** Challenges and options for tracking susceptibility of *Helicoverpa zea* and *Heliothis virescens* (Lepidoptera: Noctuidae) to transgenic crops expressing toxins derived from *Bacillus thuringiensis*. **Randall Luttrell** (randy.luttrell@ars.usda.gov), Nathan Little,

Michelle Mullen, Kenya Dixon, Chad Roberts,  
K. Clint Allen, and Omaththage P. Perera, USDA - ARS, Stoneville, MS

**Poster Session 4: Insect Immunology**

***West Hall C (Convention Center)***

**D3878** Multi-purpose applications of beetle defensin-derived antimicrobial peptides. **Jun Ishibashi** (bishiba@affrc. go.jp)1, Takashi Iwasaki1, Ai Asaoka1, Megumi Sumitani1, Makoto Nakamura2, and Minoru Yamakawa1, 1National Institute of Agrobiological Sciences, Tsukuba, Japan, 2Industrial Technology Center of Wakayama Prefecture, Wakayama, Japan

**D3879** Identification, characterization and functional  
analysis of a serine protease inhibitor (*CvT-serpin*) from *Cotesia vestalis* teratocytes. **Qijuan Gu** (ggzjdx@163. com), Min Shi, Jian Yang, and Xue-xin Chen, Zhejiang Univ., Hangzhou, China

**D3880** A hypothetical model of crossing *Bombyx mori* nucleopolyhedrovirus through its host midgut physical barrier. **Jiaping Xu** (jiapingxu@163.com) and Minghui Liu, Anhui Agricultural Univ., Hefei, China

**D3881** A peptidoglycan recognition protein acts in sweetpotato whitefly, *Bemisia tabaci*, immunity. **Zhi-zhi Wang** (wzz1312@163.com), Min Shi, Xiao-Wei Wang, and Xue-xin Chen, Zhejiang Univ., Hangzhou, China

**D3882** Secreted factors that modulate virus infection in Lepidoptera. Vassiliki Labropoulou and **Luc Swevers** (swevers@bio.demokritos.gr), Institute of Biosciences & Applications, Athens, Greece

**D3883** Dengue virus exposure at the larval stage induced immune priming in *Aedes aegypti* adult mosquitoes. **Valeria Vargas** (valeria.vargaspl@gmail.com)1,2, Guadalupe Hernández-Martínez2, and Humberto Lanz- Mendoza2, 1National Autonomous Univ. of México, Mexico City, Mexico, 2National Institute of Public Health, Cuernavaca, Mexico



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* **D3884**Novel microbes mediate immune response on an exotic host in the specialist butterfly, *Lycaeides melissa*. **Su’ad Yoon** (suady@nevada.unr.edu), Joshua Harrison, Matthew L. Forister, and Angela Smilanich, Univ. of Nevada, Reno, NV
* **D3885**Probiotics in *Drosophila* against *Aspergillus* infections. **Luis Ramirez Camejo** (ramirecamejo@gmail.com)1, Michael García Alicea2, Génesis Maldonado Morales2, and Paul Batman2, 1INDICASAT AIP, Panama, Panama, 2Univ. of Puerto Rico, San Juan, PR
* **D3886**Constitutive and induced immunity among castes of the ant *Formica exsecta.* **Dimitri Stucki** (dimitri. stucki@helsinki.fi), Liselotte Sundström, and Dalial Freitak, Univ. of Helsinki, Helsinki, Finland
* **D3887**An expanded view of the immune serine protease network in *Manduca sexta*. Haobo Jiang and **Yang Wang** (yang.wang10@okstate.edu), Oklahoma State Univ., Stillwater, OK
* **D3888**Biological control of the diamondback moth, *Plutella xylostella*, using various natural predators. **Shahil Pema** (spema@nevada.unr.edu), Angela Smilanich, Lora Richards, and Lee A. Dyer, Univ. of Nevada, Reno, NV

**Poster Session 4: Insects in Food Safety and Homeland Security**

***West Hall C (Convention Center)***

* **D3889**How many insect fragments can be detected in foods using endpoint PCR? **Monica Pava-Ripoll** (monica. pava-ripoll@fda.hhs.gov), Amy K. Miller, and  
  George C. Ziobro, U.S. Food and Drug Administration, College Park, MD
* **D3890**Enhancing the United States Department of Agriculture and Department of Homeland Security partnership using live digital streaming at distance ports.  
  **Esther Serrano** (esther.s.serrano@aphis.usda.gov)1 and Paula Kelly2, 1USDA - APHIS, Ft. Lauderdale, FL, 2U.S. Customs and Border Protection, Palmetto, FL
* **D3891**Quarantine management for biological control of invasive insects: Permitting, physical biosecurity, and staff training. **Jay S. Bancroft** (jay.bancroft@ars.usda. gov), USDA - ARS, Newark, DE

**Poster Session 4: Medical and Veterinary Entomology, Part 2**

***West Hall C (Convention Center)***

* **D3892**Resistance monitoring through the enhanced surveillance protocol for the CDC bottle bioassay and kdr mutations in *Aedes aegypti* (Linnaeus) from Mexico. Beatriz Lopez, **Franco Morales** (francomfrs@ gmail.com), Selene Gutierrez, Juan Gonzalez, and Adriana Flores, Autonomous Univ. of Nuevo León, San Nicolás de los Garza, Mexico,
* **D3893**Variability and replication in insecticide resistance testing using the CDC bottle bioassay. **Mary A. Sorensen** (marys@placermosquito.org), Placer Mosquito & Vector Control District, Roseville, CA

**D3894** Insecticidal activity of *Magnolia kobus* against *Culex pipiens* and *Aedes albopictus*. Jin-Won Seo, Hyun Kyung Kim, **JaeSeon Lee** (leejs910412@naver. com), Hyun-Na Koo, and Gil-Hah Kim, Chungbuk National Univ., Cheongju, South Korea

**D3895** First determination of lethal and sublethal effects  
of temephos on *Anopheles pseudopunctipennis* in comparison with *Aedes aegypti*. Agustín Alvarez Costa, Paula Gonzalez, Laura Harburguer, and **Hector Masuh** (hmasuh@citedef.gob.ar), Pests and Insecticides Research Centre, Villa Martelli, Argentina

**D3896** Chemical characterization and insecticidal activity of essential oils on *Aedes aegypti* (Diptera: Culicidae). Natalia Rios, Elena Stashenko, and **Jonny Duque** (jonedulu@uis.edu.co), Industrial Univ. of Santander, Bucaramanga, Colombia

**D3897** Applying *Bacillus thuringiensis israeliensis* (*Bti*) to control exophilic *Anopheles coluzzii* towards pre- elimination stage of malaria in the Democratic Republic of Sao Tome and Principe. **Kun-Hsien Tsai** (kunhtsai@ ntu.edu.tw), National Taiwan Univ., Taipei, Taiwan

**D3898** Human C5a interacts with a G-protein coupled receptor in *Aedes aegypti* cells modulating DENV infection *in vitro*. **Berlin Londono-Renteria** (blondono@uscmed. sc.edu), Andrea Troupin, and Tonya Colpitts, Univ. of South Carolina, Columbia, SC

**D3899** The role of AeCSPBP and SGS 1 in sporozoite invasion of *Aedes aegypti* salivary gland. **Bianca Kojin** (bianca.burini@gmail.com) and Margareth Capurro, Univ. of São Paulo, São Paulo, Brazil

**D3900** Chemical composition of *Zingiber zerumbet* (L.) Smith: Essential oil and its repellent activity against the yellow fever mosquito, *Aedes aegypti* L. **Nurhayat Tabanca** (ntabanca@ufl.edu)1, Maia Tsikolia1, Natasha Agramonte1, Betul Demirci2, Jeffrey Bloomquist1, and Ulrich Bernier3, 1Univ. of Florida, Gainesville, FL, 2Anadolu Univ., Eskisehir, Turkey, 3USDA - ARS, Gainesville, FL

**D3901** A cross-species comparison: The efficacy of insect repellents and attractants. **Stacy D. Rodriguez** (stacyr@nmsu.edu), Hae-Na Chung, Kristina Gonzales, and Immo Hansen, New Mexico State Univ.,

Las Cruces, NM

**D3902** Odorant receptor from the southern house mosquito sensitive to natural repellents. **Pingxi Xu** (pxxu@ ucdavis.edu), Young-Moo Choo, Garisson Buss, and Walter S. Leal, Univ. of California, Davis, CA

**D3903** Seasonal prevalence of main vector of Japanese encephalitis, *Culex tritaeniorhynchus* (Diptera: Culicidae), at 10 areas in Republic of Korea during 2011 to 2015. **Hye Mi Yu** (xjvmgapal@naver.com), E-Hyun Shin, Wook Gyo Lee, Jong Yul Roh, Young Ran Ju, and

Kyu Sik Chang, Korea National Research Institute of Health, Cheongju, South Korea

**D3904** The risk of new invasive mosquito species in southeast Europe: Current state and future risk  
maps. **Antonios Michaelakis** (a.michaelakis@bpi.gr)1, Rafaella Sotiropoulou2,3, Efthimios Tagaris3,  
Andreas Sotiropoulos4, Ioannis Spanos4,  
Dimitrios Papachristos1, Romeo Bellini5, and Panagiotis Milonas1, 1Benaki Phytopathological Institute,

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Kifissia, Greece, 2Univ. of Western Macedonia, Kozani, Greece, 3National Centre of Scientific Research, Agia Paraskevi, Greece, 4Terra Nova, Ltd., Athens, Greece, 5Agriculture Environment Centre, Bologna, Italy

* **D3905**Validation in field conditions of the traps to capture insect with HomeTrap and Guardian Nocturno.  
  **Héctor Parra** (hparra@uis.edu.co)1, Juliana Cuadros1, Gustavo Rincón2, Ruth Castillo2, and Nicolás Ruiz1, 1Industrial Univ. of Santander, Bucaramanga, Colombia, 2Industrial Univ. of Santander, Piedecuesta, Colombia
* **D3906**Observation on diel oviposition periodicity of *Toxorhynchites splendens* (Wiedemann) in laboratory. **Siriporn Phasomkusolsil** (siripornp@afrims.org), Kanchana Pantuwattana, Jaruwan Tawong, Weeraphan Khongtak, Yossasin Kertmanee, Nantaporn Monkanna, Sakon Khaosanorh, and  
  Silas Davidson, Armed Forces Research Institute of Medical Sciences, Rachatewee, Thailand
* **D3907**Effects of heterotrophic microorganisms on wetland inhabiting mosquitoes. **Dagne Duguma** (duguma@ufl. edu), Univ. of Florida, Vero Beach, FL
* **D3908**Ecological study on *Aedes albopictus* (Diptera: Culicidae) in Korea. **Hyunwoo Kim** (kim6959@gmail. com), E-Hyun Shin, Kyu Sik Chang, Jong Yul Roh, and Wook Gyo Lee, Korea National Research Institute of Health, Cheongju, South Korea
* **D3909**Container size and shape alters interspecific competitive effects among mosquito larvae. **Peter J. Brabant** (pbrab001@gmail.com) and Steven Juliano, Illinois State Univ., Normal, IL
* **D3910**WingBank: A database of morphologic and genetic data of epidemiologically important Culicidae. **Lincoln Suesdek** (lincoln.suesdek@butantan.gov.br)1 and Caroline Louise2, 1Univ. of São Paulo, São Paulo, Brazil, 2Butantan Institute, São Paulo, Brazil
* **D3911**Fauna and frequency of phlebotomine sand flies (Diptera: Psychodidae) in southwestern Iran.  
  **Gholam Hossein Shahraki** (shahraki.gh@gmail.com), Yasuj Univ. of Medical Sciences, Yasuj, Iran
* **D3912**Evaluation of sand fly trapping methods and identification of potential sand fly vectors in leishmaniasis and bartonellosis endemic areas in the northern Peruvian Amazon. Victor Zorrilla1, Liz Espada1, Marisa Lozano1, Heriberto Arevalo2, Mario Troyes3, Gissella Vasquez1, and **Craig Stoops** (craig.a.stoops. mil@mail.mil)1, 1U.S. Naval Medical Research Unit, Callao, Peru, 2San Martin Regional Health Directorate, Tarapoto, Peru, 3Jaen Health Directorate, Jaen, Peru
* **D3913**Salivary proteins from *Lutzomyia longipalpis* Hyaluronidase and Lundep as vaccine candidates against *Leishmania major* infection. **Ines Martin-Martin** (ines.martin-martin@nih.gov), Andrezza Chagas, Anderson Guimarães-Costa, Fabiano Oliveira,  
  Jesus G. Valenzuela, Jose Ribeiro, and Eric Calvo, National Institute of Allergy and Infectious Diseases, Rockville, MD

**D3914** Undergraduate research in medical entomology at a primarily undergraduate institution. **William Dees** (wdees@mcneese.edu), Caroline Hennigan, Christopher Struchtemeyer, Caleb Ardizzone,

Omar Christian, and Victoria Hayes, McNeese State Univ., Lake Charles, LA

**D3915** *Cuterebra* among definitive hosts and companion animals in the Twin Cities Metropolitan Area of Minnesota, USA. **Roger D. Moon** (rdmoon@umn.edu), Univ. of Minnesota, St. Paul, MN

**D3916** Distribution pattern of tabanids inhabiting Japan (Diptera: Tabanidae). **Hitoshi Sasaki** (h-sasaki@rakuno. ac.jp), Rakuno Gakuen Univ., Ebetsu, Japan

**D3917** Stable fly, *Stomoxys calcitrans*, phenology on a southern Manitoba, Canada dairy farm. **Kateryn Rochon** (kateryn.rochon@umanitoba.ca)1 and Kristina Friesen2, 1Univ. of Manitoba, Winnipeg, MB, Canada, 2USDA - ARS, Lincoln, NE

**D3918** A natural cattle immune response against horn fly salivary antigens may regulate parasite blood intake. **Martín Breijo** (mbreijo@fmed.edu.uy), Lucía Pastro, Sergio Rocha, Ximena Ures, Carmen Bolatto,

Cecilia Fernández, and Ana Meikle, Univ. of the Republic, Montevideo, Uruguay

**D3919** Horn fly, *Haematobia irritans*, suppression on pastured beef cattle. **Nancy Hinkle** (nhinkle@uga.edu), Annie Rich, and Brent Phelan, Univ. of Georgia, Athens, GA

**Poster Session 4: Morphology, Systematics, and Phylogeny**

***West Hall C (Convention Center)***

**D3920** DNA BarcodeTechnique for molecular identification of stored grain insects and mites. **Yi Wu** (wuyi@chinagrain. org)1, Fujun Li1, Zhihong Li2, Vaclav Stejskal3, and  
Yang Cao1, 1Academy of State Administration of Grain, Beijing, China, 2China Agricultural Univ., Beijing, China, 3Crop Research Institute, Prague, Czech Republic

**D3921** Introduction of the Chlaeniini ground-beetles (Coleoptera: Carabidae) from Korea. Ik Je Choi1, Jinyoung Park2, and **Jong Kyun Park** (entopark@knu. ac.kr)3, 1Korea National Arboretum, Pocheon, South Korea, 2National Institute of Ecology, Seocheon, South Korea, 3Kyungpook National Univ., Sangju, South Korea

**D3922** The cerambycid beetles of the genus *Oberea* Dejean, 1835 (Coleoptera: Cerambycidae) from Korea. Kyeongmi Kim1, Eun Young Choi1, Seok Young Kim1, Yang Sook Lim2, **Jinyoung Park** (entopark@nie.re.kr)3, and Jong Kyun Park1, 1Kyungpook National Univ., Sangju, South Korea, 2Sangju Persimmon Experiment Station, Sangju, South Korea, 3National Institute of Ecology, Seocheon, South Korea

**D3923** Diversity and evolution of the ponerine ants of the genus *Leptogenys* (Hymenoptera: Formicidae) from the oriental region. **Koichi Arimoto** (kou.arimoto@ gmail.com)1, Munetoshi Maruyama1, Seiki Yamane2, and Fuminori Ito3, 1Kyushu Univ., Fukuoka, Japan, 2Kagoshima Univ., Kagoshima, Japan, 3Kagawa Univ., Kagawa, Japan



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* **D3924**Contribution to taxonomical and biological study of *Heteropsylla cubana* Crawford, phytophagous insect of *Leucaena leucocephala* (Lam.) de Wit.  
  **Nurys Valenciaga Valdés** (nvalenciaga@ica.co.cu)1, Miriam Fernández Argudín2, and Ciro Mora Díaz1, 1Institute of Animal Science, San José de las Lajas, Cuba, 2National Center for Animal and Plant Health, San José de las Lajas, Cuba
* **D3925**Development of a physiological age grading system for the southern green stink bug. **Brad Elliott** (brad. elliott@ars.usda.gov), Michael Grodowitz,  
  M. Guadalupe Rojas, and Juan Morales-Ramos, USDA - ARS, Stoneville, MS
* **D3926**Comparison of morphometric indices in male and female imagoes of *Calliptamus barbarus* (Orthoptera: Acrididae: Calliptaminae) in the region of Jijel (Algeria). **Rouibah Moad** (rouibahm@yahoo.com), Univ. of Jijel, Jijel, Algeria
* **D3927**Efficient identification of 40 stingless bee species using geometric morphometric of forewings.  
  **Patrícia Daniela Pinhal** (patriciadpinhal@gmail.com)1 and Tiago Francoy2, 1Univ. of São Paulo, Ribeirão Preto, Brazil, 2Univ. of São Paulo, São Paulo, Brazil
* **D3928**Comparison of the sternal spots and carinae of twelve species of North American cuckoo wasps (Hymenoptera: Chrysididae) using scanning electron microscopy. **Robert Conrow** (rtconrow@gmail.com)1 and Gregory Paulson2, 1Oley, PA, 2Shippensburg Univ., Shippensburg, PA
* **D3929**Proboscis morphology is not a good predictor of the functionality in Saturniidae (Lepidoptera). Shen-horn Yen and **Shih-Hao Tu** (a0976546859@gmail.com), National Sun Yat-Sen Univ., Kaohsiung, Taiwan
* **D3930**The ultrastructure of infrabaccal pocket in *Camponotus japonicus* Mayr. **Hong He** (hehong@nwsuaf.edu.cn), Jun Zhang, and Cong Wei, Northwest A&F Univ., Yangling, China
* **D3931**Phylogenetic prediction: Analytical considerations. **James Hayden** (james.hayden@freshfromflorida.com)1 and Michelle DaCosta2, 1Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, 2USDA - APHIS, Miami, FL
* **D3932**Higher-level phylogeny of Plecoptera based on molecular data. **Zhi-Teng Chen** (741208116@qq.com) and Yuzhou Du, Yangzhou Univ., Yangzhou, China
* **D3933**Cladistic analysis of Catacanthini Atkinson, 1888 (Hemiptera: Heteroptera: Pentatomidae: Pentatominae). Jocelia Grazia1, **Brenda Fürstenau** (brendabianca@ gmail.com)1, and Cristiano Schwertner2, 1Federal Univ. of Rio Grande, Porto Alegre, Brazil, 2Federal Univ. of São Paulo, Diadema, Brazil
* **D3934**A comparison of wing flexural stiffness in butterflies within a Batesian mimicry complex. **Laura Unfried** (lnunfried@eagles.usi.edu), Andrew Hamilton, and Eric McCloud, Univ. of Southern Indiana, Evansville, IN
* **D3935**A comparison of wing toughness in a Batesian mimicry complex. **Andrew Hamilton** (akhamilton1@eagles.usi. edu), Laura Unfried, and Eric McCloud, Univ. of Southern Indiana, Evansville, IN

**D3936** Elliptic fourier analysis of the forewing and pronotum outline shape of male and female of *Rhipibruchus jujuyensis*. (Coleoptera: Chrysomelidae: Bruchinae). **Voyko Flores-Rocha** (voyyyko@gmail.com)1,

Maria Avila2, and Susana Muruaga de L. Argentier3, 1National Univ. of Salta, Salta, Argentina, 2National Agricultural Technology Institute, Salta, Argentina, 3National Univ. of Jujuy, Jujuy, Argentina

**D3937** Phylogenetics of Pteromalidae: Can it be done? Should it be done? Will anyone accept the answers? **Roger A. Burks** (burks.roger@gmail.com) and  
John M. Heraty, Univ. of California, Riverside, CA

**D3938** Phylogenetic relationships of the flesh fly genus *Ravinia* (Diptera: Sarcophagidae). **Gregory A. Dahlem** (dahlem@nku.edu)1, Evan Wong2, and Ronald W. DeBry2, 1Northern Kentucky Univ., Highland Heights, KY, 2Univ. of Cincinnati, Cincinnati, OH

**D3939** Excess power index: A sexually dimorphic trait in bees. **Cindy Vigueira** (cvigueir@highpoint.edu)1, Patrick Vigueira1, and Joshua Campbell2, 1High Point Univ., High Point, NC, 2Univ. of Florida, Gainesville, FL

**D3940** Laboulbeniales fungal ectoparasites on cave arthropods: Remarkable models for ecology and evolution.  
Danny Haelewaters1, Sergi Santamaria2, Donald Pfister1, Henrik Enghoff3, and **Ana Sofia Reboleira** (sreboleira@ snm.ku.dk)3, 1Harvard Univ., Cambridge, MA, 2Autonomous Univ. of Barcelona, Bellaterra, Spain, 3Natural History Museum, Copenhagen, Denmark

**D3941** A review of the New World leafhopper tribe Faltalini (Hemiptera: Cicadellidae: Deltocephalinae) and discovery of new genera and species. **James Zahniser** (james.n.zahniser@aphis.usda.gov), USDA - APHIS, San Diego, CA

**D3942** Molecular identification of *Helicoverpa armigera* from northwestern Argentina. **Maria Avila** (agronoelia@ hotmail.com)1, Marta Galvan2, Voyko Flores-Rocha3, and German San Blas4,5, 1National Agricultural Technology Institute, Salta, Argentina, 2National Scientific and Technical Research Council, Salta, Argentina, 3National Univ. of Salta, Salta, Argentina, 4National Univ. of La Pampa, La Pampa, Argentina, 5National Scientific and Technical Research Council, La Pampa, Argentina

**D3943** Some new species of the Rosaceae-feeding *Ectoedemia* in Japan (Lepidoptera: Nepticulidae). **Sadahisa Yagi** (yagi.sadahisa@gmail.com)1, Nagao Hirano2, and Toshiya Hirowatari1, 1Kyushu Univ., Fukuoka, Japan, 2Matsumoto, Japan

**D3944** Discovery of multiple cryptic species of the *Auplopus carbonarius* species-complex (Hymenoptera: Pompilidae). **Hiroaki Kurushima** (kurushima-hiroaki@ ed.tmu.ac.jp) and Akira Shimizu, Tokyo Metropolitan Univ., Hachioji, Japan

**D3945** Presentation withdrawn

**D3946** New species of the entomobryomorpha (Hexapoda: Collembola) from South Korea. **Hakseo Kim** (goodkimseo@ gmail.com), Chonbuk National Univ., Jeonju, South Korea

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* **D3947**The immature stages, larval host plants and biology of oriental poritiine butterflies (Lepidoptera: Lycaenidae: Poritiinae). **Masaya Yago** (myago@um.u-tokyo.ac.jp)1, Seiya Kudo2, Yoshichika Aoki3, Tadashi Kudo4,   
  Michael Braby5, Koji Takayama6, and Hiroshi Ikeda1, 1The Univ. Museum, The Univ. of Tokyo, Tokyo, Japan, 2Hirosaki Univ., Aomori, Japan, 3Matsumoto Mushi-no-Kai, Nagano, Japan, 4The Lepidopterological Society of Japan, Aomori, Japan, 5The Australian National Univ., Canberra, Australia, 6Museum of Natural and Environmental History, Shizuoka, Japan
* **D3948**Morphology, systematics, and phylogeny of sub-family of Gomphocerinae (Orthoptera: Acrididae). **Zina Sofrane** (sofranezina1@yahoo.fr)1, Simon Dupont2, Salaheddine Doumandji3, and Anne-Genevieve Bagnere2, 1Univ. Ferhat Abbas Sétif, Setif, Algeria, 2Univ. of Tours, Tours, France, 3National Higher School of Agronomy, El-Harrach, Algeria
* **D3949**DNA-based species delimitation within the flesh fly genus *Ravinia* (Diptera: Sarcophagidae). **Ronald DeBry** (ron.debry@uc.edu)1, Evan S. Wong1, and  
  Gregory A. Dahlem2, 1Univ. of Cincinnati, Cincinnati, OH, 2Northern Kentucky Univ., Highland Heights, KY
* **D3950**Systematic review and meta-analysis of the prey- attraction and predator-defence hypotheses for web decorations in *Argiope* and *Cyclosa* spiders.   
  **Dumas Gálvez** (dumas.galvez@mail.com), INDICASAT AIP, Panama, Panama
* **D3951***Tipula* (*Nippotipula*) *abdominalis* (Say, 1823) (Diptera: Tipulidae), a common eastern Nearctic shredder crane fly, is actually three species. **Jon K. Gelhaus** (gelhaus@ ansp.org)1, Vaughn Shirey1, and Yan Li2, 1Drexel Univ., Philadelphia, PA, 2Shenyang Agricultural Univ., Shenyang, China
* **D3952**Species diversity and speciation of physogastric rove beetles associated with *Longipeditermes longipes* in Southeast Asia. **Taisuke Kanao** (kanatai1225@gmail. com) and Munetoshi Maruyama, Kyushu Univ., Fukuoka, Japan
* **D3953**Unrecognized *Glyphomerus* species associated with gall wasps in western North America. **Chris Looney** (clooney@agr.wa.gov)1 and James Strange2, 1Washington State Dept. of Agriculture, Olympia, WA, 2USDA - ARS, Logan, UT
* **D3954**Taxonomic review to subgeneric and species level  
  of *Augochloropsis* (Hymenopters: Halictidae).  
  **Cindy Julieth Celis** (cindy.celis1@gmail.com) and Jose Ricardo Cure, Nueva Granada Military University, Cajica, Colombia
* **D3955**Presentation withdrawn
* **D3956**Biology and taxonomy of *Plutella* species in Australia. **Tharanga Kariyawasam** (tharanga.kankanamge@hdr. qut.edu.au)1, Stephen Cameron2, Mark Schutze2, and Caroline Hauxwell1, 1Queensland Univ. of Technology, Brisbane, Australia, 2Plant Biosecurity Cooperative Research Centre, Bruce, Australia
* **D3957**Revision of the genus *Gymnoscirtetes* (Orthoptera: Acrididae). **JoVonn Hill** (jgh4@entomology.msstate. edu), Mississippi State Univ., Mississippi State, MS

**D3958** Molecular taxonomy: A not so straightforward path to insect species identification. **Mauricio Montero-Astúa** (mauricio.monteroastua@ucr.ac.cr)1, Ericka Valverde- Ortiz1, Adonay Zúñiga Centeno1, Izayana Sandoval Carvajal1, Nicolás Pérez Hidalgo2, Grace Alpizar3, Laura Garita1, and William Villalobos1, 1Univ. of Costa Rica, San José, Costa Rica, 2Univ. of León, León, Spain, 3State Plant Protection Service, Alajuela, Costa Rica

**D3959** A taxonomic study on the subfamily Braconinae (Hymenoptera: Braconidae) from China. **Yang Li** (xly105@163.com), Jun-hua He, and Xue-xin Chen, Zhejiang Univ., Hangzhou, China

**D3960** The good, the bad, and the ugly: The wild, wild west of specimen databasing. **Luciana Musetti** (musetti.2@ osu.edu), Sara Hemly, Matt Elder, and Norman Johnson, The Ohio State Univ., Columbus, OH

**D3961** Review of Genus *Cryptorhynchus* Illiger and related genera in Japan (Coleoptera: Curculionidae). **Naomichi Tsuji** (64kurasawatrechus@gmail.com) and Katsura Morimoto, Kyushu Univ., Fukuoka, Japan

**D3962** Comparison of preservation methods for DNA extraction from *Tabanus bifarius* Lowe 1858  
(Diptera: Tabanidae). **Ali Kilic** (aykilic@anadolu.edu.tr) and Sumeyra Sanal Demirci, Anadolu Univ., Eskisehir, Turkey

**D3963** Taxonomy of the genus *Pilophorus* Hahn from  
Nepal (Heteroptera: Miridae: Phylinae: Pilophorini). **Ram Keshari Duwal** (ramkeshariduwal@gmail.com)1, Tomohide Yasunaga2, and Toshiya Hirowatari1, 1Kyushu Univ., Fukuoka, Japan, 2American Museum of Natural History, New York, NY

**D3964** Application of DNA barcoding to sawfly (Hymenoptera: Symphyta) taxonomy. **Nathan M. Schiff** (nschiff@fs.fed. us)1, David Smith2, Aaron Lancaster1, and Brian E. Scheffler3, 1USDA - Forest Service, Stoneville, MS, 2USDA - ARS, Washington, DC, 3USDA - ARS, Stoneville, MS

**D3965** DNA barcoding of Japanese scarabaeoid beetles (Coleoptera, Scarabaeoidea). **Tadatsugu Hosoya** (tadatsugu.hosoya.848@m.kyushu-u.ac.jp), Kyushu Univ., Fukuoka, Japan

**D3966** Scope of University of Central Florida Collection of Arthropods: A growing collection. **Shiala Naranjo** (smorales20@knights.ucf.edu), Sandor Kelly,  
Erin Barbeau, Brian Silverman, and Ryan Ridenbaugh, Univ. of Central Florida, Orlando, FL

**Symposium: Forest Entomology without Borders: Balancing Market Forces with Government Intervention**

***Room W222 A (Convention Center)***

**Moderator and Organizer:** Kimberly F. Wallin, Univ. of Vermont, Burlington, VT

9:15 **3690** Southern pine beetle infestations in relation  
to forest stand conditions, previous thinning, and prescribed burning. John T. Nowak1, James R. Meeker2, Chris Steiner2, and **David Coyle** (drcoyle@uga.edu)3, 1USDA - Forest Service, Asheville, NC, 2USDA - Forest Service, Pineville, LA, 3Univ. of Georgia, Athens, GA



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**FRIDAY**

**Friday, September 30 • MORNING •**

9:30 **3691** Emerging forest insect management issues in the Southwestern US: Insects, droughts, and megafires. **Monica Gaylord** (monicalgaylord@fs.fed.us)1,  
John Anhold1, Christopher J. Fettig2, and Andrew Graves3, 1USDA - Forest Service, Flagstaff, AZ, 2USDA - Forest Service, Davis, CA, 3USDA - Forest Service, Albuquerque, NM

9:45 **3692** Recognizing human impacts on the estimated phylogeographic structure of indigenous exotic forest pest populations in North America. **Andrew Graves** (adgraves@fs.fed.us)1, Tom W. Coleman1, and

Steven Seybold2, 1USDA - Forest Service, Albuquerque, NM, 2USDA - Forest Service, Davis, CA

10:00 **3693** Wildfire likelihood and severity following bark beetle and defoliator outbreaks in Pacific Northwest forests. Garrett Meigs1, John Bailey2, John Campbell2, William Keeton1, Robert Kennedy2, David Shaw2, Harold Zald2, and **Kimberly Wallin** (kwallin@uvm.edu)1, 1Univ. of Vermont, Burlington, VT, 2Oregon State Univ., Corvallis, OR

**10:15 BREAK**

10:30 **3694** Habitat heterogeneity and behavior of  
forest Coleoptera: Implications for monitoring and management. **Brian L. Strom** (brianstrom@fs.fed.us)1, Sheri L. Smith2, Harold W. Thistle3, James R. Meeker1, and Jeremy D. Allison4, 1USDA - Forest Service, Pineville, LA, 2USDA - Forest Service, Susanville, CA, 3USDA - Forest Service, Morgantown, WV, 4Natural Resources Canada, Sault Ste. Marie, ON, Canada

10:45 **3695** Relieving pressure on native mahogany resources in West Africa: Overcoming the limitations on plantation mahogany imposed by the mahogany shoot borer, *Hypsipyla robusta*. **Andrew J. Storer** (storer@mtu.edu)1 and Emmanuel Opuni Frimpong2, 1Michigan Technological Univ., Houghton, MI,  
2Forest Research Institute, Kumasi, Ghana

11:00 **3696** Using forest insects to link biodiversity modeling and conservation management in an invaded North American Forest. **R. Talbot Trotter** (rttrotter@ fs.fed.us), USDA - Forest Service, Hamden, CT

11:15 **3697** Looking for black and white in the grey: Variation in invasion success and management challenges in a global community. Patrick Tobin1,  
Travis Marisco2, Kathryn Thomas3, Daniel Herms4, and **Angela Mech** (angmech@uw.edu)1, 1Univ. of Washington, Seattle, WA, 2Arkansas State Univ., Jonesboro, AR, 3U.S. Geological Survey, Tucson, AZ, 4The Ohio State Univ., Wooster, OH

11:30 **3698** Measuring and modeling forest ecosystem service trade-offs of salvage logging following wind disturbances. **Kimberly F. Wallin** (kwallin@uvm.edu)1,2, Sarah Pears1, Jon Erickson1, and Eduardo Rodriguez1, 1Univ. of Vermont, Burlington, VT, 2USDA - Forest Service, Burlington, VT

**Symposium: The Brown Marmorated Stink Bug: An Invasive Insect of Global Importance**

***Room W223 A (Convention Center)***

**Moderators and Organizers:** George C. Hamilton1, Tracy C. Leskey2, and Anne L. Nielsen3, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2USDA - ARS, Kearneysville, WV, 3Rutgers, The State Univ. of New Jersey, Bridgeton, NJ

9:15 **3699** Introduction and spread of BMSB in North America. **George C. Hamilton** (hamilton@aesop.rutgers. edu), Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

9:30 **3700** Introduction and spread of BMSB in Europe. **Tim Haye** (t.haye@cabi.org), CABI, Delémont, Switzerland

9:45 **3701** Occurrence and damage of BMSB in Japan. **Ken Funayama** (funayamak@pref.akita.lg.jp), Akita Fruit-Tree Experiment Station, Yokote, Japan

10:00 **3702** Deciphering an invader’s population ecology: *Halyomorpha halys*. **Anne L. Nielsen** (nielsen@aesop. rutgers.edu)1, Shi Chen2, and Shelby J. Fleischer3, 1Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, 2North Carolina State Univ., Raleigh, NC, 3Pennsylvania State Univ., University Park, PA

**10:15 BREAK**

10:30 **3703** Genetic diversity and pathways of entry of *Halyomorpha halys* in recently invaded areas.  
**Tara Gariepy** (tara.gariepy@agr.gc.ca)1, Tim Haye2, and Hannah Fraser3, 1Agriculture and Agri-Food Canada, London, ON, Canada, 2CABI, Delémont, Switzerland, 3Ontario Ministry of Agriculture, Food and Rural Affairs, Vineland, ON, Canada

10:45 **3704** Current research status on *Halyomorpha*  
*halys* (Hemiptera: Pentatomidae) in South Korea. **Doo-Hyung Lee** (dl343@gachon.ac.kr), Minhyung Jung, and Soowan Kim, Gachon Univ., Seongnam, South Korea

11:00 **3705** Spatial movement of BMSB in agricultural systems. **Yong-Lak Park** (yong-lak.park@mail.wvu.edu), West Virginia Univ., Morgantown, WV

11:15 **3706** Behaviorally-based management of BMSB. **Tracy C. Leskey** (tracy.leskey@ars.usda.gov)1, Brent Short1, William R. Morrison1, Anne Nielsen2, Brett Blaauw2, Grzegorz Krawczyk3, and J. Christopher Bergh4, 1USDA - ARS, Kearneysville, WV, 2Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, 3Pennsylvania State Univ., Biglerville, PA, 4Virginia Polytechnic Institute and State Univ., Winchester, VA

11:30 **3707** Asian remedy for an invasive Asian pest? Biological control of brown marmorated stink bug. **Kim A. Hoelmer** (kim.hoelmer@ars.usda.gov)1 and Christine Dieckhoff1,2, 1USDA - ARS, Newark, DE, 2Univ. of Delaware, Newark, DE

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**FRIDAY**

**Friday, September 30 • MORNING •**

**Symposium: Evolution of Insect Sociality: From Theory to Genomes and Back Again**

***Room W414 A (Convention Center)***

**Moderators and Organizers:** Amro Zayed1 and Amy L. Toth2, 1York Univ., Toronto, ON, Canada, 2Iowa State Univ., Ames, IA

9:15 **3708** Evolutionary genomics of post-developmental phenotypic novelty. **Brian Johnson** (laertes74@gmail. com), Wei Lin, and Abbas Mohamed, Univ. of California, Davis, CA

9:30 **3709** The importance of direct and indirect selection in corbiculate bees. **Brock Harpur** (harpur@yorku.ca), Alivia Dey, and Amro Zayed, York Univ., Toronto, ON, Canada

9:45 **3710** Origins of social plasticity in bees. **Karen Kapheim** (karen.kapheim@usu.edu), Utah State Univ., Logan, UT

10:00 **3711** Social transitions and behavioural plasticity  
in simple societies of eusocial insects. **Seirian Sumner** (seirian.sumner@bristol.ac.uk), Univ. of Bristol, Bristol, United Kingdom

**10:15 BREAK**

10:30 **3712** Genomic signatures of social evolution in pharaoh ants (*Monomorium pharaonis*). Michael Warner1, Alexander Mikheyev2, and **Timothy A. Linksvayer** (tlinks@sas.upenn.edu)1, 1Univ. of Pennsylvania, Philadelphia, PA, 2Okinawa Institute of Science and Technology, Onna, Japan

10:45 **3713** The evolution of social chromosomes. **Yannick Wurm** (y.wurm@qmul.ac.uk), Queen Mary Univ. of London, London, United Kingdom

11:00 **3714** Testing the kinship theory of intragenomic conflict in honey bees (*Apis mellifera*).

**Christina M. Grozinger** (cmgrozinger@psu.edu)1, David Galbraith1, Sarah Kocher2, Tom Glenn3,  
Istvan Albert1, Greg J. Hunt4, Joan Strassmann5, and David Queller5, 1Pennsylvania State Univ., University Park, PA, 2Princeton Univ., Princeton, NJ, 3Glen Apiaries, Fallbrook, CA, 4Purdue Univ., West Lafayette, IN, 5Washington Univ., St. Louis, MO

11:15 **3715** Genomics of *Ceratina* small carpenter bees: What early insect societies can tell us about the evolution of sociality. **Sandra Rehan** (sandra.rehan@ gmail.com), Univ. of New Hampshire, Durham, NH

11:30 **3716** Ontogenetic shifts in gene expression among social insect castes reveal old genes for developmental novelty. **Chris R. Smith** (crsmith.ant@gmail.com), Earlham College, Richmond, IN

11:45 **3717** *Polistes* wasps: A model genus for social theory in the genomic era. **Amy L. Toth** (amytoth@iastate. edu), Iowa State Univ., Ames, IA

12:00 **3718** Molecular determinants of behavioral plasticity in a facultatively eusocial bee, *Megalopta genalis.*  
**Beryl M. Jones** (bmjones2@illinois.edu)1, Callum Kingwell2, William Wcislo3, and Gene E. Robinson1, 1Univ. of Illinois, Champaign, IL, 2Cornell Univ., Ithaca, NY, 3Smithsonian Tropical Research Institute, Panama City, Panama

**Symposium: Insects and Ecosystem Services with Special Reference to Pollination Biology**

***Room W224 A (Convention Center)***

**Moderator and Organizer:** O. K. Remadevi1,2, 1Institute of Wood Science & Technology, Bangalore, India, 2Environmental Management and Policy Research Institute, Bangalore, India

*This symposium is generously sponsored the Royal Entomological Society.*

9:15 **3719** Native pollinators as key ecosystem service providers: A case study with mango (*Mangifera indica* L.) in India. **P. V. Rami Reddy** (pvreddy2011@gmail.com), Indian Institute of Horticultural Research, Bangalore, India

9:30 **3720** Pollination biology and the role of insect pollinators in conservation of mangroves in west coast of India. **O. K. Remadevi** (okremadevi@gmail.com)1,2, 1Environmental Management and Policy Research Institute, Bangalore, India, 2Institute of Wood Science & Technology, Bangalore, India

9:45 **3721** Genome comparison of *Nosema* species from honey bees and other members of the *Nosema*/ *Vairimorpha* clade. **Charles Vossbrinck** (charles. vossbrinck@ct.gov), Connecticut Agricultural Experiment Station, New Haven, CT

10:00 **3722** Comparative ontogeny of key behaviours in the Western and Eastern honey bees. **Hema Somanathan** (hsomanathan@iisertvm.ac.in), Indian Institute of Science Education and Research, Thiruvananthapuram, India

**SD3723** Ecosystem conservation by mulberry sericulture practices in India. **E. Muniraju** (emuniraju@yahoo.com), Karnataka State Sericulture Research & Development Institute, Bangalore, India

**10:15 BREAK AND POSTER SESSION**

10:30 **3724** Degradation of soil fertility can cancel pollination benefits in sunflower. **Giovanni Tamburini** (giovanni.tamburini@unipd.it), Univ. of Padova, Legnaro, Italy

10:45 **3725** Black-coloured Muga silk moth, *Antheraea assamensis* Helfer (Lepidoptera: Saturniidae), from Assam (India): Second best example of “industrial melanism”. **Rajesh Kumar** (rajesh.ento@gmail.com), Central Muga Eri Research & Training Institute, Jorhat, India

11:00 **3726** Microsporidia — a sooner or later threat to beekeeping in Coorg and Waynad districts of South India. **T. O. Sasidharan** (tosasi@atree.org), Ashoka Trust for Research in Ecology and the Environment, Bangalore, India

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**FRIDAY**

**Friday, September 30 • MORNING •**

11:15 **3727** Butterfly diversity and role of butterflies in ecosystem services and development of ecotourism in Western Ghats. T. V. Mohandas1 and **O. K. Remadevi** (okremadevi@gmail.com)2, 1Karnataka Forest Development, Bangalore, India, 2Institute of Wood Science & Technology, Bangalore, India

11:30 **3728** Insect diversity for ecosystem services — Indian perspective. **Kailash Chandra** (kailash611@rediffmail. com), Zoological Survey of India, Kolkata, India

11:45 **3729** A comparative study on the insect diversity of two protected areas in southern Western Ghats, Kerala, India, with special reference to their ecological function. **Gigi K. Joseph** (gigiperiyar@yahoo.co.in), Nirmala College, Muvattupuzha, India

**Symposium: Partners in Crime: Vector-Pathogen Interactome**

***Room W232 C (Convention Center)***

**Moderators and Organizers:** Cecilia Tamborindeguy1 and Michelle Cilia2, 1Texas A&M Univ., College Station, TX, 2USDA - ARS, Ithaca, NY

9:15 **3730** Investigating psyllid-*Liberibacter* transcriptional dialog. **Cecilia Tamborindeguy** (ctamborindeguy@ tamu.edu) and Freddy Ibanez, Texas A&M Univ., College Station, TX

9:45 **3731** Bacterial adaptative strategies inside host cells: *Ehrlichia* as a case-study. **Damien Meyer** (damien.meyer@ gmail.com), CIRAD, Petit Bourg, Guadeloupe; INRA, Montpellier, France

10:00 **3732** Multitasking: How single bacterial virulence proteins modulate plant development and attract insect vectors. **Zigmunds Orlovskis** (zigmunds.orlovskis@jic. ac.uk)1, Pascal Pecher1, Vera Thole1, Cristina Canale1,2, Gabriele Moro1, Akiko Sugio1, Allyson MacLean1,

Joao R. S. Lopes2, and Saskia A. Hogenhout1, 1The John Innes Centre, Norwich, United Kingdom, 2Univ. of São Paulo, Piracicaba, Brazil

**10:15 BREAK**

10:30 **3733** Rapid isolation of aphid-virus protein complexes from viruliferous insects using affinity purification-mass spectrometry. **Stacy DeBlasio** (sld98@cornell.edu)1, Richard Johnson2, Murad Ghanim3, Michael MacCoss2, and Michelle Cilia1, 1USDA - ARS, Ithaca, NY, 2Univ. of Washington, Seattle, WA, 3Agricultural Research Organisation, Bet-Dagan, Israel

10:45 **3734** New proteins involved in the interaction between tomato yellow leaf curl virus in its whitefly vector *Bemisia tabaci* B biotype. **Murad Ghanim** (ghanim@volcani.agri.gov.il), Pakkianathan Britto Cathrin, Svetlana Kontsedalov, Galina Lebedev and Surapathrudu Kanakala, Agricultural Research Organisation, Bet-Dagan, Israel

11:00 **3735** Proteins shared by nymph and adult *Ixodes scapularis* tick saliva. **Željko Radulović** (szradul@yahoo. com), Lindsay Porter, Tae Kim, and Albert Mulenga, Texas A&M Univ., College Station, TX

**Symposium: Keeping Science in Citizen Science**

***Room W315 A (Convention Center)***

**Moderators and Organizers:** Kathleen Prudic1, Maxim Larrivée2, and Kent McFarland3, 1Univ. of Arizona, Tucson, AZ, 2Montréal Insectarium Space for Life, Montréal, QC, Canada, 3Vermont Center for Ecostudies, Norwich, VT

9:15 **3736** Keeping science in citizen science: Successful scientific discovery in entomology with an all-volunteer army. **Kathleen Prudic** (klprudic@email.arizona.edu)1, Kent McFarland2, and Maxim Larrivée3, 1Univ. of Arizona, Tucson, AZ, 2Vermont Center for Ecostudies, Norwich, VT, 3Montréal Insectarium Space for Life, Montréal, QC, Canada

9:30 **3737** The bees’ needs: Integrating ecological research and outreach. **Virginia L. Scott** (virginia.scott@colorado. edu)1, Alexandra Rose1, Adrian L. Carper2, and  
M. Deane Bowers2, 1Univ. of Colorado Museum of Natural History, Boulder, CO, 2Univ. of Colorado, Boulder, CO

9:45 **3738** Climate change, butterfly conservation,  
and citizen science in Massachusetts and Alaska.  
**Greg Breed** (gabreed@alaska.edu)1, Kathryn Daly1, Derek S. Sikes1, Sharon Stitcher2, and Elizabeth Crone3, 1Univ. of Alaska, Fairbanks, AK, 2Massachusetts Butterfly Club, Fairbanks, AK, 3Tufts Univ., Medford, MA

10:00 **3739** The butterflies and the bees: Statewide atlasing in Vermont with citizen scientists jumpstarts conservation. **Kent McFarland** (kmcfarland@vtecostudies.org)1,  
Sara Zahendra1, Leif Richardson2, and Bryan Pfeiffer1,2, 1Vermont Center for Ecostudies, Norwich, VT, 2Univ. of Vermont, Burlington, VT

**10:15 BREAK**

10:30 **3740** Butterfly biodiversity, conservation, and  
citizen science in urban Los Angeles. **Elizabeth C. Long** (elong@nhm.org), Natural History Museum, Los Angeles, CA; Mohonk Preserve, Gardiner, NY

10:45 **3741** Using machine learning in insect conservation and biodiversity research. **Rebecca Hutchinson** (rah@eecs.oregonstate.edu)1, Kathleen Prudic2, and Weng-Keen Wong1, 1Oregon State Univ., Corvallis, OR, 2Univ. of Arizona, Tucson, AZ

11:00 **3742** eButterfly and monarch migration in Canada. **Maxim Larrivée** (maxim.larrivee@ville.montreal.qc.ca)1, Jeremy Kerr2, Paul Galpern3, Dominique Berteaux4, and Nicolas Casajus4, 1Montréal Insectarium Space for Life, Montréal, QC, Canada, 2Univ. of Ottawa, Ottawa, ON, Canada, 3Univ. of Calgary, Calgary, AB, Canada, 4Univ. of Quebec, Rimouski, QC, Canada



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**FRIDAY**

**Friday, September 30 • MORNING •**

**Symposium: Making Species Inventories Work for You: Diverse Uses Across Varied Fields**

***Room W224 B (Convention Center)***

**Moderators and Organizers:** Michael Orr and Emily A. Sadler, Utah State Univ., Logan, UT

9:15 **3743** Conserved natural areas: Unexplored repositories of bee diversity. **Terry Griswold** (terry.griswold@ars.usda. gov)1, John S. Ascher2, Doug Yanega3, Harold Ikerd1, Olivia Messinger Carril4, Joan M. Meiners5,

Rebekah Andrus-Nelson6, and James Herndon6, 1USDA - ARS, Logan, UT, 2National Univ. of Singapore, Singapore, Singapore, 3Univ. of California, Riverside, CA, 4Southern Illinois Univ., Carbondale, IL, 5Univ. of Florida, Gainesville, FL, 6Utah State Univ., Logan, UT

9:30 **3744** Catching them all: A case study in sampling arthropod diversity. **Michael Skvarla** (mskvarla36@ gmail.com) and Ashley P. G. Dowling, Univ. of Arkansas, Fayetteville, AR

9:45 **3745** The gall of some wasps: A small look into a large collection. **Crystal McEwen** (clmcewen@gmail. com)1, Charles Mitter1, and Michael Gates2, 1Univ. of Maryland, College Park, MD, 2USDA - ARS, Washington, DC

10:00 **3746** Worldwide collections of sand flies (Psychodidae: Phlebotominae) to assess insecticide resistance.  
**David Denlinger** (david.denlinger@aggiemail.usu.edu)1, Yvonne-marie Linton2, Zachariah Gompert1, and

Scott A. Bernhardt1, 1Utah State Univ., Logan, UT, 2Walter Reed Biosystematics Unit, Suitland, MD

**10:15 BREAK**

10:30 **3747** A wasp’s tale: Understanding the present by revealing the past (Hymenoptera: Chyphotidae, Mutillidae, and Tiphiidae). **Emily A. Sadler** (sadler.e@ gmail.com) and James P. Pitts, Utah State Univ., Logan, UT

10:45 **3748** Inside job: An inventory of bumble bee parasites and pathogens in the US. **Amber D. Tripodi** (amber.tripodi@ars.usda.gov) and James Strange, USDA - ARS, Logan, UT

11:00 **3749** What can inventories tell us about bee phenology? **Michael Orr** (michael.christopher.orr@ gmail.com)1, Joan M. Meiners2, Olivia Messinger Carril3, James P. Pitts1, and Terry Griswold4, 1Utah State Univ., Logan, UT, 2Univ. of Florida, Gainesville, FL, 3Southern Illinois Univ., Carbondale, IL, 4USDA - ARS, Logan, UT

**Symposium: Advancement and Challenges in Biological Control of Invasive Forest Insects: A Global Perspective**

***Room W232 B (Convention Center)***

**Moderators and Organizers:** Juli Gould1, Leah S. Bauer2, Xiao-yi Wang3, and Jian Duan4, 1USDA - APHIS, Buzzards Bay, MA, 2USDA - Forest Service, Lansing, MI, 3Chinese Academy of Forestry, Beijing, China, 4USDA - ARS, Newark, DE

9:15 **3750** An overview of biological control programs against invasive insects and plants for protection of forested ecosystems in the United States. **Sharlene Sing** (ssing@fs.fed.us)1, Carol Bell Randall2, and Richard

Reardon3, 1USDA - Forest Service, Bozeman, MT, 2USDA - Forest Service, Coeur d’Alene, ID, 3USDA - Forest Service, Morgantown, WV

9:30 **3751** Challenges and regulatory hurdles in foreign exploration for natural enemies of invasive woodborers from Asia. **Juli Gould** (juli.r.gould@aphis.usda.gov)1, Leah S. Bauer2, Jian Duan3, and David Williams1, 1USDA - APHIS, Buzzards Bay, MA, 2USDA - Forest Service, Lansing, MI, 3USDA - ARS, Newark, DE

9:45 **3752** Biological control of invasive forest pests using augmentative releases of natural enemies native to China. **Zhong-qi Yang** (yangzhqi@126.com)1, Xiao-Yi Wang1, and Yi-nan Zhang2, 1Chinese Academy of Forestry, Beijing, China, 2Beijing Vocational College of Agriculture, Beijing, China

10:00 **3753** Biosafety testing and risk assessment for biological control of forest insect pests in New Zealand. **Toni Withers** (toni.withers@scionresearch.com)1, Barbara Barratt2, and Lisa Berndt1, 1Scion and Better Border Biosecurity Collaboration, Rotorua, New Zealand, 2AgResearch, Ltd., Mosgiel, New Zealand

**10:15 BREAK**

10:30 **3754** Issues surrounding potential introduction of parasitic nematodes against *Sirex* in North America. **E. Erin Morris** (morri639@msu.edu)1 and Ann E. Hajek2, 1Michigan State Univ., East Lansing, MI, 2Cornell Univ., Ithaca, NY

10:45 **3755** Cooperative foreign exploration and research in Asia to support biological control of the emerald ash borer in North America. **Leah S. Bauer** (lbauer@fs.fed. us)1, Houping Liu2, Zhong-qi Yang3, Xiao-Yi Wang3, Tonghai Zhao3, Juli Gould4, Jian Duan5, Toby R. Petrice1, Deborah Miller1, and David Williams4, 1USDA - Forest Service, Lansing, MI, 2Pennsylvania Dept. of Conservation and Natural Resources, Harrisburg, PA, 3Chinese Academy of Forestry, Beijing, China, 4USDA - APHIS, Buzzards Bay, MA, 5USDA - ARS, Newark, DE

11:00 **3756** Biological control of an invasive forest insect: From biological invasion to population ecology.  
**David E. Jennings** (david.e.jennings@gmail.com)1 and Jian Duan2, 1Univ. of Maryland, College Park, MD, 2USDA - ARS, Newark, DE

11:15 **3757** Candidates for biological control of the Asian and citrus longhorned beetles in Asia, Europe, and North America. Franck Hérard1, Matteo Maspero2, **Xiao-Yi Wang** (xywang@caf.ac.cn)3, Zhong-qi Yang3, Juli Gould4, and Jian Duan5, 1USDA - ARS, Montferrier- sur-Lez, France, 2Minoprio Foundation, Como, Italy, 3Chinese Academy of Forestry, Beijing, China, 4USDA - APHIS, Buzzards Bay, MA, 5USDA - ARS, Newark, DE

11:30 **3758** What do you want to hear first: The good news or the bad news about biological control of hemlock woolly adelgid, *Adelges tsugae* (Hemiptera: Adelgidae)? **Scott Salom** (salom@vt.edu)1, Kenton Sumpter1,

Ariel Heminger1, Molly Darr1, Albert E. Mayfield III2, Jerome F. Grant3, Joseph Elkinton4, Thomas McAvoy1, Andy Roberts1, and Carlyle C. Brewster1, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2USDA - Forest Service, Asheville, NC, 3Univ. of Tennessee, Knoxville, TN, 4Univ. of Massachusetts, Amherst, MA

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**FRIDAY**

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**Symposium: Behavior and Ecology of Native, Naturalized, and Invasive Ladybird Beetles**

***Room W224 G (Convention Center)***

**Moderators and Organizers:** Eric Riddick1, Oldrich Nedved2, Louis Hesler3, Helen Roy4, John Sloggett5, and Antonio Soares6, 1USDA - ARS, Stoneville, MS, 2Univ. of South Bohemia,  
České Budějovice, Czech Republic, 3USDA - ARS, Brookings, SD, 4Natural Environment Research Council, Wallingford, United Kingdom, 5Maastricht Univ., Maastricht, Netherlands, 6Univ. of the Azores, Azores, Portugal

9:15 **3759** Non-native lady beetles: A diversity of outcomes. **Louis Hesler** (louis.hesler@ars.usda.gov), USDA - ARS, Brookings, SD

9:30 **3760** Invasion ecology and evolution in *Coccinella septempunctata*: Comparative morphometrics between native and introduced range. **Yukie Kajita** (yukie-kajita@ utc.edu)1, Erik Hearn1, Kelly Lehman1, John Obrycki2, and Eric O’Neill1, 1Univ. of Tennessee, Chattanooga, TN, 2Univ. of Kentucky, Lexington, KY

9:45 **3761** Odor-mediated aggregations of *Hippodamia convergens*, a native coccinellid of North America. **Christopher Wheeler** (cwhee002@ucr.edu)1,2 and Ring T. Cardé1, 1Univ. of California, Riverside, CA, 2Provivi, Inc., Santa Monica, CA

10:00 **3762** Long-term dynamics in invaded lady beetle communities. **Christie Bahlai** (cbahlai@msu.edu) and Douglas A. Landis, Michigan State Univ.,  
East Lansing, MI

**10:15 BREAK**

10:30 **3763** Can invisibility of Azorean habitats overcome the invasiveness of *Harmonia axyridis* Pallas (Coleoptera: Coccinellidae)? **Antonio Soares** (onofre@ uac.pt)1, Isabel Borges1, Alexandra Magro2, and

Artur Gil1, 1Univ. of the Azores, Ponta Delgada, Portugal, 2Univ. of Toulouse, Castanet-Tolosan, France

10:45 **3764** Invasion of *Harmonia axyridis* in Chile: Spread patterns and associated changes in coccinellid assemblages. **Audrey Grez** (audreygrez@gmail.com)1, Tania Zaviezo2, and Alberto Alaniz1, 1Univ. of Chile, Santiago, Chile, 2Pontifical Catholic Univ., Santiago, Chile

11:00 **3765** Polymorphism in ladybirds: Between thermal melanism, sexual selection, and aposematism. **Oldrich Nedved** (nedved@prf.jcu.cz), Univ. of South Bohemia, České Budějovice, Czech Republic

11:15 **3766** Unbalanced polyandry in wild caught *Harmonia axyridis.* **Mona Awad** (mona.awad2003@ gmail.com)1, Guillaume Laugier2, Anne Loiseau3, and Oldrich Nedved4, 1Cairo Univ., Giza, Egypt, 2Center of Advanced Studies in Arid Areas, La Serena, Chile, 3INRA, Montferrier-sur-Lez, France, 4Univ. of South Bohemia, České Budějovice, Czech Republic

11:30 **3767** Powder from cedar heartwood affects oviposition behavior in *Coleomegilla maculata*: A ladybird native to the Americas. **Eric Riddick** (eric.riddick@ ars.usda.gov)1, Zhixin Wu1, Fred Eller2, and Mark Berhow2, 1USDA - ARS, Stoneville, MS, 2USDA - ARS, Peoria, IL

**Symposium: Insects and Landscape Ecology: Defining an Entomological Perspective**

***Room W414 B (Convention Center)***

**Moderator and Organizer:** Robinson Sudan, New Leaf, Austin, TX

9:15 **3768** Entomology and landscape ecology: History, challenges, and integration. **Robinson Sudan** (robinson@newleaf-tx.org), New Leaf, Austin, TX

9:45 **3769** Transient effects of corridors on invasive red imported fire ants and native ants. **Julian Resasco** (jresasco@colorado.edu), Univ. of Colorado, Boulder, CO

10:00 **3770** Effects of urban landscapes on native bee communities in central Texas. **Kimberly Ballare** (kim.ballare@gmail.com), The Univ. of Texas, Austin, TX

**10:15 BREAK**

10:30 **3771** Evaluating the effects of wildfire on pollinator diversity and their interactions with plants across landscapes in the Northern Rockies. **Laura Burkle** (laura.burkle@montana.edu), Montana State Univ., Bozeman, MT

10:45 **3772** Presentation withdrawn

11:15 **3773** Experimental fragmentation alters the relative roles of niche and neutral processes in structuring ant communities. **Jeff McClenahan** (jlmcclenahan@gmail. com), Univ. of Colorado, Boulder, CO

**Symposium: Globally Important Pests and Globally Important Control Tools: Comparing and Contrasting IRM Successes and Challenges, IRAC US Symposium**

***Room W224 H (Convention Center)***

**Moderators and Organizers:** Graham P. Head1, Bradley W. Hopkins2, Scott W. Ludwig3, Clinton D. Pilcher4, Christopher Sansone5, Caydee Savinelli6, and Sean Whipple7, 1Monsanto Company,  
St. Louis, MO, 2Dow AgroSciences, Indianapolis, IN, 3Nichino America, Arp, TX, 4DuPont Pioneer, Johnston, IA, 5Bayer CropScience, Research Triangle Park, NC, 6Syngenta Plant Protection, Greensboro, NC, 7ISK Biosciences Corporation, Kearney, MO

9:15 **3774** Q biotype control in ornamentals — the invasion from Europe to the US. **Scott W. Ludwig** (sludwig@ nichino.net)1, Cristi L. Palmer2, James A. Bethke3,  
Joe Chamberlin4, Daniel Gilrein5, Cindy L. McKenzie6, Ronald Oetting7, and Lance Osborne8, 1Nichino America, Arp, TX, 2Rutgers, The State Univ. of New Jersey,

New Brunswick, NJ, 3Univ. of California Cooperative Extension, San Diego, CA, 4Valent U.S.A., Snellville, GA, 5Long Island Horticultural Research and Extension Center, Riverhead, NY, 6USDA - ARS, Ft. Pierce, FL, 7Univ. of Georgia, Griffin, GA, 8Univ. of Florida,

Apopka, FL

9:30 **3775** Implementation of the global plan for insecticide resistance management in malaria vectors: Progress, challenges, and the way forward. **Janet Hemingway** (hemingway@liverpool.ac.uk), Liverpool School of Tropical Medicine, Liverpool, United Kingdom

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9:45 **3776** Oxitec mosquito — a novel mode of action using genetics to precisely control pest species with no off-target effects on beneficial insects and pollinators. **Simon Warner** (simon.warner@oxitec.com), Oxitec, Ltd., Abingdon, United Kingdom

10:00 **3777** Enhancing IRM for Bt crops: Global lessons from local challenges. **Graham P. Head** (graham.p. head@monsanto.com), Monsanto Company,  
St. Louis, MO

**10:15 BREAK**

10:30 **3778** Magnitude of mutational effects and risks of resistance evolution: Why some populations are recurrent challenges. **David J. Hawthorne** (djh@umd. edu), Univ. of Maryland, College Park, MD

10:45 **3779** Colorado potato beetle insecticide resistance spreading west? **Silvia Rondon** (silvia.rondon@ oregonstate.edu), Oregon State Univ., Hermiston, OR

11:00 **3780** A case study of western corn rootworm, *Diabrotica virgifera virgifera* LeConte, Brescia Province, Lombardy Region, NW Italy — a dynamic pest of maize. **Richard Edwards** (edwards@purdue.edu)1, Mauro Agosti2, and Lorenza Michelon2, 1Purdue Univ.,

West Lafayette, IN, 2Consortium of Intensive Crops of Defence, Brescia, Italy

11:15 **3781** Managing insecticide resistance and *Bemisia tabaci* in Florida tomato. **Hugh A. Smith** (hughasmith@ ufl.edu), Univ. of Florida, Wimauma, FL

11:30 **3782** Resistance management of cotton aphid, *Aphis gossypii* Glover (Hemiptera: Aphididae), in Australian cotton: From a highly pesticide reliant system to an integrated IRM and IPM strategy. **Grant Herron** (grant.herron@dpi.nsw.gov.au)1 and Lewis Wilson2, 1New South Wales Dept. of Primary Industries, Narellan, Australia, 2CSIRO, Narrabri, Australia

11:45 **3783** The global importance of the tomato borer, *Tuta absoluta*, its control, and the current state of insecticide resistance. **Emmanouil Roditakis** (eroditakis@gmail.com)1, Emmanouil Vasakis1, Marianna Stavrakaki1, Aris Ilias2, Pablo Bielza3,  
Chris Bass4, Andrea Bassi5, Ralf Nauen6, John Vontas7, and Anastasia Tsagkarakou1, 1Hellenic Agricultural Organisation, Heraklion, Greece, 2Univ. of Crete, Herakleion, Greece, 3Polytechnic Univ., Cartagena, Spain, 4Univ. of Exeter, Penryn, United Kingdom, 5DuPont Italy, Naviglio, Italy, 6Bayer CropScience, Monheim, Germany, 7Agricultural Univ. of Athens, Athens, Greece

12:00 **3784** Diamide resistance management in the diamondback moth, *Plutella xylostella*. **Jan Elias** (jan.elias@syngenta.com), Syngenta Crop Protection, Stein, Switzerland

**Symposium: Insect-Resistant GM Crops in Asia-Pacific: Current Status, Challenges, and Opportunities**

***Room W222 B (Convention Center)***

**Moderators and Organizers:** Mao Chen1, Edwin P. Alcantara2, and Andi Trisyono3, 1Monsanto Company, Singapore, Singapore, 2Univ. of the Philippines, Los Baños, Philippines, 3Univ. of Gadjah Mada, Yogyakarta, Indonesia

9:15 **3785** Bollgard II and onwards: Proactive resistance management in Australia. **Kristen Knight** (kristen.m.knight@monsanto.com), Monsanto Australia, Toowoomba, Australia

9:30 **3786** Presentation withdrawn

10:00 **3787** Baseline susceptibility of two Bt proteins to key corn insect pests in Vietnam. **Ngo Luc Cuong** (cuong.ngoluc@gmail.com), Cuu Long Delta Rice Research Institute, Can Tho, Vietnam

**10:15 BREAK**

10:30 **3788** Bt cotton adoption and well-being of farmers in Pakistan. Ali Asif and **Masooma Naseer Cheema** (masooma@uaf.edu.pk), Univ. of Agriculture, Faisalabad, Pakistan

10:45 **3789** Field, laboratory, and screenhouse efficacy evaluation of Bt corn for resistance to the Asian corn borer, *Ostrinia furnacalis* (Guenee), in the Philippines. **Merdelyn Caasi-Lit** (binglit610429@gmail.com), Univ. of the Philippines, Los Baños, Philippines

11:00 **3790** Resistance monitoring program for Bt corn in the Philippines. **Edwin P. Alcantara** (epalcantara@uplb. edu.ph), Univ. of the Philippines, Los Baños, Philippines

11:15 **3791** Studies on non-target organisms in Bt corn  
in the Philippines and the important role of Bt corn technology in enhancing arthropod biodiversity in corn fields. **Ireneo Lit Jr.** (illit@up.edu.ph)1, Edwin Benigno2, and Merdelyn Caasi-Lit2, 1Univ. of the Philippines, Laguna, Philippines, 2Univ. of the Philippines,

Los Baños, Philippines

11:30 **3792** Opportunities and challenges for Bt corn in Indonesia. **Andi Trisyono** (andi\_trisyono@yahoo.com), Univ. of Gadjah Mada, Yogyakarta, Indonesia

11:45 **3793** The development and status of Bt rice in China. **Yunhe Li** (yunhe.li@hotmail.com)1 and Yufa Peng2, 1Agroscope, Zürich, Switzerland, 2Chinese Academy of Agricultural Sciences, Beijing, China

12:00 **3794** Evolution of resistance in *Helicoverpa armigera* to Bt cotton in China. **Yidong Wu** (wyd@njau.edu.cn), Nanjing Agricultural Univ., Nanjing, China



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**Symposium: Cassava and Bean IPM throughout the Developing World: Honoring the Contributions of Anthony Bellotti and César Cardona Mejía**

***Room W330 A (Convention Center)***

**Moderators and Organizers:** Stephen L. Lapointe1 and Kris Wyckhuys2, 1USDA - ARS, Ft. Pierce, FL, 2International Center for Tropical Agriculture, Hanoi, Vietnam

9:15 **3795** Classical biological control of cassava pests in Latin America and Africa. **Stephen L. Lapointe** (stephen.lapointe@ars.usda.gov), USDA - ARS,  
Ft. Pierce, FL

9:45 **3796** A region-wide response to invasive pests and insect-vectored diseases in southeast Asian cassava crops. **Kris Wyckhuys** (k.wyckhuys@cgiar.org), International Center for Tropical Agriculture,

Hanoi, Vietnam

**10:15 BREAK**

10:30 **3797** Crop and parasitoid diversity: A rich source  
to suppress pest insects based on scientific evidence. **Silvia Dorn** (silvia.dorn@ipw.agrl.ethz.ch), ETH Zürich, Zürich, Switzerland

10:45 **3798** Classical biological control of cassava green mite, *Mononychellus tanajoa*. **Lincoln Smith** (link.smith@ars.usda.gov), USDA - ARS, Montferrier- sur-Lez, France

11:00 **3799** Revisiting the history and success of classical biological control of the cassava mealybug in north- eastern Brazil. **José Mauricio Bento** (jmsbento@usp. br), Univ. of São Paulo, Piracicaba, Brazil

11:15 **3800** Management of the cassava hornworm. **Jorge Peña** (jepena@ufl.edu), Univ. of Florida, Homestead, FL

11:30 **3801** Fungal pathogens for control of cassava pests. **Italo Delalibera** (italo@esalq.usp.br), Univ. of São Paulo, Piracicaba, Brazil

11:45 **3802** Cassava green mites in Africa: Anthony Bellotti’s contributions to a successful classical biological control campaign. **John Stephen Yaninek** (yaninek@purdue. edu), Purdue Univ., West Lafayette, IN

**Symposium: Discovering Sustainable Insecticides: Resistance, Innovation, and Responsibility**

***Room W224 C (Convention Center)***

**Moderators and Organizers:** Margaret Hardy1 and Stephen Duke2, 1Univ. of Queensland, Brisbane, Australia, 2USDA - ARS, Univ., MS

9:15 **3803** Funding discovery projects: How to attract commercial interest and protect your intellectual property. **Andrea Adkins** (andrea.adkins@ucf.edu), Univ. of Central Florida, Orlando, FL

9:30 **3804** Arthropod venoms are a rich source of environmentally friendly biopesticides. **Margaret Hardy** (m.hardy@imb.uq.edu.au) and Glenn F. King, Univ. of Queensland, Brisbane, Australia

9:45 **3805** Natural product-based pest management: Discovery and development considerations.  
**Stephen Duke** (stephen.duke@ars.usda.gov), USDA - ARS, University, MS

10:00

**10:15**

10:30

10:45

11:00

**3806** U.S. EPA’s Endocrine Disruptor Screening Program: Moving forward with high throughput screening assays and computational models.  
**Sharlene Matten** (matten.sharlene@epamail.epa.gov), U.S. Environmental Protection Agency, Washington, DC

**BREAK**

**3807** An example of the agro-business response to the risk of insecticide resistance and why successful insecticide resistance management needs an integrated approach. **Russell Slater** (russell.slater@syngenta.com), Syngenta Crop Protection, Basel, Switzerland

**3808** Can Bt crops contribute to sustainable crop protection? A European perspective. **Michael Meissle** (michael.meissle@agroscope.admin.ch) and

Jörg Romeis, Agroscope, Zürich, Switzerland

**3809** Development of new seed treatment technologies through the lens of integrated product stewardship. **Keri Carstens** (keri.carstens@pioneer.com), DuPont Pioneer, Johnston, IA



**Symposium: Future Approaches for the Control of Insect Pests**

***Room W231 C (Convention Center)***

**Moderator and Organizer:** Phil Wege, Syngenta, Bracknell, United Kingdom

*This symposium is generously sponsored by Syngenta.*

9:15 **3810** A brief look at the future of insect pest control in crop protection, urban, and vector control markets. **Mark Hoppe** (mark.hoppe@syngenta.com)1 and  
Phil Wege2, 1Syngenta Crop Protection, Stein, Switzerland, 2Syngenta, Bracknell, United Kingdom

9:30 **3811** Urban pest control globally in the next twenty years. **Ron Harrison** (rharriso@rollins.com), Orkin Pest Control, Atlanta, GA

9:45 **3812** Presentation withdrawn

10:00 **3813** Characterization of vegetation biophysical components using ultra-high spatial resolution multispectral imagery acquired by drones and small aircraft. **Kevin Price** (kevin@agpixel.com)1, Lynn Brien2,3, David Burchfield2,3, Johnny Bryant2,3, Mark Lanning4, Kirk Demuth4, and Daniel Melia4, 1AgPixel, Johnston, KS, 2AgPixel, Manhattan, KS, 3Kansas State Univ., Manhattan, KS, 4AgPixel, Des Moines, IA

**10:15 BREAK**

10:30 **3814** Laser-based insect population control.  
**Arty Makagon** (amakagon@intven.com), Intellectual Ventures Laboratory, Bellevue, WA

10:45 **3815** There are no silver bullets: The future of sustainable insect pest management will depend upon a blend of established and emerging technologies. **Thomas Clark** (thomas.l.clark@monsanto.com), Monsanto Company, St. Louis, MO

11:00 **3816** Prospects for robust insect resistance in crops via plant genetic engineering. **Mike Birkett** (mike.birkett@rothamsted.ac.uk) and John Pickett, Rothamsted Research, Harpenden, United Kingdom

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11:15 **3817** Future trends in pest control technology. **Juergen Benting** (juergen.benting@bayer.com), Bayer CropScience, Monheim, Germany

11:30 **3818** Engineering technologies for future advanced agronomic and horticultural pest control. **John Schueller** (schuejk@ufl.edu), Univ. of Florida, Gainesville, FL

**Symposium: Modulation of Insect Chemical Response at Different Time Scales: Ethology, Ecology, and Evolution**

***Room W230 B (Convention Center)***

**Moderators and Organizers:** Fredrik Schlyter1 and Bill Hansson2, 1Swedish Univ. of Agricultural Sciences, Alnarp, Sweden,  
2Max Planck Institute for Chemical Ecology, Jena, Germany

9:15 **3819** Modulation of insect olfaction: From neurons to behavior. **Sylvia Anton** (sylvia.anton@angers.inra.fr) and Christophe Gadenne, INRA, Beaucouzé, France

9:30 **3820** Modulation of olfactory responses in *Spodoptera littoralis*. **Santosh Revadi** (revadi. santosh@slu.se)1, Saveer Ahmed1,2, Sophie Kroman1, Fredrik Schlyter1, Göran Birgersson1, Marie Bengtsson1, William B. Walker1, Peter Anderson1, Rickard Ignell1, Peter Witzgall1, and Paul Becher1, 1Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, 2Vanderbilt Univ., Nashville, TN

9:45 **3821** Role of experience in host plant choice of a polyphagous moth. **Peter Anderson** (peter.anderson@ slu.se), Swedish Univ. of Agricultural Sciences,  
Alnarp, Sweden

10:00 **3822** Modulation of attraction by non-host volatiles: Mechanisms for semiochemical diversity. **Fredrik Schlyter** (fredrik.schlyter@slu.se), Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

**10:15 BREAK**

10:30 **3823** Chemical signals, behavioral responses, and response modulation in *Drosophila*: When flies do or do not respond. **Boyd Mori** (bmori@ualberta.ca)1, Sebastien Lebreton1,2, Felipe Borrero-Echeverry1,  
Paul Becher1, and Peter Witzgall1, 1Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, 2Institute of Biology and Development of Marseille, Marseille, France

10:45 **3824** Chemical ecology of egg laying in *Drosophila*. **Marit Solum** (marit.solum@slu.se)1, Paul Becher1, Alexandra Schmidt1, Lina Bryngelsson1, Peter Witzgall1, Bill Hansson2, Teun Dekker1, and Mattias Larsson1, 1Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, 2Max Planck Institute for Chemical Ecology, Jena, Germany

11:00 **3825** Gall midge olfaction and its role in speciation. **Péter Molnár** (molnar.bela.peter@agrar.mta.hu)1,2, Tina Boddum2, Sharon Hill2, Bill Hansson3,  
Göran Birgersson2, and Ylva Hillbur4, 1Hungarian Academy of Sciences, Budapest, Hungary, 2Swedish Univ. of Agricultural Sciences, Alnarp, Sweden,

3Max Planck Institute for Chemical Ecology, Jena, Germany, 4International Institute of Tropical Agriculture, Ibadan, Nigeria

11:15 **3826** Host selection among mosquito disease vectors. **Sharon Hill** (sharon.hill@slu.se), Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

11:30 **3827** Functional, molecular, and evolutionary aspects of lepidopteran host plant olfaction. **Mattias Larsson** (mattias.larsson@slu.se)1, Arthur de Fouchier2,  
Nicolas Montagné3, William B. Walker1, Claudia Steiner3, Muhammad Binyameen4, Fredrik Schlyter1,

Thomas Chertemps3, Christelle Monsempes2,  
Annick Maria3, Marie-Christine François2,  
Göran Birgersson1, Peter Anderson1, Bill Hansson5,  
and Emmanuelle Jacquin-Joly2, 1Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, 2INRA, Versailles, France, 3Pierre and Marie Curie Univ., Paris, France, 4Bahauddin Zakariya Univ., Multan, Pakistan,

5Max Planck Institute for Chemical Ecology, Jena, Germany

**Symposium: Outlaws of Immunology and Infection**

***Room W414 D (Convention Center)***

**Moderators and Organizers:** David Schneider1 and  
Ann Thomas Tate2, 1Stanford Univ., Stanford, CA, 2Univ. of Houston, Houston, TX

9:15 **3828** Mathematical modeling of immune priming in infected insect populations. **Ann Thomas Tate** (annthomastate@gmail.com), Univ. of Houston, Houston, TX

9:30 **3829** Gut, immunity, microbiota, and the problem of universals. **Nichole A. Broderick** (nichole.broderick@ yale.edu), Yale Univ., New Haven, CT

9:45 **3830** Antimicrobial defense and persistent infection in insects revisited. **Jens Rolff** (jens.rolff@fu-berlin.de), Freie Univ., Berlin, Germany

10:00 **3831** How does circadian rhythm modulate immunity? **Mimi Shirasu-Hiza** (mshirasuhiza@gmail. com), Columbia Univ., New York, NY

**10:15 BREAK**

10:30 **3832** A genome-wide association study to identify novel genes and pathways important for phagocytosis in *Drosophila melanogaster*. **Louisa Wu** (lwu1@umd. edu), Univ. of Maryland, College Park, MD

10:45 **3833** Costs of infection along the continuum of host health. **Pedro Vale** (pferrei2@staffmail.ed.ac.uk), Univ. of Edinburgh, Edinburgh, Scotland

11:00 **3834** Tsetse’s cardia tissue: Gatekeeper of trypanosome transmission? **Aurélien Vigneron** (aurelien.vigneron@ yale.edu) and Brian Weiss, Yale Univ. School of Public Health, New Haven, CT

11:15 **3835** Defining the shape of an immune response. **David Schneider** (dschneider@stanford.edu), Stanford Univ., Stanford, CA

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**Symposium: Ecologically-Based Integrated Pest Management for Selected Food Security Crops in Central Asia**

***Room W240 C (Convention Center)***

**Moderators and Organizers:** Frank Zalom1 and Karim Maredia2, 1Univ. of California, Davis, CA, 2Michigan State Univ., East Lansing, MI

9:15 **3836** An overview of the history and status of integrated pest management in Central Asia.  
**Karim Maredia** (kmaredia@msu.edu)1, Frank Zalom2, and Saltanat Mambetova1, 1Michigan State Univ., East Lansing, MI, 2Univ. of California, Davis, CA

9:45 **3837** The role of biolaboratories in facilitating IPM in Central Asia. **Bahodir Eshchanov** (bahodire@yahoo. com)1,2, George Bird2, and Frank Zalom3, 1Uzbek Scientific Research Institute for Plant Protection, Tashkent, Uzbekistan, 2Michigan State Univ.,

East Lansing, MI, 3Univ. of California, Davis, CA

10:00 **3838** Opportunities for enhancing ecosystem services in Tajikistan agriculture. **Nurali Saidov** (n.saidov@cgiar.org)1, Douglas A. Landis2, and  
Anvar Jalilov3, 1International Center for Agricultural Research in the Dry Areas, Duschanbe, Tajikistan, 2Michigan State Univ., East Lansing, MI, 3Tajik Academy of Agricultural Science, Duschanbe, Tajikistan

**10:15 BREAK**

10:30 **3839** Challenges and opportunities for wheat IPM in Central Asia. **Mustafa El Bohssini** (m.bohssini@cgiar. org)1, Douglas A. Landis2, Nurali Saidov3, Anvar Jalilov4, Megan M. Kennelly5, and Ram Sharma6, 1International Center for Agricultural Research in the Dry Areas, Aleppo, Syria, 2Michigan State Univ., East Lansing, MI, 3International Center for Agricultural Research in the Dry Areas, Duschanbe, Tajikistan, 4Tajik Academy of Agricultural Science, Duschanbe, Tajikistan, 5Kansas State Univ., Manhattan, KS, 6International Center for Agricultural Research in the Dry Areas, Tashkent, Uzbekistan

10:45 **3840** Potato pest management in Central Asia. **George Bird** (birdg@msu.edu)1, Nurali Saidov2,  
Anara Chakaeva3, and Murataly Aitmatov4, 1Michigan State Univ., East Lansing, MI, 2International Center for Agricultural Research in the Dry Areas, Duschanbe, Tajikistan, 3Kyrgyz Research Institute of Livestock Breeding and Pastures, Bishkek, Kyrgyzstan, 4Aga Khan Development Network Agency, Bishkek, Kyrgyzstan

11:00 **3841** Status of tomato IPM in Uzbekistan. **Frank Zalom** (fgzalom@ucdavis.edu)1, Barno Tashpulatova2, and Ravza Mavlyanova3, 1Univ. of California, Davis, CA, 2International Center for Agricultural Research in the Dry Areas, Tashkent, Uzbekistan, 3AVRDC-The World Vegetable Center, Tashkent, Uzbekistan

11:15 **3842** IPM capacity, communication, and outreach at university, governmental, and non-governmental organizations in Central Asia. **Gulnaz Kaseeva** (gkaseeva@agrolead.org)1, Karim Maredia2, and

Joy Landis2, 1AgroLead, Bishkek, Kyrgyzstan, 2Michigan State Univ., East Lansing, MI

**Symposium: Exploiting Multi-Trophic Interactions in the Management of Invasive Agricultural Arthropod Pests**

***Room W240 B (Convention Center)***

**Moderator and Organizer:** Dominique Mazzi, Agroscope, Wädeswl, Switzerland

9:15 **3843** Interactions between native and invasive hogweeds, the parsnip webworm, and its parasitoid/ hyperparasitoid complex. **Jeff Harvey** (j.harvey@nioo. knaw.nl)1, Paul Ode2, and Rieta Gols3, 1Netherlands Institute of Ecology, Heteren, Netherlands, 2Colorado State Univ., Fort Collins, CO, 3Wageningen Univ. and Research Centre, Wageningen, Netherlands

9:30 **3844** Biological control of the Asian citrus psyllid  
in California. **David Morgan** (dmorgan@cdfa.ca.gov), California Dept. of Food and Agriculture, Riverside, CA

9:45 **3845** Integrating community ecology theories for sustaining the development of effective management of invasive pests. **Anaïs Chailleux** (chailleux.anais@ gmail.com), CIRAD, Dakar, France

10:00 **3846** Foodweb ecology of an invasive mite that manipulates plant defenses. **Angelo Pallini** (pallini@ ufv.br)1, Arne Janssen2, Renato Sarmento3, Felipe Lemos2, Cleide Dias1, Madelaine Venzon4, Livia Ataide1, and Marcus Vinicius Alfenas Duarte4, 1Federal Univ. of Viçosa, Viçosa, Brazil, 2Univ. of Amsterdam, Amsterdam, Netherlands, 3Federal Univ. of Tocantins, Tocantins, Brazil, 4Agriculture and Livestock Research Enterprise of Minas Gerais, Viçosa, Brazil

**10:15 BREAK**

10:30 **3847** The impact of polyphagous predators on invasive pests: The case of heteropterans in Mediterranean vegetable crops. **Judit Arnó** (judit. arno@irta.cat) and Rosa Gabarra, IRTA, Cabrils, Spain

10:45 **3848** Predicting the risk of exotic pest species establishing in a new area using the self-organizing map, a community ecology-based approach.  
**Irene Vänninen** (irene.vanninen@luke.fi)1, Susan Worner2, Erja Huusela-Veistola1, Tuomo Tuovinen1, Anne Nissinen3, and Kari Saikkonen1, 1Natural Resources Institute, Helsinki, Finland, 2Lincoln Univ., Canterbury, New Zealand, 3Agrifood Research Finland, Jokioinen, Finland

11:00 **3849** Alien interference: Understanding the impact of invasive herbivores on infochemical networks and plant-parasitoid associations. **Gaylord Desurmont** (gaylord.desurmont@unine.ch) and Ted Turlings, Univ. of Neuchâtel, Neuchâtel, Switzerland

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**FRIDAY**

**Friday, September 30 • MORNING •**

**Symposium: Global Improvements in Invasive Ant Management**

***Room W224 D (Convention Center)***

**Moderators and Organizers:** Grzegorz Buczkowski1 and Benjamin D. Hoffmann2, 1Purdue Univ., West Lafayette, IN, 2CSIRO, Winnellie, Australia

9:15 **3850** Eradicating Argentine ants on Santa Cruz Island, California: New methods in ant elimination. **Christina Boser** (cboser@tnc.org)1, Cause Hanna2, David Holway3, Ida Naughton4, Korie Merrill5,

Kate Faulkner6, John Randall1, and Scott Morrison1,  
1The Nature Conservancy, Ventura, CA, 2California State Univ., Camarillo, CA, 3Univ. of California, La Jolla, CA, 4Univ. of California, San Diego, CA, 5Univ. of California, Riverside, CA, 6U.S. National Park Service, Ventura, CA

9:30 **3851** Hydrogel baits as a novel way to manage invasive Argentine ants: Field studies in South Africa. **Grzegorz Buczkowski** (gbuczkow@purdue.edu), Purdue Univ., West Lafayette, IN

9:45 **3852** Enabling effective ant management by remote communities in the Pacific: Case studies with the yellow crazy ant in the Pacific nations of Tokelau and Kiribati. **Monica Gruber** (monica.gruber@vuw.ac.nz), Allan Burne, Phil Lester, and Gary Ward, Victoria Univ., Wellington, New Zealand

10:00 **3853** Scaling up ant eradications: Proven methods and new technologies. **Benjamin D. Hoffmann** (ben. hoffmann@csiro.au)1, Gloria M. Luque2, Celine Bellard3, Nick Holmes4, and Josh Donlan5, 1CSIRO, Winnellie, Australia, 2Univ. of Paris Sud, Orsay, France, 3Univ. College London, London, United Kingdom, 4Island Conservation, Santa Cruz, CA, 5Advanced Conservation Strategies, Midway, UT

**10:15 BREAK**

10:30 **3854** Invasive ant management through viruses and other pathogens? **Phil Lester** (phil.lester@vuw.ac.nz), Monica Gruber, Alexandra Sébastien, and Meghan Cooling, Victoria Univ., Wellington, New Zealand

10:45 **3855** Impacts of invasive ants. **Gloria M. Luque** (gloria.luque@u-psud.fr), Univ. of Paris Sud, Orsay, France

11:00 **3856** Detecting Argentine ants (*Linepithema humile*) on California’s Channel Islands. **Korie Merrill** (koriecm@ gmail.com)1, Christina Boser2, Ida Naughton3, Dong-Hwan Choe1, and Erin Rankin1, 1Univ. of California, Riverside, CA, 2The Nature Conservancy, Ventura, CA, 3Univ. of California, San Diego, CA

11:15 **3857** Adapting little fire ant (LFA), *Wasmannia auropunctata*, mitigation strategies to Micronesia. **Ross Miller** (rmiller@uguam.uog.edu) and Aubrey Moore, Univ. of Guam, Mangilao, Guam

11:30 **3858** Eradication of *Wasmannia auropunctata* in Hawaii: What works and what does not. Cas Vanderwoude1 and **Michelle Montgomery** (michelle.montgomery@ littlefireants.com)2, 1Univ. of Hawai’i, Hilo, HI, 2Univ. of Hawai`i, Honolulu, HI

11:45 **3859** Presentation withdrawn

12:00 **3860** Cooperation within supercolonies: Illuminating Argentine ant (*Linepithema humile*) social structure using genomics and chemical ecology. **Neil Tsutsui** (ntsutsui@berkeley.edu), Univ. of California, Berkeley, CA

12:15 **3861** Eradication in the absence of all biological knowledge: *Lepisiota frauenfeldi* in Perth. **Marc Widmer** (marc.widmer@agric.wa.gov.au)1, Benjamin D. Hoffmann2, and Cleo Bertelesmeier3, 1Dept. of Agriculture, Perth, Australia, 2CSIRO, Winnellie, Australia, 3Univ. of Lausanne, Lausanne, Switzerland

**Symposium: Genetics and Genomics of Mosquitoes and Implications for Transmission of Pathogens**

***Room W224 F (Convention Center)***

**Moderators and Organizers:** Frank H. Collins and  
Gloria I. Giraldo-Calderón, Univ. of Notre Dame, South Bend, IN

9:15 **Introduction**

9:30 **3862** Extensive genetic variation in *Aedes aegypti* and its implications for understanding and controlling dengue, chikungunya, and Zika. **Jeffrey R. Powell** (jeffrey.powell@yale.edu), Yale Univ., New Haven, CT

10:00 **3863** Towards a complete catalogue of functional genomic elements from multiple *Anopheles* genomes. **Robert Waterhouse** (robert.waterhouse@gmail.com), Univ. of Geneva, Geneva, Switzerland

**10:15 BREAK**

10:30 **3864** Chromosome-centric view of the genome organization and evolution. **Igor V. Sharakhov** (igor@vt.edu)1,2, Xiaofang Jiang1, Ashley Peery1,  
A. Brantley Hall1, Maria V. Sharakhova1,2,  
Anastasia N. Naumenko1, Zhijian Tu1, Gleb Artemov2, and Vladimir Stegniy2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Tomsk State Univ., Tomsk, Russia

10:45 **3865** Identification of SNPs associated with aridity tolerance in *Anopheles gambiae*. **Nora J. Besansky** (nbesansk@nd.edu)1, Diego Ayala2, Simo Zhang3, Carlo Costantini2, and Matthew Hahn3, 1Univ. of Notre Dame, South Bend, IN, 2Institute for Research Development, Montpellier, France, 3Indiana Univ., Bloomington, IN

11:00 **3866** Impacts of natural *Wolbachia* infection on the microbiome of *Anopheles* mosquitoes. **Daniel E. Neafsey** (neafsey@broadinstitute.org)1, W. Robert Shaw2, Perrine Marcenac2, and Flaminia Catteruccia2, 1Broad Institute of MIT and Harvard, Cambridge, MA, 2Harvard School of Public Health, Boston, MA

11:15 **Discussion**

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**Symposium: Hormones in Arthropod Vectors of Infectious Diseases**

***Room W232 A (Convention Center)***

**Moderators and Organizers:** Jinsong Zhu1 and Ian Orchard2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Univ. of Toronto, Mississauga, ON, Canada

9:15 **3867** Function of a male-transferred hormone in *Anopheles gambiae* reproduction and its relevance  
for malaria transmission. **Perrine Marcenac** (perrinemarcenac@fas.harvard.edu)1, Adam South1,  
W. Robert Shaw1, Abdoulaye Diabaté2, Serge Yerbanga2, Thierry Lefèvre3, and Flaminia Catteruccia1, 1Harvard School of Public Health, Boston, MA, 2Health Sciences Research Institute, Bobo-Dioulasso, Burkina Faso, 3Univ. of Montpellier, Montpellier, France

9:30 **3868** Hormonal regulation of gene expression patterns in mosquito reproduction. **Sourav Roy** (sourav.roy@ucr.edu)1, Tusar Saha1, Jisu Ha1,  
Lisa K. Johnson1, Bo Zhao1, Thomas Girke1, Zhen Zou2, and Alexander Raikhel1, 1Univ. of California, Riverside, CA, 2Chinese Academy of Sciences, Beijing, China

9:45 **3869** Ovary ecdysteroidogenic hormone and insulin-like peptide signaling convergently activate egg maturation in mosquitoes. **Mark R. Brown** (mrbrown@ uga.edu) and Michael Strand, Univ. of Georgia, Athens, GA

10:00 **3870** Hormonal and molecular regulation of diapause in the mosquito *Culex pipiens*. **Cheolho Sim** (cheolho\_sim@baylor.edu), Baylor Univ., Waco, TX

**10:15 BREAK**

10:30 **3871** Targets of neuropeptides regulating juvenile hormone synthesis in mosquitoes. Marcela Nouzova, Crisalejandra Rivera-Perez, **Maria Areiza** (mareiza@ gmail.com), and Fernando Noriega, Florida International Univ., Miami, FL

10:45 **3872** Integration of genomic and nongenomic pathways in juvenile hormone signaling in *Aedes aegypti*. **Pengcheng Liu** (pcliu@vt.edu), Reyhaneh Ojani, and Jinsong Zhu, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

11:00 **3873** Discovery of plant antagonists of insect juvenile hormone. **Sang Woon Shin** (shinwoongg@gmail.com), Univ. of California, Riverside, CA

11:15 **3874** Prothoracicotropic hormone and insulin-like peptide act via the PI3K/Akt pathway to regulate both ecdysteroidogenesis and induction of clock protein PERIOD in the prothoracic glands of *Rhodnius prolixus* (Hemiptera). **Xanthe Vafopoulou** (xanthev@yorku.ca) and Colin Steel, York Univ., Toronto, ON, Canada

11:30 **3875** Transcriptional control of lipid metabolism in *Rhodnius prolixus*: How can hormones affect it? **Katia Gondim** (katia@bioqmed.ufrj.br), Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil

11:45 **3876** Neuroendocrinology in the blacklegged tick, *Ixodes scapularis*. **Donghun Kim** (kp5091@ksu.edu) and Yoonseong Park, Kansas State Univ., Manhattan, KS

**Symposium: New Approaches to Biological and Integrated Control Changing Global Perspectives on Filth Fly Management**

***Room W224 E (Convention Center)***

**Moderators and Organizers:** Erika Machtinger1 and Elad Chiel2, 1USDA - ARS, Beltsville, MD, 2Univ. of Haifa, Tivon, Israel

9:15 **3877** Filth fly control: What innovative control methods can be adopted from other pests? **Elad Chiel** (eladchiel@gmail.com), Univ. of Haifa, Tivon, Israel

9:30 **3878** Climate change and filth fly management. **Christopher Geden** (chris.geden@ars.usda.gov), USDA - ARS, Gainesville, FL

9:45 **3879** Monitoring and reproduction of *Stomoxys calcitrans* in stubble pineapple, banana, palm oil, and livestock in Costa Rica. **Yannery Gómez-Bonilla** (ygomez@inta.go.cr)1, Arturo Solórzano2, and

Dennis Alpizar3, 1INTA, San José, Costa Rica, 2INTA, Centro Colón, Costa Rica, 3Ministry of Agriculture and Granaderia, Santa Tecla, El Salvador

10:00 **3880** The business of biological filth fly control. **Carol S. Glenister** (carolg@ipmlabs.com), IPM Laboratories, Inc., Locke, NY

**10:15 BREAK**

10:30 **3881** Bioconversion by the black soldier fly, *Hermetia illucens* (L.) (Diptera: Stratiomyidae): Prospects for managing organic waste and filth flies. **Jonathan A. Cammack** (jonathan.cammack@ag.tamu. edu), Jeffery K. Tomberlin, Kelly Beskin, and

Chelsea Holcomb, Texas A&M Univ., College Station, TX

10:45 **3882** Entomophthorales on filth flies: Basic biology, co-evolution, and potential novel uses in biological control. **Jørgen Eilenberg** (jei@plen.ku.dk)1,  
Annette Jensen1, and Henrik de Fine Licht2, 1Univ.

of Copenhagen, Frederiksberg, Denmark, 2Univ. of Copenhagen, Copenhagen, Denmark

11:00 **3883** Evaluation of two novel non-nutritive  
sugars as potential pesticides against the house fly (*Musca domestica*). **Edwin Burgess** (eburgess2@niu. edu), Northern Illinois Univ., DeKalb, IL

11:15 **3884** Manure preferences and post-emergence learning of two common filth fly parasitoids, *Spalangia cameroni* and *Muscidifurax raptor* (Hymenoptera: Pteromalidae). **Erika Machtinger** (erika.machtinger@ ars.usda.gov), USDA - ARS, Beltsville, MD

**Symposium: Rapid Evolutionary Radiations in Insects: Phylogenetic Causes and Consequences of Life in the Fast Lane**

***Room W231 A (Convention Center)***

**Moderator and Organizer:** Brian Wiegmann, North Carolina State Univ., Raleigh, NC

9:15 **3885** Insect radiations: The big picture from fossils and phylogenies. **Peter Mayhew** (peter.mayhew@york. ac.uk), Univ. of York, York, United Kingdom

9:30 **3886** Assembly of the trophic pyramid of beetle diversity. **Brian Farrell** (bfarrell@fasmail.harvard.edu), Harvard Univeristy, Cambridge, MA

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9:45 **3887** Diversity vs. disparity: Contrasting patterns of adaptive radiation among Hawaiian spiders. **Rosemary Gillespie** (gillespie@berkeley.edu), Univ. of California, Berkeley, CA

10:00 **3888** Increased resolution of major episodes of higher fly diversification. **Brian Wiegmann** (bwiegman@ ncsu.edu)1, Keith Bayless1, Michelle Trautwein2, and David Yeates3, 1North Carolina State Univ., Raleigh, NC, 2California Academy of Sciences, San Francisco, CA, 3CSIRO, Acton, Australia

**10:15 BREAK**

10:30 **3889** Host-associated radiations in plant-feeding flies: Timing, constraints, and diversification.  
**Isaac Winkler** (isw971@gmail.com)1, Marty A. Condon1, and Sonja Scheffer2, 1Cornell College, Mount Vernon, IA, 2USDA - ARS, Beltsville, MD

10:45 **3890** From mutations to species: Causes and consequences of host use variation in pine sawflies. **Catherine Linnen** (catherine.linnen@uky.edu), Univ. of Kentucky, Lexington, KY

11:00 **3891** Phylogenomic resolution and evolutionary implications of rapid radiation episodes within aculeate Hymenoptera (bees, ants, stinging wasps). **Seán Brady** (bradys@si.edu)1, Bonnie Blaimer1, Elizabeth Murray2, Michael Brainstetter3, James P. Pitts4, and

Bryan N. Danforth5, 1Smithsonian Institution National Museum of Natural History, Washington, DC, 2Univ. of California, Riverside, CA, 3Univ. of Utah, Salt Lake City, UT, 4Utah State Univ., Logan, UT, 5Cornell Univ., Ithaca, NY

**Symposium: Physiological Responses to Environmental Change**

***Room W414 C (Convention Center)***

**Moderators and Organizers:** Jonathan Shik1 and Sarah Diamond2, 1Univ. of Copenhagen, Copenhagen, Denmark, 2Case Western Reserve Univ., Cleveland, OH

9:15 **3892** Consequences of stress for diet balancing by an insect. **Shawn Wilder** (wilder.shawn@gmail.com) and Taylor Brooks, Oklahoma State Univ., Stillwater, OK

9:30 **3893** Interactions among bark beetles, blue stain fungi, and termites: Impacts on decomposition and diversity. **Natalie Clay** (nclay@latech.edu)1,  
Nathan Little2, Courtney Siegert2, Juliet Tang3, and John Riggins4, 1Louisana Tech Univ., Ruston, LA, 2USDA - ARS, Stoneville, MS, 3USDA - Forest Service, Madison, WI, 4Mississippi State Univ., Mississippi State, MS

9:45 **3894** Patterns and consequences of variation in arthropod water balance across ecosystems with divergent climate, land-use, and hydrological alteration. **Kevin McCluney** (kmcclun@bgsu.edu)1, John Sabo2, Steven Frank3, and Jamie Becker1, 1Bowling Green State Univ., Bowling Green, OH, 2Arizona State Univ., Tempe, AZ, 3North Carolina State Univ., Raleigh, NC

10:00 **3895** Climate change and overwintering insects: Energy, cold, and immunity. **Brent Sinclair** (bsincla7@ uwo.ca), Univ. of Western Ontario, London, ON, Canada

**10:15 BREAK**

10:30 **3896** Responding to environmental change: Plasticity or evolution? **Carla Sgro** (carla.sgro@monash.edu), Monash Univ., Melbourne, Australia

10:45 **3897** Predicting growth and fitness responses of insects to climate change: Beyond thermal performance curves. **Joel Kingsolver** (jgking@bio.unc.edu)1 and Art Woods2, 1Univ. of North Carolina, Chapel Hill, NC, 2Univ. of Montana, Missoula, MT

11:00 **3898** The (thermal) ecology of individuals.  
**Nathan J. Sanders** (nathan.sanders@snm.ku.dk)1, Lacy D. Chick2, and Rob R. Dunn1,3, 1Univ. of Copenhagen, Copenhagen, Denmark, 2Case Western Reserve Univ., Cleveland, OH, 3North Carolina State Univ., Raleigh, NC

11:15 **3899** Pattern and process in butterfly responses to climate and land-use change. **Sarah Diamond** (sarah. diamond@case.edu), Case Western Reserve Univ., Cleveland, OH

11:30 **3900** Social dimensions of thermal performance using whole ant colonies. **Clint Penick** (capenick@ ncsu.edu)1, Sarah Diamond2, Lacy D. Chick2, and  
Rob R. Dunn1,3, 1North Carolina State Univ., Raleigh, NC, 2Case Western Reserve Univ., Cleveland, OH, 3Univ. of Copenhagen, Copenhagen, Denmark

11:45 **3901** Physiological consequences of social transitions in ants. **Jonathan Shik** (jonathan.shik@ gmail.com)1, William Wcislo2, and Jacobus Boomsma1, 1Univ. of Copenhagen, Copenhagen, Denmark, 2Smithsonian Tropical Research Institute, Panama City, Panama

**Symposium: Spreading the Word: Bed Bug Education and Training in Today’s Society**

***West Hall F4 (WF4) (Convention Center)***

**Moderators and Organizers:** Molly L. Stedfast and Dini Miller, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:15 **3902** Bed bug education using a webinar-based short course. **Molly L. Stedfast** (msted14@vt.edu) and  
Dini Miller, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:30 **3903** Overcoming challenges in affordable housing bed bug management with resident outreach and education. **Susannah Reese** (sck27@cornell.edu), Northeastern IPM Center, Ithaca, NY

9:45 **3904** It’s about instilling confidence: New results from the “Let’s Beat the Bug!” campaign. **Amelia Shindelar** (shin0148@umn.edu), Univ. of Minnesota,  
St. Paul, MN

10:00 **3905** Meeting people where they are: Strategies from the National Pesticide Information Center. **Kaci Buhl** (buhlk@ace.orst.edu), Oregon State Univ., Corvallis, OR

**10:15 BREAK**

10:30 **3906** Learning bed bugs 101. **Frank Meek** (fmeek@ rollins.com), Orkin Pest Control, Atlanta, GA

10:45 **3907** Fifty shades of bed bug grey: Out of the book and into the bedroom! **Nancy Troyano** (nancy.troyano@ rentokilna.com), Ehrlich-Rentokil North American Pest Control, Reading, PA

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11:00 **3908** Bed bug central: Taking science to the pest management industry. **Jeffrey White** (jeff.white@ bedbugcentral.com), Bed Bug Central, Lawrenceville, NJ

11:15 **3909** Bed bug training and education: Progress and future work. **Dini Miller** (dinim@vt.edu) and  
Molly L. Stedfast, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

**Contributed Papers: Acarology: Mites**

***Room W340 B (Convention Center)***

**Moderators:** Samuel Ramsey1, Joseph Roberts2, and Georgios Broufas3, 1Univ. of Maryland, College Park, MD, 2Harper Adams Univ., Newport, United Kingdom, 3Democritus Univ. of Thrace, Orestiada, Greece

9:15 **3910** Mites on apples in Indonesia and the biology  
of the predator mite *Zetzellia* sp. on the tetranychid *Panonychus citri* and *Tetranychus* sp. **Retno Puspitarini** (riniwidyo@yahoo.com), Mochamad Hadi, and

Ahmad Mushoffan, Univ. of Brawijaya, Malang, Indonesia

9:30 **3911** Intraguild predation among exotic and native phytoseiid predators is diminished by the provision of alternative food. **Georgios Broufas** (gbroufas@agro. duth.gr), Konstantinos Samaras, Evangelos Fytas, Paraskevi Theodosiou, Vasileios Karageorgiou, and Maria Pappas, Democritus Univ. of Thrace, Orestiada, Greece

9:45 **3912** Paedogenesis in an oriatid mite, *Notogalumna nortoni* Ramani and Haq, 1990 (Acari: Oribatei). **Niravath Ramani** (drnramani@gmail.com),  
Puthiya Nalakath Nasareen, and Mohamed Haq,

Univ. of Calicut, Malapuram, India

10:00 **3913** Identifying the primary host tissue composing the diet of a honey bee parasitic mite (*Varroa destructor*). **Samuel Ramsey** (insectious@gmail.com) and Dennis vanEngelsdorp, Univ. of Maryland, College Park, MD

**10:15 BREAK**

10:30 **3914** Does the gall-inducing eriophyid mite *Aceria doctersi* (Nalepa, 1909) (Acari: Eriophyidae) influence photosynthetic performance in leaves of *Cinnamomum verum* Presl.? **Puthiya Nalakath Nasareen** (nazreenpnm@ hotmail.com) and Niravath Ramani, Univ. of Calicut, Malapuram, India

10:45 **3915** Identification of *Tetranychus urticae*-induced plant volatiles in the headspace of French dwarf bean plants and the response of *Phytoseiulus persimilis* to synthetic volatile blends. **Joseph Roberts** (jroberts@ harper-adams.ac.uk)1, Tom Pope1, Ian Baxter2, and Simon Leather3, 1Harper Adams Univ., Newport, United Kingdom, 2Certis UK, Great Abington, United Kingdom, 3Imperial College London, Ascot, United Kingdom

11:00 **3916** Predatory mites of the super family Bdelloidea from Northwest Iran. **Amir Eghbalian** (ah\_eghbalian@ yahoo.com), Bu-Ali Sina Univ., Hamedan, Iran

11:15 **3917** Description of a new predatory mite species (*Agistemus saeedii*; Acari: Stigmaeidae) from Pakistan. **Bilal Khan** (bilalentomologyuaf@gmail.com), Univ. of Agriculture, Faisalabad, Pakistan

11:30 **3918** Mites associated with gladiolus in Mahallat, Markazi Province Iran. **Mohammad Khanjani** (mkhanjani@ gmail.com) and Mohammadreza Amin, Bu-Ali Sina Univ., Hamedan, Iran

11:45 **3919** Predatory activities of *Typhlodromalus* and *Anystis* spp. against the citrus red mite, *Panonychus citri* McGregor (Acarina: Tetranychidae), in Nigeria. **Vincent Umeh** (vumeha@yahoo.com) and

Mercy Olaniyi, National Horticultural Research Institute, Ibadan, Nigeria

**Contributed Papers: Apidology, Sericulture, and Social Insects: Environmental Responses**

***Room W240 A (Convention Center)***

**Moderators:** Reed Johnson1 and Adam Dolezal2, 1The Ohio State Univ., Wooster, OH, 2Iowa State Univ., Ames, IA

9:15 **3920** The influence of the social environment  
and metapleural gland activity on disease resistance in acorn ants, *Temnothorax curvispinosus*. **Svjetlana Vojvodic** (vojvodic@rowan.edu), Rowan Univ., Glassboro, NJ

9:30 **3921** Assessing the effects of larval exposure to neonicotinoid pesticides on the development and adult reproductive fitness of a solitary bee (*Osmia bicornis*). **Elizabeth Nicholls** (e.nicholls@sussex.ac.uk)1 and Dave Goulson2, 1Univ. of Sussex, Sussex, United Kingdom, 2Univ. of Sussex, Brighton, United Kingdom

9:45 **3922** Nest sites of solitary wood-nesting bees.  
**Per Westerfelt** (per.westerfelt@skogforsk.se), Uppsala Science Park, Uppsala, Sweden

10:00 **3923** Pollen stress during larval development impairs lifetime performance of critical tasks by adult honey bees (*Apis mellifera*). **Heather Mattila** (hmattila@ wellesley.edu), Corena Loeb, Anne Shen, and Anita Yau, Wellesley College, Wellesley, MA

**10:15 BREAK**

10:30 **3924** Multi-locus metabarcoding reveals floral origins of honey bee pollen diet across a Midwestern urban-rural gradient. **Rodney Richardson** (richardson.827@osu.edu)1, Douglas Sponsler2, Chia-Hua Lin1, and Reed Johnson2, 1The Ohio State Univ., Columbus, OH, 2The Ohio State Univ., Wooster, OH

10:45 **3925** Impact of combined exposure to abiotic and biotic stressors on bumble bee (*Bombus terrestris*) colonies. **Cristina Botías** (cristinabotias@gmail.com), Tobias Pamminger, Julia Jones, Williams O. H. Hughes, and Dave Goulson, Univ. of Sussex, Brighton, United Kingdom

11:00 **3926** Pollen nutrition drives bumble bee (*Bombus impatiens*) foraging preferences from the lab to the landscape. **Anthony Vaudo** (advaudo@gmail.com), Harland M. Patch, David Mortensen, John Tooker, and Christina M. Grozinger, Pennsylvania State Univ., University Park, PA

11:15 **3927** Presentation withdrawn

11:30 **3928** Agricultural land use positively contributes to wild bee communities in New England. **Erika Tucker** (erika.tucker@unh.edu) and Sandra Rehan, Univ. of New Hampshire, Durham, NH

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11:45 **3929** Diet quantity as a mediator of caste determination in the honey bee, *Apis mellifera*. Garett Slater1,  
George Yocum2, and **Julia Bowsher** (julia.bowsher@ ndsu.edu)1, 1North Dakota State Univ., Fargo, ND, 2USDA - ARS, Fargo, ND

12:00 **3930** Effects of simulated heat waves on honey bees (*Apis mellifera*). **Célia Bordier** (celia.bordier@paca.inra. fr)1, Maryline Pioz1, Séverine Suchail2, Didier Crauser1, Yves Le Conte1, and Cedric Alaux1, 1INRA, Avignon, France, 2Univ. d’Avignon et des Pays de Vaucluse, Avignon, France

12:15 **3931** Effects of larval nutritional stress on honey bee disease susceptibility and immunocompetence. **Adam Dolezal** (adolezal@iastate.edu), Alexander Walton, and Amy L. Toth, Iowa State Univ., Ames, IA

**Contributed Papers: Biodiversity, Biogeography, and Conservation of Arthropods: Lepidoptera**

***Room W223 B (Convention Center)***

**Moderators:** Guanyang Zhang1 and Braj Sinha2, 1Arizona State Univ., Tempe, AZ, 2Ranchi Univ., Ranchi, India

9:15 **3932** Inferring ecological processes underlying the latitudinal diversity gradient in New World swallowtail butterflies (*Papilio*, *Heraclides*, and *Pterourus*). **Hannah Owens** (howens@flmnh.ufl.edu), Univ. of Florida, Gainesville, FL

9:30 **3933** Molecular phylogeny and biogeography  
of a highly diverse genus of Andean butterflies. **Pablo Padron** (sebastianpadronm@yahoo.com)1 and Keith R. Willmott2, 1Univ. of Azuay, Cuenca, Ecuador, 2Univ. of Florida, Gainesville, FL

9:45 **3934** Practical use of a long term preservation method in the silkworm, *Bombyx mori*. **Tsuguru Fujii** (fujii.tsuguru.233@m.kyushu-u.ac.jp), Hisayoshi Fukumori, and Yutaka Banno, Kyushu Univ., Fukuoka, Japan

10:00 **3935** Butterfly biodiversity of the Australian continent. **Michael Braby** (michael.braby@anu.edu.au), The Australian National Univ., Canberra, Australia

**10:15 BREAK**

10:30 **3936** Mapping global biodiversity connections by DNA barcoding: Lepidoptera of Pakistan. **Muhammad Ashfaq** (mashfaq@uoguelph.ca) and Paul Hebert, Univ. of Guelph, Guelph, ON, Canada

10:45 **3937** Butterfly responses to fragmentation associated with in-situ oil sands developments in northern Alberta boreal forests. **Federico Riva** (friva@ualberta.ca), John Acorn, and Scott Nielsen, Univ. of Alberta, Edmonton, AB, Canada

11:00 **3938** All milkweeds are not created equal: A summary of oviposition preference tests for monarch butterflies (*Danaus plexippus*). **Victoria Pocius** (pociusv@iastate.edu)1, Keith Bidne2, Richard Hellmich2, Diane Debinski1, and John Pleasants1, 1Iowa State Univ., Ames, IA, 2USDA - ARS, Ames, IA

11:15 **3939** Composition and diversity of butterflies in Malang and Pasuruhan green spaces, East Java, Indonesia. **Amin Leksono** (amin28@ub.ac.id), Ayu Nisa, Lutfi Kurniawan, and Nikita Normalitasari, Univ. of Brawijaya, Malang, Indonesia

11:30 **3940** Change in butterfly species diversity in  
Mt. Mikusa Zephyrus Coppice, Japan for 24 years: A struggle against the dwarf bamboo understory. **Minoru Ishii** (ishii@osakafu-u.ac.jp), Yuta Asai, Yasuaki Nishinaka, and Norio Hirai, Osaka Prefecture Univ., Sakai, Japan

11:45 **3941** Insights into the origin and evolution of preponine butterflies. **Elena Ortiz-Acevedo** (e.ortiz. acevedo@gmail.com)1, Marianne Espeland2, and Keith R. Willmott1, 1Univ. of Florida, Gainesville, FL, 2Zoological Research Museum Alexander Koenig, Bonn, Germany

12:00 **3942** Batesian mimetic butterflies in the Indo- Australian Archipelago: Biogeography of a novel adaptive radiation. **David Lohman** (dlohman@ccny. cuny.edu)1,2, Chia-Hsuan Wei3, Dylan Scott2, Djunijanti Peggie4, Krushnamegh Kunte5,

Tenzing Doleck2, Elva Yang2, Susan Tsang2, Chris Müller6, Andrew Brownjohn2, and Shen-Horn Yen3, 1National Museum of the Philippines, Manila, Philippines,  
2City Univ. of New York, New York, NY, 3National Sun Yat-Sen Univ., Kaohsiung, Taiwan, 4Research Centre for Biology-LIPI, Cibinong-Bogor, Indonesia, 5National Center for Biological Sciences, Bangalore, India, 6Australian Museum, Sydney, Australia

**Contributed Papers: Biodiversity, Biogeography, and Conservation of Arthropods: Pollination, Agriculture, and Disease Control**

***Room W230 C (Convention Center)***

**Moderators:** Neelendra Joshi1 and Kayla A. Mollet2, 1Univ. of Arkansas, Fayetteville, AR, 2Univ. of Nebraska, North Platte, NE

9:15 **3943** Can insect biodiversity supress infectious disease transmission? **Philip Weinstein** (philip. weinstein@adelaide.edu.au)1 and Emily Flies2, 1Univ. of Adelaide, Adelaide, Australia, 2Univ. of South Australia, Adelaide, Australia

9:30 **3944** Aversive learning in the disease vector mosquito *Aedes aegypti*. **Clement Vinauger** (vinauger@uw.edu), Chloé Lahondère, Lauren Locke, Jessica Liaw, and Jeff Riffell, Univ. of Washington, Seattle, WA

9:45 **3945** Diversity and geographic distribution of  
major cereal aphid bacterial communities through metagenomics. **Samir Fakhour** (sfakhour@gmail.com)1,2, Thierry Hance1, Vincent Foray3, Jérôme Ambroise4, and Jean-Luc Gala4, 1Catholic Univ. of Louvain, Louvain-la- Neuve, Belgium, 2National Institute of Agronomic Research, Beni-Mellal, Morocco, 3CNRS, Montpellier, France, 4Catholic Univ. of Louvain, Brussels, Belgium

10:00 **3946** Diversity relationships between arthropods and selected plant family groups of maize agro-ecosystems in two grassy biomes of South Africa. **Monique Botha** (moniquebotha210@gmail.com), Stefan Siebert, and Johnnie van den Berg, North-West Univ., Potchefstroom, South Africa

**10:15 BREAK**

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**FRIDAY**

**Friday, September 30 • MORNING •**

10:30 **3947** Pollinator habitat in agricultural ecosystems: Promoting biodiversity through incentivized conservation programs. **Kayla A. Mollet** (kmollet2@ unl.edu) and Julie Peterson, Univ. of Nebraska, North Platte, NE

10:45 **3948** Addressing invasive alien insect species in Japan — its progress and challenges. **Koichi Goka** (goka@nies.go.jp), National Institute for Environmental Studies, Ibaraki, Japan

11:00 **3949** Can differences in pollinator communities  
and consequent crop pollination deficits be detected? **Akhmad Rizali** (akhmad.rizali@gmail.com)1, Damayanti Buchori2, Anik Larasati2, Purnama Hidayat2, Hien Ngo3, and Barbara Herren4, 1Univ. of Brawijaya, Malang, Indonesia, 2Bogor Agricultural Univ., Bogor, Indonesia, 3Intergovernmental Platform on Biodiversity and Ecosystem Services, Bonn, Germany, 4Food and Agriculture Organization of the United Nations, Nairobi, Kenya

11:15 **3950** Pheromone-based monitoring of threatened forest insect diversity reveals striking differences in landscape utilization with key implications for conservation. **Mikael Molander** (mikael.molander@slu. se)1, Lars Westerberg2, Per Milberg2, Karl-Olof Bergman2, Inis Winde3, Joseph Burman4, Franklin Nyabuga3,

Erik Hedenström5, Nils Ryrholm6, Jocelyn G. Millar7, Lawrence M. Hanks8, and Mattias Larsson1, 1Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, 2Linköping Univ., Linköping, Sweden, 3Lund Univ., Lund, Sweden, 4Canterbury Christ Church Univ., Canterbury, United Kingdom, 5Mid Sweden Univ., Sundsvall, Sweden, 6Univ. of Gävle, Gävle, Sweden, 7Univ. of California, Riverside, CA, 8Univ. of Illinois, Urbana, IL

11:30 **3951** Marginal lands for biocontrol and ecosystem services: Where to enhance and what do we put there? **Jason Schmidt** (jschmid2@uga.edu)1, Dawn Olson2, Tim Strickland2, and Alisa Coffin2, 1Univ. of Georgia, Tifton, GA, 2USDA - ARS, Tifton, GA

11:45 **3952** Presentation withdrawn

12:00 **3953** How much do pollinator species overlap between spring-blooming orchards and summer- blooming pollinator habitats? **Julianna Wilson** (jkwilson@ msu.edu)1, Jason Gibbs1, Larry Gut1, and Nikki Rothwell2, 1Michigan State Univ., East Lansing, MI, 2Michigan State Univ., Traverse City, MI

12:15 **3954** Assessing *Nesidiocoris tenuis* as a potential biological control agent of *Bactericera cockerelli*. **Gabriela Esparza-Díaz** (gesparzadiaz@ag.tamu.edu)1, Joseph Munyaneza2, and Raul T. Villanueva1, 1Texas A&M Univ., Weslaco, TX, 2USDA - ARS, Wapato, WA

**Contributed Papers: Biological Control and Insect Pathology: Unique Studies III**

***Room W340 A (Convention Center)***

**Moderators:** Salvador Herrero1 and Beth Ferguson2, 1Univ. of València, Burjassot, Spain, 2Univ. of Arkansas, Fayetteville, AR

9:15 **3955** Preliminary results of radiation dose responses of *Drosophila suzukii* (Matsumura) for use in the Sterile Insect Technique (SIT). Geneviève Lanouette1, Jacques Brodeur2, François Fournier3, Veronique Martel4,

Marc J.B. Vreysen5, Carlos Caceres5, and **Annabelle Firlej** (annabelle.firlej@irda.qc.ca)6, 1Institute of Research  
on Vegetable Biology, Montréal, QC, Canada, 2Univ. of Montréal, Montréal, QC, Canada, 3Collège Montmorency, Laval, QC, Canada, 4Natural Resources Canada, Québec City, QC, Canada, 5International Atomic Energy Agency, Vienna, Austria, 6Institute of Research and Development on the Agroenviornment, St-Bruno-de-Montarville,

QC, Canada

9:30 **3956** New RNA viruses producing covert infections in field and laboratory insects of *Ceratitis capitata* (Wiedemann): Implications in SIT programs. Angel Llopis1, Rosa González-Martínez1, Anabel Millán-Leiva2,

Marta Catalá3, Elena Llacer3, Alberto Urbaneja3, and **Salvador Herrero** (sherrero@uv.es)1, 1Univ. of València, Burjassot, Spain, 2Institute of Subtropical and Mediterranean Horticulture, Málaga, Spain, 3Valencian Institute of Agricultural Research, Moncada, Spain

9:45 **3957** Temperature adaptability of introduced natural enemy alligator weed flea beetle in China. **Ruiyan Ma** (maruiyan2004@163.com), Shanxi Agricultural Univ., Taigu, China

10:00 **3958** Floral and non-floral diet effects on *Larinus minutus*. **Beth Ferguson** (mef005@email.uark.edu), Timothy J. Kring, and Robert N. Wiedenmann, Univ. of Arkansas, Fayetteville, AR

**10:15 BREAK**

10:30 **3959** Provision of shelter to natural enemies via companion planting. **Lessando Gontijo** (lessandomg@ ufv.br), Rafael Viana, Barbara Bordin, and  
Daiane Souza, Federal Univ. of Viçosa, Florestal, Brazil

10:45 **3960** Regulation of host reproduction by the endosymbiotic bacteria *Wolbachia* and its role in  
the modification of parasitic natural enemy insects. **Bin Cong** (bin1956@163.com), Shenyang Agricultural Univ., Shenyang, China

11:00 **3961** Biological control facilitates conventional control of weeds. **Philip Tipping** (philip.tipping@ars. usda.gov)1, Lyn Gettys2, and Carey Minteer1, 1USDA - ARS, Ft. Lauderdale, FL, 2Univ. of Florida, Davie, FL

11:15 **3962** Natural enemies of coffee leaf miners increase survival feeding on extrafloral nectar. **Madelaine Venzon** (venzon@epamig.ufv.br)1, Maíra Rezende2,3, Bruno Santos2, Erickson Freitas2, Eduardo Silva2, Elem Martins2, and Paulo Santos1, 1Agricultural Research Company of Minas Gerais, Viçosa, Brazil, 2Federal Univ. of Viçosa, Viçosa, Brazil, 3Federal Institute of Education, Science and Technology of the Triangle Mine, Patos de Minas, Brazil

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**FRIDAY**

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11:30 **3963** Impact of *Wolbachia* infection on population ecology of Pieridae butterflies in India. **H. P. Puttaraju** (puttarajuhp@hotmail.com), Bangalore Univ., Bangalore, India

**Contributed Papers: Biological Control and Insect Pathology: Utilizing Parasitoid Wasps I**

***Room W225 B (Convention Center)***

**Moderators:** Masami Takagi1 and Matthew Kaiser2, 1Kyushu Univ., Fukuoka, Japan, 2Univ. of Minnesota, St. Paul, MN

9:15 **3964** Effects of temporary host deprivation on the reproductive activity of three local trichogrammatid species in Egypt. **Essam Agamy** (essamagamy@yahoo. com), Cairo Univ., Giza, Egypt

9:30 **3965** How an introduced parasitic wasp (*Aroplectrus dimerus*) tamed a nasty caterpillar (*Darna palivitta*) in Hawaii. **Renato C. Bautista** (renato.c.bautista@hawaii. gov) and Juliana A. Yalemar, Hawaii Dept. of Agriculture, Honolulu, HI

9:45 **3966** Genetic structure of coexisting sexual and asexual populations of the parasitoid wasp *Meteorus pulchricornis* (Hymenoptera: Braconidae) that attacks lepidopteran larvae. **Kaoru Maeto** (maeto@kobe-u.ac.jp), Shunpei Fujie, Hironobu Umemoto, and Yoko Tsutsui, Kobe Univ., Kobe, Japan

10:00 **3967** Ecology of a hymenopteran parasitoid, *Cotesia vanessae* (Braconidae). **Vincent Hervet** (vincent. hervet@gmail.com)1, Kevin Floate2, and Robert Laird1, 1Univ. of Lethbridge, Lethbridge, AB, Canada, 2 Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

**10:15 BREAK**

10:30 **3968** Post-release trends in the lygus parasitoid *Peristenus relictus* in the Monterey Bay region of California, a 12-year study. **Charles H. Pickett** (cpickett@cdfa.ca.gov)1, Diego J. Nieto2, Janet A. Bryer2, Sean Swezey2, and Martin Erlandson3, 1California Dept. of Food and Agriculture, Sacramento, CA, 2Univ. of California, Santa Cruz, CA, 3Agriculture and Agri-Food Canada, Saskatoon, SK, Canada

10:45 **3969** Improving biocontrol and adoption by farmers of an aggressive generalist predator, *Oecophylla longinoda*. **Emilie Deletre** (emilie.deletre@cirad.fr)1 and Anais Chailleux2, 1CIRAD, Nairobi, Kenya, 2CIRAD, Dakar, France

11:00 **3970** Biological control of alfalfa weevil under unstable paddy field environment in Japan.  
**Masami Takagi** (mtakagi@grt.kyushu-u.ac.jp), Kengo Nakahira, Shun-ichiro Iwase, and Midori Tuda, Kyushu Univ., Fukuoka, Japan

11:15 **3971** New progress on biological control of the  
rice striped stem borer (*Chilo suppressalis*) with *Trichogramma* in northeastern China. **Lian-Sheng Zang** (lsz0415@163.com), Chang-Chun Ruan, and Jun-Jie Zhang, Jilin Agricultural Univ., Changchun, China

11:30 **3972** Host range test of candidate Asian parasitoids for biological control of spotted wing drosophila in North America. **Xin-geng Wang** (xggwang@ucanr. edu)1, Antonio Biondi2,3, Betsey Miller4, Jeffrey C. Miller4,

Peter Shearer5, Kim A. Hoelmer6, Vaughn Walton4,  
and Kent M. Daane2, 1Univ. of California Cooperative Extension, Parlier, CA, 2Univ. of California, Berkeley, CA, 3Univ. of Catania, Catania, Italy, 4Oregon State Univ., Corvallis, OR, 5Oregon State Univ., Hood River, OR, 6USDA - ARS, Newark, DE

11:45 **3973** Transgenerational fecundity compensation in the aphid *Aphis craccivora* in response to parasitism by two competing parasitoids. **Matthew Kaiser** (kais0101@umn.edu) and George Heimpel, Univ. of Minnesota, St. Paul, MN

12:00 **3974** Release and post-release monitoring of *Diadromus pulchellus*, a pupal parasitoid of leek moth (*Acrolepiopsis assectella*). **Peter Mason** (peter.mason@ agr.gc.ca), Andrea Brauner, and Jacob Miall, Agriculture and Agri-Food Canada, Ottawa, ON, Canada

**Contributed Papers: Ecology and Population Dynamics: Pest Management**

***Room W240 D (Convention Center)***

**Moderators:** Justin Cappadonna1 and John Diaz-Montano2, 1Univ. of Queensland, Brisbane, Australia, 2Colombian Corporation for Agricultural Research, Rionegro, Colombia

9:15 **3975** Prospects of biological control and other management options of the banana aphid *Pentalonia nigronervose*, the vector of banana bunchy top virus in Africa. **Rachid Hanna** (r.hanna@cgiar.org)1,  
Sergine Ngatat1, and Lava Kumar2, 1International Institute of Tropical Agriculture, Yaounde, Cameroon, 2International Institute of Tropical Agriculture, Ibadan, Nigeria

9:30 **3976** Native vegetation isn’t necessarily a source of natural enemies: The case of parasitoids of light brown apple moth in Australia. **Michael Keller** (mike. keller@adelaide.edu.au)1, Yi Feng2, Olena Kravchuk1, Stephen Wratten3, and Harpinder Sandhu4, 1Univ. of Adelaide, Adelaide, Australia, 2Northwest A&F Univ., Yangling, China, 3Lincoln Univ., Lincoln, New Zealand, 4Flinders Univ., Adelaide, Australia

9:45 **3977** Host plant resistance and biological control:  
A test of the movement-risk hypothesis. **Cory Straub** (cstraub@ursinus.edu)1, Katharina Griesbach-Hobbach2, and Michael Traugott2, 1Ursinus College, Collegeville, PA, 2Univ. of Innsbruck, Innsbruck, Austria

10:00 **3978** Incidence of insect pests on avocado in the eastern region of Antioquia (Colombia, South America). **John Diaz-Montano** (jdiazm@corpoica.org.co) and Claudia Holguin, Colombian Corporation for Agricultural Research, Rionegro, Colombia

**10:15 BREAK**

10:30 **3979** Seasonal variations in the occurrence of  
citrus leafminer, *Phyllocnistis citrella* Stainton, on *Citrus reticulata* in three Tehsils of District Sargodha, Pakistan. **Muhammad Irfan Ullah** (mirfanullah@uos. edu.pk)1, Muhammad Arshad1, Muhammad Afzal1, Abdul Khaliq1, Muhammad Saqib1, Samina Khalid2, Yasir Iftikhar1, and Zahoor Hussain1, 1Univ. of Sargodha, Sargodha, Pakistan, 2COMSATS Institute of Information Technology, Vehari, Pakistan

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**FRIDAY**

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10:45 **3980** Distribution patterns of *Hypothenemus hampei* Ferr. (coffee berry borer) in coffee plants at Jeneponto Regency Rumbia Sub Regency. **Itji Daud** (itfir@yahoo. com), Hasanuddin Univ., Makassar, Indonesia

11:00 **3981** Impact of male density and food sources on the progeny development of cotton mealybug, *Phenacoccus solenopsis* (Hemiptera: Pseudococcidae). **Muhammad Jalal Arif** (jalalarif807@yahoo.com), Muhammad Dildar Gogi, Ahmad Nawaz, Muhammad Sufyan, and Amjad Majeed Pasha, Univ. of Agriculture, Faisalabad, Pakistan

11:15 **3982** Multiple host-use by the generalist cotton  
pest *Creontiades dilutus* (Hemiptera: Miridae) in natural and agricultural landscapes. **Justin Cappadonna** (justin.cappadonna@gmail.com), James Hereward,  
and Gimme H. Walter, Univ. of Queensland, Brisbane, Australia

11:30 **3983** Seasonal occurrence of TuMV and potential aphid vectors in Kyushu, Japan. **Shuhei Adachi** (aphidtennis@gmail.com)1, Tomoki Honma2, Yasaka Ryosuke1, Ohshima Kazusato2, and Tokuda Makoto2, 1Kagoshima Univ., Kagoshima, Japan, 2Saga Univ., Saga, Japan

**Contributed Papers: Ecology of Pesticides, Re- sistance, Toxicology, and Genetically Modified Crops**

***Room W314 A (Convention Center)***

**Moderators:** Daniel Fleming1 and Waseem Akbar2, 1Mississippi State Univ., Mississippi State, MS, 2Monsanto Company, Chesterfield, MO

11:45 **3984** Offspring sex ratio and larval development  
are determined by sexual activity in *Echinothrips americanus* Morgan 1913 (Thysanoptera: Thripidae). **Stephanie Krueger** (stephanie.krueger@zoologie. uni-halle.de)1, Laurence Mound2, and Gerald Moritz1, 1Martin Luther Univ., Halle, Germany, 2CSIRO, Canberra, Australia

12:00 **3985** Effect of seedling age on the ovipositon and performance of Hessian fly (*Mayetiola destructor*) on wheat. **Hao Zhang** (zhh1972@nwsuaf.edu.cn)1,  
Kirk Anderson2, and Marion Harris2, 1Northwest

A&F Univ., Yangling, China, 2North Dakota State Univ., Fargo, ND

12:15 **3986** Survey of overwintering sites of *Riptortus pedestris* (Fabricius) (Hemiptera: Alydidae) in  
diverse landscapes in South Korea. **Minhyung Jung** (alsgud\_11@naver.com), Hong Geun Kim, and Doo-Hyung Lee, Gachon Univ., Seongnam, South Korea

12:30 **3987** Growth and development of *Spodoptera exigua* (Lepidoptera: Noctuidae) on alternate hosts with reference to integrated pest management. Qamar Saeed1 and **Faheem Ahmad** (faheem.ahmad@ comsats.edu.pk)2, 1Bahauddin Zakariya Univ.,

Multan, Pakistan, 2COMSATS Institute of Information Technology, Islamabad, Pakistan

9:15

9:30

9:45

10:00

**10:15**

10:30

10:45

11:00

**3989** Predicting evolution of *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) resistance to transgenic crops in agricultural landscapes, based on larval movement. **Adriano Garcia** (adrianogomesgarcia@ gmail.com)1, Cláudia Ferreira2, Fernando Cônsoli1, and Wesley Godoy1, 1Univ. of São Paulo, Piracicaba, Brazil, 2São Paulo State Univ., Botucatu, Brazil

**3990** Caterpillar resistance to *Bacillus thuringiensis* (Bt): Impact of increased feeding rates. **Anirudh Dhammi** (adhammi@ncsu.edu)1, Dominic Reisig2, Ryan E. Kurtz3, Jiwei Zhu1, and R. Michael Roe1, 1North Carolina State Univ., Raleigh, NC, 2North Carolina State Univ., Plymouth, NC, 3Cotton Incorporated, Cary, NC

**3991** Does timing matter in pesticide resistance? One splice form variant of *MDR49* provides early, but not late, ‘protection’ to DDT. **Keon Mook Seong** (kseong6@ illinois.edu)1, Barry R. Pittendrigh1, Weilin Sun1, and John M. Clark2, 1Univ. of Illinois, Champaign, IL, 2Univ.

of Massachusetts, Amherst, MA

**3992** Screening for Bt resistance allele in the Philippine population of *Ostrinia furnacalis* (Guenée) (Lepidoptera: Crambidae) collected from Bt-corn sentinel sites in Isabela province. **Gelyn Sapin** (gdsapin@up.edu.ph), Barbara Caoili, Edwin P. Alcantara, and Bonifacio F. Cayabyab, Univ. of the Philippines,  
Los Baños, Philippines

**BREAK**

**3993** Identification of the allele responsible for field-evolved resistance to Cry1Fa corn in *Spodoptera frugiperda* from Puerto Rico. **Rahul Banerjee** (rbanerje@vols.utk.edu)1, James M. Hasler2, Lucas Hietala1, Kenneth Narva2, and Juan Luis Jurat-Fuentes1, 1Univ.

of Tennessee, Knoxville, TN, 2Dow AgroSciences, Indianapolis, IN

**3994** Survival of sugarcane borer on Bt maize and refuge from seed blends. **Andre Crespo** (andre.crespo@ pioneer.com)1, Gerardo Rapetti2, Maria Celiz3,  
Taline das Neves4, Paulo da Silva5, Josemar Foresti5, Yiwei Wang1, Bonnie Hong1, and J. Lindsey Flexner6, 1DuPont Pioneer, Johnston, IA, 2DuPont Pioneer, Pergamino, Argentina, 3DuPont Pioneer, Jesus Maria, Argentina, 4DuPont do Brasil S.A., Itumbiara, Brazil, 5DuPont do Brasil S.A., Planaltina, Brazil, 6DuPont Pioneer, Wilmington, DE

**3995** Systemic RNAi in western corn rootworm does not involve transitive pathways. **Huarong Li** (hli2@dow. com)1, Andrew Bowling1, Premchand Gandra1, Murugesan Rangasamy1, Heather Pence1, Robert McEwan1, Chitvan Khajuria2, Blair Siegfried3, and Kenneth Narva1, 1Dow AgroSciences, Indianapolis, IN, 2Monsanto Company, Chesterfield, MO, 3Univ. of Florida, Gainesville, FL

12:45 **3988** Mortality factors affecting *Bemisia tabaci* (Gennadius) populations in Bt cotton: Life table analysis. **Ravinder Chandi** (rschandi@pau.edu) and Jagdev Kular, Punjab Agricultural Univ., Ludhiana, India

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**FRIDAY**

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11:15 **3996** Genetically modified corn hybrids resistant to the sugarcane borer in Sinaloa, Mex. **Luis Aguirre** (luisaguirreu@yahoo.com.mx)1, Agustín Hernández- Juárez1, Mariano Flores1, Ernesto Cerna1, Jerónimo Landeros1, Gustavo Frías1, and Marvin K. Harris2, 1Antonio Narro Agrarian Autonomous Univ., Saltillo, Mexico, 2Texas A&M Univ., College Station, TX

11:30 **3997** Efficacy of transgenic Bt cotton and corn events against heliothine pests: A meta-analysis. **Daniel Fleming** (def18@msstate.edu)1, Nathan Little2, and Fred Musser1, 1Mississippi State Univ., Mississippi State, MS, 2USDA - ARS, Stoneville, MS

11:45 **3998** A new transgenic trait protects cotton from thrips and *Lygus* damage. **Waseem Akbar** (waseem. akbar@monsanto.com), Jeffrey Ahrens, Robert Brown, AnilKumar Gowda, Jason Stelzer, Scott Bollman,

John Greenplate, and Thomas Clark, Monsanto Company, Chesterfield, MO

12:00 **3999** Genetic basis of resistance to Bt toxin Cry2Ab in pink bollworm, *Pectinophora gossypiella*.  
**Lolita G. Mathew** (lolita.mathew@ars.usda.gov)1, Yves Carrière2, Xianchun Li2, Bruce Tabashnik2, and Jeffrey A. Fabrick1, 1USDA - ARS, Maricopa, AZ, 2Univ. of Arizona, Tucson, AZ

12:15 **4000** IRM value and potential for protein interaction in Bt soybean pyramids. **Ted C. MacRae** (ted.c.macrae@ monsanto.com), Monsanto Company, Chesterfield, MO

**Contributed Papers: Ecology of Pesticides, Resistance, Toxicology, and Genetically Modified Crops: Pollinators**

***Room W314 B (Convention Center)***

**Moderators:** Ana Cabrera1 and Troy D. Anderson2, 1Bayer CropScience, Research Triangle Park, NC, 2Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:15 **4001** Neonicotinoid residues in ornamentals alter behavior and survival of bees and beneficials.  
**Vera Aber Krischik** (krisc001@umn.edu), Univ. of Minnesota, St. Paul, MN

9:30 **4002** Investigation of molecular mechanisms of differential toxicity of neonicotinoid insecticides in buff-tailed bumble bee, *Bombus terrestris*.  
**Bartek Troczka** (bartek.troczka@rothamsted.ac.uk)1, Emma Randall2, Katherine Beadle2, Laura Kor1, Christoph Zimmer2, Martin Williamson1, T. G. Emyr Davies1, Ralf Nauen3, Chris Bass2, and Lin Field1, 1Rothamsted Research, Harpenden, United Kingdom, 2Univ. of Exeter, Penryn, United Kingdom, 3Bayer CropScience, Monheim, Germany

9:45 **4003** Survey of imidacloprid residues in nectar and pollen collected by honey bees (*Apis mellifera*) in urban and suburban environments in different regions of the United States. **Ana Cabrera** (ana.cabrera@bayer.com)1, Zachary Y. Huang2, Joseph Sullivan3, Juliana Rangel4, Pierre Lau4, Vaughn Bryant4, Daniel Schmehl1,5, and James D. Ellis5, 1Bayer CropScience, Research Triangle Park, NC, 2Michigan State Univ., East Lansing, MI, 3Ardea Consulting, Woodland, CA, 4Texas A&M Univ., College Station, TX, 5Univ. of Florida, Gainesville, FL

10:00 **4004** Detection of imidacloprid residues in pollen and nectar collected from annual and perennial bedding plants purchased from selected retail garden stores. **Stephanie Darnell** (stephanie.darnell@bayer.com) and Daniel Schmehl, Bayer CropScience, Research Triangle Park, NC

**10:15 BREAK**

10:30 **4005** Consistency patterns of toxicity of the nitroguanidine neonicotinoid insecticides to honey bee (*Apis mellifera*) colonies. **Allen Olmstead** (allen. olmstead@bayer.com)1, Silvia Hinarejos2, Rob Hummel3, and Jay Overmyer4, 1Bayer CropScience, Research Triangle Park, NC, 2Valent U.S.A., Dublin, CA, 3Landis International, Raleigh, NC, 4Syngenta Plant Protection, Greensboro, NC

10:45 **4006** A common neonicotinoid pesticide, thiamethoxam, impairs honey bee flight performance (*Apis mellifera* L.). **Simone Tosi** (stosi@ucsd.edu)1,2, Giovanni Burgio2, and James C. Nieh1, 1Univ. of California, La Jolla, CA, 2Univ. of Bologna, Bologna, Italy

11:00 **4007** Neonicotinoid levels found in foraging and dead honey bees (*Apis mellifera*) collected before, during and after the 2014 and 2015 corn planting seasons. **Victor Limay-Rios** (vlimayri@uoguelph.ca),

Andrew Rinald, Yanjun Luo, Luis Forero, Yingen Xue, and Arthur Schaafsma, Univ. of Guelph, Ridgetown, ON, Canada

11:15 **4008** Effects of a new pesticide, flupyradifurone (Sivanto), on honey bee sucrose response thresholds and orientation. **James C. Nieh** (jnieh@ucsd.edu), Angeliki Kanellopoulou, and Heather Bell, Univ. of California, La Jolla, CA

11:30 **4009** Can poisons stimulate bees? Appreciating the potential of hormesis in bee–pesticide research. **Chris Cutler** (chris.cutler@dal.ca), Dalhousie Univ., Truro, NS, Canada

11:45 **4010** Chronic exposure to an agricultural spray adjuvant and honey bee pathogen causes synergistic mortality in larval honey bees (*Apis mellifera*).  
**Julia Fine** (jdf250@psu.edu)1, Chris Mullin1, and Diana Cox-Foster2, 1Pennsylvania State Univ., University Park, PA, 2USDA - ARS, Logan, UT

12:00 **4011** Utilizing behavior on a colony scale to examine sub-lethal toxicity in honey bees. Troy D. Anderson, Thomas P. Kuhar, and **James M. Wilson** (jamesmw3@ vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

12:15 **4012** Assessing geographic varroacide resistance in the honey bee pest *Varroa destructor,* and effective treatment strategies for control. **Daniel Schmehl** (daniel.schmehl@bayer.com)1,2, Dick Rogers1, and James Ellis2, 1Bayer CropScience, Research Triangle Park, NC, 2Univ. of Florida, Gainesville, FL

12:30 **4013** Evaluation of modifications towards improvement of the OECD draft 22-day repeat exposure larval honey bee (*Apis mellifera* L.) methods over the course of two years. **Michael Patnaude** (mpatnaude@smithers.com) and James Hoberg, Smithers Viscient Laboratories, Wareham, MA



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12:45 **4014** Implications of negligible transfer of diet-de- rived pollen microRNAs in adult honey bees. **Jonathan Snow** (jsnow@barnard.edu)1, Maryam Masood1, Claire Everett1, and Stephen Chan2, 1Columbia Univ., New York, NY, 2Univ. of Pittsburgh Medical Center, Pittsburgh, PA

**Contributed Papers: Integrated Pest Management and Sustainable Agriculture: Tree Fruits and Nuts**

***Room W231 B (Convention Center)***

**Moderator:** Elizabeth Grafton-Cardwell, Univ. of California, Exeter, CA

9:15 **4015** Asian citrus psyllid (*Diaphorina citri*) and huanglongbing radically alter California citrus IPM. **Elizabeth Grafton-Cardwell** (eegraftoncardwell@ ucanr.edu), Univ. of California, Exeter, CA

9:30 **4016** Effect of thermal therapy on transmission of *Candidatus Liberibacter asiaticus* by the Asian citrus psyllid, *Diaphorina citri*. **Alicia Kelley** (ajkelley@ufl. edu) and Kirsten S. Pelz-Stelinski, Univ. of Florida, Lake Alfred, FL

9:45 **4017** Post-harvest detection of *Thaumatotibia leucotreta* in citrus fruit in South Africa. **Wayne Kirkman** (waynek@cri.co.za)1,2, Sean Moore1,2, Martin Hill1,  
Rui Krause1, Frikkie de Beer3, Jakobus Hoffman3, and Timothy Gibson4, 1Rhodes Univ., Grahamstown, South Africa, 2Citrus Research International, Port Elizabeth, South Africa, 3Nuclear Energy Corporation of South Africa, Pretoria, South Africa, 4RoboScientific, Leeds, United Kingdom

10:00 **4018** Updating dormant season management thresholds for IPM of navel orangeworm (*Amyelois transitella*) in California (USA) nut crops. **Elizabeth Boyd** (eaboyd@csuchico.edu)1 and Justin Nay2, 1California State Univ., Chico, CA, 2Integral Ag. Inc., Durham, CA

**10:15 BREAK**

10:30 **4019** Determination of the efficacy of some pest control methods used in organic hazelnut growing. Seref Yamakoglu and **Sebahat Ozman-Sullivan** (sozman@omu.edu.tr), Ondokuz Mayis Univ., Samsun, Turkey

10:45 **4020** Ecology of the cocoa pod borer, *Conopomorpha cramerella* (Lepidoptera: Gracillariidae), a major pest for the cocoa industry. **Jerome Niogret** (niogret.ecology. consulting@gmail.com)1, Hans Alborn2, Keith Ingram3, Paul E. Kendra4, Smilja Lambert5, and Nancy D. Epsky4, 1Niogret Ecology Consulting LLC, Miami, FL, 2USDA - ARS, Gainesville, FL, 3Mars, Inc., Gainesville, FL, 4USDA - ARS, Miami, FL, 5Mars, Inc., Cairns, Australia

11:00 **4021** Direct and indirect methods for detecting  
red palm weevil infestation in date palm plantations, Kingdom of Bahrain. **Abdul Aziz Mohamed** (amamohamed@agu.edu.bh)1, Abderrazak Bannari1, and Derek Peddle2, 1Arabian Gulf Univ., Manama, Bahrain, 2Univ. of Lethbridge, Lethbridge, AB, Canada

11:30 **4023** Presentation withdrawn

11:45 **4024** Is relying on wild pollinators to pollinate  
apple and cherry orchards in Pennsylvania risky? **David Biddinger** (djb134@psu.edu)1, Neelendra K. Joshi2, Edwin Rajotte3, Thomas Kon1, and Timothy W. Leslie4, 1Pennsylvania State Univ., Biglerville, PA, 2Univ. of Arkansas, Fayetteville, AR, 3Pennsylvania State Univ., University Park, PA, 4Long Island Univ., Brooklyn, NY

12:00 **4025** Invasive mango-feeding fruit fly, *Bactrocera dorsalis* (Diptera: Tephritidae), in Senegal: Effect of organic insecticides (neem oil and Surround WP) on behavior and reproduction. **Assa Balayara** (balayara@ vt.edu) and Douglas G. Pfeiffer, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

12:15 **4026** The bio-ecology of the cape grapevine leafminer, *Holocacista capensis* (Lepidoptera: Heliozelidae), in the Western Cape, South Africa. **Leigh Torrance** (torrance@sun.ac.za), Pia Addison, and Henk Geertsema, Stellenbosch Univ., Stellenbosch, South Africa

12:30 **4027** Analytical approach to develop decision support system for managing *Hyposidra talaca,* a major pest of tea in Dooars region of eastern India. **Chanchal Pramanik** (chanchal.pramanik@tcs.com)1, Bhushan Jagyasi2, Sandika Biswas3, Barun Biswas4, Amar Nain5, Srinivasu Pappula1, and Shaonpius Mondal6, 1Tata Consultancy Services, Hyderabad, India, 2Tata Consultancy Services, Bangalore, India, 3Tata Consultancy Services, Kolkata, India, 4Punjab Agricultural Univ., Gurdaspur, India, 5Goodricke Group Limited, Kolkata, India, 6Cornell Univ., Ithaca, NY

**Contributed Papers: Medical and Veterinary Entomology: Biting Flies**

***West Hall F3 (WF3) (Convention Center)***

**Moderators:** Megan Riddin1, Peter James2, and Ramiro Morales- Hojas3, 1Rhodes Univ., Grahamstown, South Africa, 2Univ. of Queensland, Dutton Park, Australia, 3The Pirbright Institute, Woking, United Kingdom

9:15 **4028** Genomics of bluetongue virus vector competence in *Culicoides sonorensis* (Diptera: Ceratopogonidae). **Ramiro Morales-Hojas** (ramiro. morales-hojas@rothamsted.ac.uk)1, Malcolm Hinsley2, Irina Armean2, Paul Kersey2, Rhiannon Silk3,

Simon T. Carpenter3, and Mark Fife4, 1Rothamsted Research, Harpenden, United Kingdom, 2The European Bioinformatics Institute, Hinxton, United Kingdom, 3The Pirbright Institute, Woking, United Kingdom, 4The Pirbright Institute, Pirbright, United Kingdom

9:30 **4029** Nematode parasitism of arbovirus vectors: Effects of mermithids (Nematoda: Mermithidae) on *Culicoides* biting midges and their potential use for disease and vector control. **Georgette Kluiters** (g.kluiters@liverpool.ac.uk), Univ. of Liverpool, Neston, United Kingdom

9:45 **4030** Differential expression of salivary genes of *Phlebotomus papatasi* in a ZCL hyperendemic area of Iran. **Nasibeh Hosseini-Vasoukolaei** (nasibeh.hoseini@ gmail.com)1,2, Amir Ahmad Akhavan1, and Mahmood Jeddi-Tehrani3, 1Tehran Univ. of Medical Sciences,

11:15 **4022**

Presentation withdrawn

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Tehran, Iran, 2Mazandaran Univ. of Medical Sciences, Sari, Iran, 3Monoclonal Antibody Research Center, Tehran, Iran

10:00 **4031** A paratransgenic strategy to control vectorial transmission of leishmaniasis. **Ivy Hurwitz** (ihurwitz@ salud.unm.edu)1, Arinder Arora2, Annabeth Fieck1, Ju-Lin Weng3, Marcelo Ramalho-Ortigao3, and

Ravi Durvasula1, 1Univ. of New Mexico, Albuquerque, NM, 2Texas A&M Univ., College Station, TX, 3Kansas State Univ., Manhattan, KS

**10:15 BREAK**

10:30 **4032** Buffalo flies (*Haematobia exigua* de Meijere): A significant tropical cattle pest with an expanding range in Australia. **Peter James** (p.james1@uq.edu. au)1, Robert Dobson2, and James Rothwell3, 1Univ. of Queensland, Dutton Park, Australia, 2Murdoch Univ., Murdoch, Australia, 3Univ. of Queensland, North Sydney, Australia

10:45 **4033** Sandfly diversity and speciation using high resolution melt analysis in a new visceral leishmaniasis foci, Marsabit County, northern Kenya. **Damaris Matoke- Muhia** (dmatoke@icipe.org)1,2, Jandouwe Villinger1, Enock Mararo1, Philip Ngumbi2, Johnstone Ingonga2, Jackline Mwangi2, Tobias Landmann1, and Daniel Masiga1, 1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Kenya Medical Research Institute, Nairobi, Kenya

11:00 **4034** African horse sickness virus and *Culicoides*  
in the Eastern Cape, South Africa. **Megan Riddin** (g09r1172@campus.ru.ac.za)1, Martin Villet1, and  
Gert Venter2, 1Rhodes Univ., Grahamstown, South Africa, 2Agricultural Research Council, Onderstepoort, South Africa

11:15 **4035** An Indian phlebotomine (Diptera: Psychodidae) with description of one new species. **Prakash Salunkhe** (salunkhepr.niv@gmail.com), National Institute of Virology, Pune, India

**Contributed Papers: Medical and Veterinary Entomology: Mosquito Behavior and Trapping Technologies**

***West Hall F2 (WF2) (Convention Center)***

**Moderators:** Casey Parker1, Daniel Kline2, and Pablo Gurman3, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Gainesville, FL, 3GearJump Technologies LLC, Revere, MA

9:15 **4036** Controlled release devices for field and personal protection against mosquitoes of public health importance. Ulrich R. Bernier1, Craig Scoops2, Melynda Perry3, Daniel Kline1, **Pablo Gurman** (pablogurman@gmail. com)4, and Noel Elman4, 1USDA - ARS, Gainesville,

FL, 2U.S. Naval Medical Research Unit, Callao, Peru, 3U.S. Army Research, Development, and Engineering Command, Natick, MA, 4GearJump Technologies LLC, Revere, MA

9:30 **4037** Dietary carbohydrate manipulation leads to differential pathogen interference in *Wolbachia*-infected *Aedes aegypti*. **Eric Caragata** (e.caragata@gmail.com), Fernanda Rezende, Taynana Simões, and Luciano Moreira, Oswaldo Cruz Foundation, Belo Horizonte, Brazil

9:45 **4038** A pyriproxyfen autodissemination station efficacy in *Aedes albopictus* hot spots in residential areas. **Devi Suman** (dssuman37@gmail.com)1, Yi Wang1, Kshitij Chandel1, Isik Unlu2, Greg Williams3, and

Randy Gaugler1, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2Mercer County Mosquito Control, West Trenton, NJ, 3Hudson County Mosquito Control, Jersey City, NJ

10:00 **4039** Targeting the breeding sites of container mosquitoes using habitat-sharing heterospecific species carrying insect growth regulator. **Yi Wang** (ywangs@hotmail.com), Devi Suman, Kshitij Chandel, and Randy Gaugler, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

**10:15 BREAK**

10:30 **4040** Female *Culex quinquefasciatus* mosquitoes are attracted to secretion derived from blood-feeding females. **Fangfang Zeng** (ffzeng@ucdavis.edu), Garisson Buss, and Walter S. Leal, Univ. of California, Davis, CA

10:45 **4041** Know your enemy: Bio-rational trap outperforms human landing catches across mosquito genera. **Frances Hawkes** (f.m.hawkes@gre.ac.uk)1, Simon Sawadago2, Kounbobr Dabire2, Stephen Torr3, and Gabriella Gibson1, 1Natural Resources Institute, Chatham, United Kingdom, 2Health Sciences Research Institute, Bobo-Dioulasso, Burkina Faso, 3Liverpool School of Tropical Medicine, Liverpool, United Kingdom

11:00 **4042** Field evaluation of lethal ovitraps against dengue vectors: An impact on populations of *Aedes* spp. mosquitoes in Malaysia. **Hidayatulfathi Othman** (hida@ukm.edu.my)1, Saiful Azlan Nordin1, and Zainol Pawanchee2, 1National Univ. of Malaysia, Kuala Lumpur, Malaysia, 2Dept. of Health and the Environment, Kuala Lumpur, Malaysia

11:15 **4043** Influence of natal habitats on oviposition preference and larval performance in container- inhabiting mosquitoes. **Nnaemeka Ezeakacha** (ezeakacha.fn@gmail.com)1 and Donald Yee2,

1Pennsylvania State Univ., University Park, PA, 2Univ. of Southern Mississippi, Hattiesburg, MS

11:30 **4044** From concept to commercialization: The story of a mosquito ovitrap. **Rebecca Heinig** (rheinig@ springstar.net), SpringStar, Inc., Woodinville, WA

11:45 **4045** Mom knows best except when she doesn’t: Linking patterns of oviposition and larval survival in the container mosquitoes *Aedes albopictus* and *Culex quinquefasciatus*. **Donald Yee** (donald.yee@usm.edu), William C. Glasgow, and Nnaemeka Francis Ezeakacha, Univ. of Southern Mississippi, Hattiesburg, MS

12:00 **4046** Lab evaluation of a novel lethal ovitrap for control of *Aedes aegypti* and *Aedes albopictus*. **Casey Parker** (caseyparker@ufl.edu)1, Alexandra Chaskopoulou2, Roberto Pereira1, and Philip Koehler1, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Thessaloniki, Greece



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**Contributed Papers: Medical and Veterinary Entomology: Ticks II**

***Room W331 D (Convention Center)***

**Moderators:** Robert Mitchell1 and Rebecca Trout Fryxell2, 1North Carolina State Univ., Raleigh, NC, 2Univ. of Tennessee, Knoxville, TN

9:15 **4047** Comparison of seasonal activity and biodiversity components of north Iranian hard ticks (Acari: Ixodidae) under highland, woodland, and plain conditions. **Mahmoud Fazeli-Dinan** (fazelidinan@ gmail.com)1, Fatemeh Asgarian2, Seyyed Payman Ziapour1, Seyed Hassan Nikookar1, and Ahmadali Enayati1, 1Mazandaran Univ. of Medical Sciences,  
Sari, Iran, 2Ahvaz Jundishapur Univ. of Medical Sciences, Ahvaz, Iran

9:30 **4048** Deciphering mechanisms involved in tick hematophagy. **Robert Mitchell** (rdmitche@ncsu.edu), Grayson Cave, Anirudh Dhammi, Jiwei Zhu, and R. Michael Roe, North Carolina State Univ., Raleigh, NC

9:45 **4049** Presentation withdrawn

10:00 **4050** Vectorial capacity of *Rhipicephalus sanguineus* in Israel and the Palestinian Territories. **Kosta Mumcuoglu** (kostasm@ekmd.huji.ac.il), Kuvin Center for the Study of Infectious and Tropical Diseases, Jerusalem, Israel

**10:15 BREAK**

10:30 **4051** Tick determinants of Powassan virus transmission. Meghan Hermance, Rodrigo Santos, and **Saravanan Thangamani** (sathanga@utmb.edu), The Univ. of Texas, Galveston, TX

10:45 **4052** Transmission-blocking vaccines: A solid approach for soft ticks. **Girish Neelakanta** (gneelaka@ odu.edu), Old Dominion Univ., Norfolk, VA

11:00 **4053** Population genetics and microbial communities of field-collected *Amblyomma maculatum*.  
**Rebecca Trout Fryxell** (rfryxell@utk.edu),  
Jennifer DeBruyn, and Margaret Staton, Univ. of Tennessee, Knoxville, TN

11:15 **4054** Field and laboratory studies on Heartland virus (Bunyaviridae: *Phlebovirus*), a recently described human pathogen, in the lone star tick, *Amblyomma americanum* (L.) (Acari: Ixodidae). **Harry Michael Savage** (hms1@cdc.gov) and Marvin Godsey, Centers for Disease Control and Prevention, Fort Collins, CO

**Contributed Papers: Morphology, Systematics, and Phylogeny: Behavior, Chrysomelids, Curculionids, and Scarabs**

***Room W230 A (Convention Center)***

**Moderators:** Anthony I. Cognato1 and András Dobai2, 1Michigan State Univ., East Lansing, MI, 2Carleton Univ., Ottawa, ON, Canada

9:15 **4055** Special behavior in beetles negates a developmental constraint against hyper-elongation of a penis. **Yoko Matsumura** (yoko.matumura.hamupeni@ gmail.com), Keio Univ., Yokohama, Japan

9:30 **4056** Dispersal by flight reduces survival and reproduction in the chrysomelid *Oreina cacaliae*: A field study. **Nicole Kalberer** (nicole.kalberer@bs.ch) and Mathias Koelliker, Univ. of Basel, Basel, Switzerland

9:45 **4057** Synopsis of North and Central American *Diabrotica* species (Coleoptera: Chrysomelidae). **Alexander Derunkov** (alderunkov@gmail.com)1 and Alexander S. Konstantinov2, 1National Academy of Sciences of Belarus for Bioresources, Minsk, Belarus, 2USDA - ARS, Washington, DC

10:00 **4058** Revision and phylogeny of the nightshade  
flea beetles *Epitrix* and *Acallepitrix* (Coleoptera: Chrysomelidae: Galerucinae: Alticini) in America north of Mexico. **Anthony Deczynski** (adeczyn@g.clemson. edu), Clemson Univ., Clemson, SC

**10:15 BREAK**

10:30 **4059** Patterns of host use within a lineage of temperate and tropical saproxylic beetles (Coleoptera: Curculionidae: Scolytinae: Scolytini). **Anthony I. Cognato** (cognato@msu.edu)1, Sarah M. Smith1, and

Bjarte Jordal2, 1Michigan State Univ., East Lansing, MI, 2Univ. of Bergen, Bergen, Norway

10:45 **4060** Acoustic communication in bark beetles (Coleoptera: Curculionidae: Scolytinae): A new perspective. **András Dobai** (dobandi@gmail.com) and Jayne Yack, Carleton Univ., Ottawa, ON, Canada

11:00 **4061** Geometric morphometric analysis of the rostrum of weevils (Coleoptera: Curculionoidea).  
**Hui Wen** (wenhui1999108@126.com), Menglei Zhang, Zhiliang Wang, and Runzhi Zhang, Chinese Academy of Sciences, Beijing, China

11:15 **4062** Genome-wide species delineation in inbred, widespread, and morphologically variable ambrosia beetles. **Caroline Storer** (cgstorer@gmail.com) and Jiri Hulcr, Univ. of Florida, Gainesville, FL

11:30 **4063** Chorion ultrasculpture of eggs in diagnostics of June beetles (Coleoptera: Scarabaeidae). **Sreedevi Kolla** (kolla.sreedevi@gmail.com), Indian Council of Agricultural Research, New Delhi, India

**Contributed Papers: Morphology, Systematics, and Phylogeny: Diptera**

***Room W331 B (Convention Center)***

**Moderators:** Gary Steck1 and John Moulton2, 1Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, 2Univ. of Tennessee, Knoxville, TN

9:15 **4064** Molecular phylogenetics of *Aedini* mosquitoes. **John Soghigian** (jsoghigian@clarku.edu) and  
Todd P. Livdahl, Clark Univ., Worcester, MA

9:30 **4065** Revisionary studies of the Nearctic Dixidae (Diptera): The *Dixa inextricata* and *D. modesta* species complexes. **John Moulton** (jmoulton@utk.edu), Univ. of Tennessee, Knoxville, TN

9:45 **4066** Systematics and natural history of the millipede- parasitic genus *Myriophora* (Diptera: Phoridae).  
**John Hash** (jhash001@ucr.edu)1, John M. Heraty1, and Brian V. Brown2, 1Univ. of California, Riverside, CA, 2Natural History Museum, Los Angeles, CA

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10:00 **4067** The *Anastrepha* Project: Morphological, molecular, and biological studies of adults and larvae. **Gary Steck** (gary.steck@freshfromflorida.com)1, Allen Norrbom2, Bruce Sutton1, Erick Rodriguez1, and Pratibha Srivastava1, 1Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, 2USDA - ARS, Washington, DC

**10:15 BREAK**

10:30 **4068** Sex ticklers and dirty flies: The evolution of a novel abdominal appendage in male sepsid flies. **Kathy Su** (kathysufy@gmail.com), Gowri Rajaratnam, and Rudolf Meier, National Univ. of Singapore, Singapore, Singapore

10:45 **4069** A review of the stilt-legged fly subfamily Eurybatinae (Diptera: Micropezidae). **Nur Athiqah Md. Yusof** (nurathiqah.mdyusof@gmail.com) and Stephen A. Marshall, Univ. of Guelph, Guelph, ON, Canada

11:00 **4070** A review and phylogeny of the ant-like flies *Plocoscelus* Enderlein, 1922 (Diptera: Micropezidae), with the description of 13 new species. **Gustavo Ferro** (gustavo\_ferro01@yahoo.com.br), Univ. of Guelph, Guelph, ON, Canada

11:15 **4071** A revision of the Australian species of *Howickia* (Diptera: Sphaeroceridae). **Hailey Ashbee** (hashbee@ uoguelph.ca)1 and Stephen A. Marshall2, 1Univ. of Guelph, Fenwick, ON, Canada, 2Univ. of Guelph, Guelph, ON, Canada

11:30 **4072** The mega diverse, minute Diptera: A revision of the New World genus *Bromeloecia* (Sphaeroceridae, Limosininae). **Tiffany Yau** (tyau@alumni.uoguelph. ca) and Stephen Marshall, Univ. of Guelph, Guelph, ON, Canada

11:45 **4073** A mitogenomic perspective on calyptrate phylogeny. **Liping Yan** (yanlp523@qq.com)1, Kai Li1, Thomas Pape2, and Dong Zhang1, 1Beijing Forestry Univ., Beijing, China, 2Natural History Museum, Copenhagen, Denmark

12:00 **4074** Morphology of *Gasterophilus* (Diptera: Oestridae) larvae: Evolutionary trends, homology and phylogenet- ic implications. **Xin-yu Li** (lixinyubjfu@bjfu.edu.cn)1, Liping Yan1, Kai Li1, Thomas Pape2, and Dong Zhang1, 1Beijing Forestry Univ., Beijing, China, 2Natural History Museum, Copenhagen, Denmark

12:15 **4075** Phylogenetical insights on the evolution of stomach bot flies (Oestridae: *Gasterophilus*). **Dong Zhang** (ernest8445@163.com)1, Liping Yan1, Xin-yu Li1, Kai Li1, and Thomas Pape2, 1Beijing Forestry Univ., Beijing, China, 2Natural History Museum, Copenhagen, Denmark

12:30 **4076** A phylogenetic framework for the tachinid fly tribe Blondeliini (Diptera: Tachinidae: Exoristinae).  
**Z. L. Burington** (keroplatus@gmail.com) and  
John Stireman III, Wright State Univ., Dayton, OH

**Contributed Papers: Morphology, Systematics, and Phylogeny: Hemiptera**

***Room W225 A (Convention Center)***

**Moderators:** Adam Wallner1 and Christopher Owen2, 1USDA - APHIS, Miami, FL, 2The George Washington Univ., Ashburn, VA

9:15 **4077** Morphology of thoracic muscles in Hemiptera and its significance in uncovering evolution of jumping behavior. **Naoki Ogawa** (ogawa222@res.agr.hokudai. ac.jp) and Kazunori Yoshizawa, Hokkaido Univ., Sapporo, Japan

9:30 **4078** Revision of the taxonomic status of *Aphis floridanae* Tissot (Hemiptera: Aphididae).  
**Doris Lagos-Kutz** (dlagos@illinois.edu)1, Susan Halbert2, David Voegtlin1, and Glen L. Hartman3, 1Univ. of Illinois, Champaign, IL, 2Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, 3National Soybean Research Center, Urbana, IL

9:45 **4079** Chromosomal variation and cryptic species  
in the *Apiomorpha minor* species complex.  
**Penelope Mills** (penelope.mills@uqconnect.edu.au) and Lyn Cook, Univ. of Queensland, Brisbane, Australia

10:00 **4080** Systematics, biogeography, and host-plant relationships of the Neotropical jumping plant-louse genus *Russelliana* (Hemiptera: Psylloidea). **Liliya Serbina** (liliya\_serbina@mail.ru)1,2 and Daniel Burckhardt1, 1Natural History Museum, Basel, Switzerland, 2Univ.

of Basel, Basel, Switzerland

**10:15 BREAK**

10:30 **4081** Phylogenomic estimate of the Cicadidae (Hemiptera: Cicadoidea): Identifying contaminated/ paralogous locus copies and exploring the utility of Hemiptera and cicada 1:1 ortholog sets in pest Hemiptera lineages. **Christopher Owen** (christopherlowen@yahoo. com)1, David C. Marshall2, Katherine B. R. Hill2, Elizabeth Wade2, Geert Goemans2, Alan Lemmon3, Emily Lemmon3, and Chris Simon2, 1The George Washington Univ., Ashburn, VA, 2Univ. of Connecticut, Storrs, CT, 3Florida State Univ., Tallahassee, FL

10:45 **4082** A phylogenetic investigation of the spittlebug superfamily Cercopoidea (Hemiptera: Auchenorrhyncha). **Adam J. Bell** (ajbell7@gmail.com)1 and Jason Cryan2, 1State Univ. of New York, Albany, NY, 2North Carolina Museum of Natural Sciences, Raleigh, NC

11:00 **4083** Morphological utility of the female gonapophysis in Delphacidae (Hemiptera: Delphacidae) taxonomy. **Adam Wallner** (adam.m.wallner@aphis.usda.gov)1 and Charles Bartlett2, 1USDA - APHIS, Miami, FL, 2Univ. of Delaware, Newark, DE

11:15 **4084** Establishing a DNA metabarcoding approach to determine diet profiles of assassin bugs (Heteroptera: Reduviidae). **Wei Song Hwang** (nhmhws@nus.edu.sg) and Rudolf Meier, National Univ. of Singapore, Singapore, Singapore

11:30 **4085** Pollinator predators exposed: Using molecules and morphometrics to delimit species boundaries of ambush bugs (Hemiptera: Reduviidae). **Paul Masonick** (pmaso001@ucr.edu) and Christiane Weirauch, Univ. of California, Riverside, CA



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11:45 **4086** Know your enemy: A comprehensive study  
of macadamia lace bugs (Tingidae: *Ulonemia* spp.). **Ryan Shofner** (r.shofner@unsw.edu.au), Gerry Cassis, and William Sherwin, Univ. of New South Wales, Sydney, Australia

12:00 **4087** The Tingidae (Hemiptera: Heteroptera) of Costa Rica. **Alex Knudson** (alexander.knudson.2@ndsu.edu), David Rider, and Janet Knodel, North Dakota State Univ., Fargo, ND

**Contributed Papers: Morphology, Systematics, and Phylogeny: Parasitoid Wasps and Trichoptera**

***Room W230 D (Convention Center)***

**Moderators:** Jason Mottern1 and Austin Baker2, 1USDA - ARS, Washington, DC, 2Univ. of California, Riverside, CA

9:15 **4088** Hymenoptera, taxonomy, and the integument. **István Mikó** (istvan.miko@gmail.com), Heather M. Hines, and Andrew Deans, Pennsylvania State Univ., University Park, PA

9:30 **4089** How many species of Pteromalidae (Hymenoptera: Chalcidoidea) exist in North- and Central-Europe? **Michael Haas** (michael.haas@smns-bw.de)1,  
Carlos Monje1, Hannes Baur2, Dave Karlsson3,

Johannes Steidle4, and Lars Krogmann1, 1State Museum of Natural History, Stuttgart, Germany, 2Natural History Museum of Civil Society, Bern, Switzerland, 3Station Linné, Öland, Sweden, 4Univ. of Hohenheim, Stuttgart, Germany

9:45 **4090** Preliminary results on the taxonomy and mo- lecular phylogenetics of *Oobius* (Hymenoptera: Encyrtidae), parasitoids of wood-boring Coleoptera. **Jason Mottern** (jason.mottern@ars.usda.gov) and Michael Gates, USDA - ARS, Washington, DC

10:00 **4091** Phylogenetics of ant parasitoids in the subfamily Oraseminae (Hymenoptera: Eucharitidae). **Austin Baker** (bakerau73@gmail.com) and  
John M. Heraty, Univ. of California, Riverside, CA

**10:15 BREAK**

10:30 **4092** Solving the *Habrobracon hebetor* species complex. **Rebecca Kittel** (rebecca.n.kittel@gmail.com) and Kaoru Maeto, Kobe Univ., Kobe, Japan

10:45 **4093** The European species of *Eupelmus* (*Macroneura*) (Hymenoptera: Chalcidoidea: Eupelmidae): An integrative taxonomic approach. **Lucian Fusu** (lucfusu@hotmail. com), Alexandru Ioan Cuza Univ., Iasi, Romania

11:00 **4094** Evolutionary history of the Podagrionini, parasitoids of praying mantises. **Petr Janšta** (janstapetr@ gmail.com)1 and Gérard Delvare2, 1Charles Univ., Prague, Czech Republic, 2CIRAD, Montpellier, France

11:15 **4095** Comparative head anatomy of larval caddisflies with implications on the phylogeny of Trichoptera. **Frank Friedrich** (frank.friedrich@uni-hamburg.de), Univ. of Hamburg, Hamburg, Germany

**Contributed Papers: RNAi and Gene Expression Control in Insects: Interactions**

***Room W315 B (Convention Center)***

**Moderators:** Joe Hull1 and Jornt Spit2, 1USDA - ARS, Maricopa, AZ, 2Syngenta Ghent Innovation Center, Zwijnaarde, Belgium

9:15 **4096** Uptake and degradation of dsRNA in the gut lumen of insects in relation to environmental RNAi efficiency. **Jornt Spit** (jornt.spit@bio.kuleuven.be)1,2, Annelies Philips2, Niels Wynant1, and Jozef Vanden Broeck1, 1Catholic Univ., Leuven, Belgium, 2Syngenta Ghent Innovation Center, Zwijnaarde, Belgium

9:30 **4097** The spookiest phenotype: RNAi-mediated knockdown of Halloween genes in the western tarnished plant bug, *Lygus hesperus*. **Joe Hull** (joe. hull@ars.usda.gov)1, Evelien Van Ekert1, Meixian Wang2, Yun-Gen Miao2, and Colin Brent1, 1USDA - ARS, Maricopa, AZ, 2Zhejiang Univ., Hangzhou, China

9:45 **4098** A transcription factor FOXG1 controls twin-spot markings on caterpillars. **Nozomi Uemura** (uemuranoz@ ib.k.u-tokyo.ac.jp), Junichi Yamaguchi, and Haruhiko Fujiwara, The Univ. of Tokyo, Kashiwa, Japan

10:00 **4099** RNAi knockdown of red flour beetle, *Tribolium castaneum*, odorant binding proteins result in altered electrophysiological responses. **Karthi Balakrishnan** (karthimrgn@gmail.com), Stefan Dippel, Ernst A. Wimmer, and Stefan Schütz, Georg August Univ., Göttingen, Germany

**10:15 BREAK**

10:30 **4100** RNA interference by soaking in the two spotted spider mite, *Tetranychus urticae*. **Takeshi Suzuki** (tszk@cc.tuat.ac.jp)1, Maria Urizarna2, Maria Nunes2, Vojislava Grbic2, and Miodrag Grbic2, 1Tokyo Univ. of Agriculture and Technology, Tokyo, Japan, 2Univ. of Western Ontario, London, ON, Canada

10:45 **4101** Using RNA interference to block egg development in *Lygus hesperus* Knight (Hemiptera: Miridae).  
**Evelien Van Ekert** (evelien.vanekert@ars.usda.gov), Joe Hull, Colin Brent, and Jeff Fabrick, USDA - ARS, Maricopa, AZ

11:00 **4102** Sex-sorting and sterilization of male Asian tiger mosquitoes (*Aedes albopictus*) using RNA interference. **David Giesbrecht** (d.gies@ymail.com), Alison Tayler, David Boguski, and Steve Whyard, Univ. of Manitoba, Winnipeg, MB, Canada

11:15 **4103** RNAi-based interactions: Persistent and acute viral infections in lepidopteran cell lines. **Dulce Santos** (dulce.cordeirodossantos@bio.kuleuven.be)1, Niels Wynant1, Lina Mingels1, Luc Swevers2, and Jozef Vanden Broeck1, 1Catholic Univ., Leuven, Belgium, 2Institute of Biosciences & Applications, Athens, Greece



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**Contributed Papers: Stored Products Entomology: Novel Strategies II**

***Room W331 C (Convention Center)***

**Moderators:** Sharon Dobesh1, Dylan McFarlane2, and Hongjian Ding3, 1Kansas State Univ., Manhattan, KS, 2Univ. of Queensland, Brisbane, Australia, 3U.S. Food and Drug Administration, Jefferson, AR

Yoonseong Park1, Raul Narciso Guedes3, Brenda Oppert4, George Opit5, and Thomas Phillips1, 1Kansas State Univ., Manhattan, KS, 2Agri-Science Queensland, Brisbane, Australia, 3Federal Univ. of Vicosa, Viçosa, Brazil, 4USDA - ARS, Manhattan, KS, 5Oklahoma State Univ., Stillwater, OK

11:30 **4112** Phosphine resistance in *Oryzaephilus surinamensis* (L.) from almond storage and processing facilities in California. **Sandipa G. Gautam** (sandipa. gautam@okstate.edu), George Opit, and  
Kandara Shakya, Oklahoma State Univ., Stillwater, OK

11:45 **4113** Detection, identification, and quantification of insect infestation in stored products using PCR approaches. **Mireia Solà** (mireia.sola.cassi@gmail. com)1, Nuria Agusti1, Jonathan Lundgren2, and  
Jordi Riudavets3, 1IRTA, Cabrils, Spain, 2USDA - ARS, Brookings, SD, 3IRTA, Barcelona, Spain

**Contributed Papers: Urban Entomology in a Changing Environment: Termites and Ants**

***West Hall F1 (WF1) (Convention Center)***

**Moderators:** Joe DeMark1 and Rou-Ling Yang2, 1Dow AgroSciences, Fayetteville, AR, 2National Palace Museum, Taipei, Taiwan

9:15 **4114** Survey and control of termites in National Palace Museum. **Rou-Ling Yang** (rlyang@npm.gov.tw), National Palace Museum, Taipei, Taiwan

9:30 **4115** Presentation withdrawn

9:45 **4116** Entomotoxicant potential of *Croton penduliflorous* extract in the control of subterranean termites, *Macrotermes subhyalinus*. **Adenike Adeyemo** (acadeyemo@futa.edu.ng), Olaniyi Ogungbite, Funmilola Arogundade, Taiwo Bamigboye, and

Caleb Faboye, Federal Univ. of Technology, Akure, Nigeria

10:00 **4117** Evaluation of efficacy of synthetic resins on woods against subterranean termites. **Sohail Ahmed** (saha786\_pk@yahoo.com), Univ. of Agriculture, Faisalabad, Pakistan

**10:15 BREAK**

10:30 **4118** An investigation of the factors influencing  
the colony structure of the eastern subterranean termite, *Reticulitermes flavipes*. **Carlos Aguero** (cague001@tamu.edu)1, Tawni L. Crippen2, Jason Martin3, Mark S. Bulmer3, and Edward Vargo1, 1Texas A&M Univ., College Station, TX, 2USDA - ARS, College Station, TX, 3Towson Univ., Towson, MD

10:45 **4119** Area-wide treatment of Formosan subterranean termites at Jackson Barracks, New Orleans, LA.  
**Carrie Cottone** (cbcottone@nola.gov) and Claudia Riegel, City of New Orleans Mosquito, Termite & Rodent Control Board, New Orleans, LA

11:00 **4120** TotalityTM wood treatment: A summary of pre-construction termite treatment success in the field. **Dina Richman** (dina.richman@fmc.com)1 and Brian Mount2, 1FMC Corporation, Philadelphia, PA, 2FMC Corporation, Bradenton, FL



9:15 **4104**  
storage pest fragments contaminating food products. **Hongjian Ding** (hongjian.ding@fda.hhs.gov)1, Joshua Xu1, Howard Semey1, Himansu Vyas1, Darryl Langley1,  
Amy Barnes1, Monica Pava-Ripoll2, and Weida Tong1, 1U.S. Food and Drug Administration, Jefferson, AR, 2U.S. Food and Drug Administration, College Park, MD

9:30 **4105** Comparative evaluation of four Nigeria-derived diatomaceous earths and a commercial DE Insecto® against *Callosobruchus maculatus* F. (Coleoptera: Bruchidae) on two varieties of stored cowpea in Nigeria. **Egobude Okonkwo** (egoulu@yahoo.com), Olufemi Peters, Samuel Nwaubani, Grace O. Otitodun, Moses Ogundare, Grace Abel, Michael Omodara, Adaora N. Osegbo, Oluwatoyin Atibioke, and Oluswaseun D. Olagunju, Nigerian Stored Products Research Institute, Ilorin, Nigeria

9:45 **4106** Understanding the effects of PICS bags in reducing PHL in maize storage in Nigeria. **Bamikole Ayedun** (b.ayedun@cgiar.org)1,

Tahirou Abdoulaye1, and Dieudonne Baributsa2, 1International Institute of Tropical Agriculture, Ibadan, Nigeria, 2Purdue Univ., West Lafayette, IN

10:00 **4107** Effects of air plant (*Bryophyllum pinnatum*) on bean weevil (*Acanthoscelides obectus)*. **Love Allison** (lovealldy@yahoo.com)1 and Alex Allison1,2,3, 1Federal Univ. of Technology, Owerri, Nigeria, 2Imo State Univ., Owerri, Nigeria, 3Nkiru Kamalu, Owerri, Nigeria

**10:15 BREAK**

10:30 **4108** Effect of different insect growth regulators for their anti-insect activity against the larvae of *Tribolium castaneum* (Herbst) and *Trogoderma granarium* (Everts). **Mansoor ul Hasan** (mansoorsahi2000@yahoo.com)1, Qurban Ali1, Muhammad Sagheer1, Imran Faraz1, and Shahzad Saleem2, 1Univ. of Agriculture, Faisalabad, Pakistan, 2COMSATS Institute of Information Technology, Sahiwal, Pakistan

10:45 **4109** The role of fungi and their associated volatiles in the ecology of *Tribolium castaneum*. **Dylan McFarlane** (dylan.mcfarlane@uqconnect.edu.au), Univ. of Queensland, Brisbane, Australia

11:00 **4110** Bait trap attractiveness to warehouse beetle (*Trogoderma variabile*) and larger cabinet beetle (*Trogoderma inclusum*) using commercially available traps. **Sharon Dobesh** (sdobesh@ksu.edu)1, Frank Arthur2, James Campbell2, and R. Jeff Whitworth1, 1Kansas State Univ., Manhattan, KS, 2USDA - ARS, Manhattan, KS

11:15 **4111** A new point mutation in the gene coding for strong phosphine resistance in *Tribolium castaneum* (Coleoptera: Tenebrionidae). **Zhaorigetu Chen** (jorigtoo@k-state.edu)1, Hongbo Jiang1, David Schlipalius2,

Developing an intelligent recognition system for

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11:15 **4121** Sentricon® System Recruit® AG FlexPack new bait matrix lab and field trials. **Joe DeMark** (jjdemark@ dow.com)1 and Neil Spomer2, 1Dow AgroSciences, Fay- etteville, AR, 2Dow AgroSciences, Indianapolis, IN

11:30 **4122** Termidor® *H•E* High-Efficiency Termiticide: Market introduction and benefits. **Freder Medina** (fred- er.medina@basf.com)1, Robert Davis2, Robert Hickman3, Thomas Nishimura4, Jason Meyers5, Kyle Jordan6, and Joseph Schuh6, 1BASF, Phoenix, AZ, 2BASF, Pfluger- ville, TX, 3BASF, Maitland, FL, 4BASF, Raleigh, NC, 5BASF, Kansas City, MO, 6BASF, Research Triangle Park, NC

11:45 **4123** Effects of resorcinol, a phenol characterized from heartwood extractives of white mulberry (*Morus alba*) against *Reticulitermes flavipes* (Isoptera: Rhino- termitidae). **Mark E. Mankowski** (markemankowski@ fs.fed.us)1, Babar Hassan2, and Grant Kirker3, 1USDA

- Forest Service, Starkville, MS, 2Univ. of Agriculture, Faisalabad, Pakistan, 3USDA - Forest Service, Madison, WI

12:00 **4124** How do red imported fire ants (Hymenoptera: Formicidae) feed on sugar water? **Cai Wang** (wangcai@ scau.edu.cn)1, Xuan Chen2, Xiujun Wen1, and Tao Ma1, 1South China Agricultural Univ., Guangzhou, China, 2Louisiana State Univ., Baton Rouge, LA

**Friday, September 30, 2016 • Afternoon**

**Symposium: Global Challenges in Rice Pest Management**

***Room W230 C (Convention Center)***

**Moderators and Organizers:** Mark Stevens1 and Larry Godfrey2, 1New South Wales Dept. of Primary Industries, Yanco, Australia, 2Univ. of California, Davis, CA

1:30 **4125** Advances in the management of insect pests in rice. **Michael Stout** (mstout@agcenter.lsu.edu), Louisiana State Univ. AgCenter, Baton Rouge, LA

2:00 **4126** Ecological engineering for insect pest management in rice — results from the Yangtze River Delta Plain. **Ping Qian** (pq2009@zju.edu.cn)1, Hang Yu1, Gui-Yao Wang1, Fei-Qiang Li1, Zi-Jie Zhu1, Ye Tan1, Xiao-Xiao Shi1, Xin Yuan1, Guang-Hua Wang1, Xue-Qin Wang1, Yue Chen2, Jian-Liang Zhang2, Yan-Dong Jiang1, Qin-Zi Zhu1, Yue-Liang Bai1, Wen-Juan Jiao1, Mu-Fei Zhu1, Jing Ye1, Yi Ma1, Nan-Nan Wang1, Kong Luen Heong1, Jiaan Cheng1, and Zeng-Rong Zhu1, 1Zhejiang Univ., Hangzhou, China, 2Jiaxing Agricultural Development Investment Limited Company, Jiaxing, China

2:15 **4127** Incursions of exotic pests into European rice areas — detection and management. **Daniela Lupi** (daniela.lupi@unimi.it)1 and François-Régis Goebel2, 1Univ. of Milan, Milan, Italy, 2CIRAD, Montpellier, France

2:30 **4128** New approaches to midge management in temperate direct-seeded rice. **Maria del Mar Català Forner** (mar.catala@irta.cat), IRTA, Amposta, Spain

2:45 **4129** Status of insecticide resistance and virulence to resistant rice varieties in the brown planthopper in Asia. **Masaya Matsumura** (mmasa@affrc.go.jp)1 and Hideshi Yasui2, 1NARO Kyushu Okinawa Agricultural Research Center, Kumamoto, Japan, 2Kyushu Univ., Fukuoka, Japan

**3:00 BREAK**

3:15 **4130** New IPM tactics and tools for management of key invertebrate pests in Californian rice. **Larry Godfrey** (ldgodfrey@ucdavis.edu)1, Luis Espino2, Mohammad- Amir Aghaee1, Joanna Bloese1, and Kevin Goding1, 1Univ. of California, Davis, CA, 2Univ. of California Cooperative Extension, Colusa, CA

3:30 **4131** Developing economic thresholds for stink bugs in rice — problems and prospects. **José Barrigossi** (jose.barrigossi@embrapa.br)1, Daniel Caixeta2, and Tavvs Alves3, 1Embrapa Rice and Beans, Santo António de Goiás, Brazil, 2Uni-Evangélica, Goianésia, Brazil, 3Univ. of Minnesota, St. Paul, MN

3:45 **4132** Influence of water conservation practices on pest management in Australian rice. **Mark Stevens** (mark.stevens@dpi.nsw.gov.au), New South Wales Dept. of Primary Industries, Yanco, Australia

4:00 **4133** Identification of novel fecundity-related genes and molecular markers in the brown planthopper, *Nilaparvata lugens*. **Wenqing Zhang** (lsszwq@mail. sysu.edu.cn), Zhongxiang Sun, Jieqi Qiu, Tengchao Li, and Rui Pang, Sun Yat-sen Univ., Guangzhou, China

4:15 **4134** The predicted response of *Scirpophaga incertulas* Walker (Lepidoptera: Pyralidae) to climate change and its implications for rice production in Bangladesh. **Panna Ali** (panna\_ali@yahoo.com), Bangladesh Rice Research Institute, Gazipur, Bangladesh

**Symposium: Technological Innovations and Integrated Pest Management**

***Room W331 B (Convention Center)***

**Moderators and Organizers:** Grzegorz Krawczyk1 and Waqas Wakil2, 1Pennsylvania State Univ., Biglerville, PA, 2Univ. of Agriculture, Faisalabad, Pakistan

1:30 **4135** New technologies in delivery of mating disruption products. **Larry Gut** (gut@msu.edu), Michigan State Univ., East Lansing, MI

1:45 **4136** Fixed spraying systems for improved pesticide application in fruit planting. **Arthur Agnello** (ama4@ cornell.edu), Cornell Univ., Geneva, NY

2:00 **4137** Sampling of *Bemisia tabaci* adults using a pre-programmed autonomous pest control robot. **Chunlei Xia** (c.xia2009@gmail.com)1, Bu-Keun Chung2, Jang-Myung Lee3, Yan Li3, and Tae-Soo Chon3, 1Chinese Academy of Sciences, Yantai, China, 2Gyeongsangnam-Do Agricultural Research and Extension Services, Jinju, South Korea, 3Pusan National Univ., Busan, South Korea

2:15 **4138** Automated traps and Cloud-based pest management. **Greg Krawczyk** (gxk13@psu.edu)1, Brian Lehman1, Larry A. Hull1, and Johnny Park2,

1Pennsylvania State Univ., Biglerville, PA, 2Spensa Technologies, Inc., West Lafayette, IN

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2:30 **4139** Mass trapping and attract-and-kill to control medfly (*Ceratitis capitata* Wied.) for low-zero residues in apples. **Lucia-Adriana Escudero-Colomar** (adriana. escudero@irta.cat)1, Mariano Vilajeliu1, Esther Penarrubia- Maria1, and Lluis Batllori2, 1IRTA Mas Badia, Girona, Spain, 2DAAM Aiguamolls de l’Empordà, Girona, Spain

2:45 **4140** Mass trapping and new toxic bait formulations for fruit fly management. **Marcos Botton** (marcos. botton@embrapa.br), Embrapa Grape and Wine, Bento Goncalves, Brazil

**3:00 BREAK**

3:15 **4141** Trunk injection technology for pesticide delivery in apples. **Charles Coslor** (coslorch@msu.edu), Christine Vandervoort, and John Wise, Michigan State Univ., East Lansing, MI

3:30 **4142** Field efficacy and economics of insect-pathogens and jasmonic acid against *Helicoverpa armigera* Hübner (Lepidoptera: Noctuidae): Impact on natural enemies. **Waqas Wakil** (waqaswakeel@hotmail.com), Univ. of Agriculture, Faisalabad, Pakistan

3:45 **4143** Interactions of Bt cotton, entomopathogenic fungi, and temperature variations on the life parameters of *Heliothis virescens* (Fabricius) (Insecta: Lepidoptera: Noctuidae) under laboratory conditions. **M. Usman Ghazanfar** (usmanghazanfar1073@yahoo. com), Univ. of Sargodha, Sargodha, Pakistan

**Symposium: Harnessing the Power of Genomics Tools: Monitoring Stressors in Pollinator Populations**

***Room W315 A (Convention Center)***

**Moderators and Organizers:** Christina M. Grozinger1 and Robert Paxton2, 1Pennsylvania State Univ., University Park, PA, 2Martin Luther Univ., Halle, Germany

1:30 **4144** The influence of the ectoparasite *Varroa* on the transmission and population of deformed wing virus  
in honey bees. **David Evans** (d.j.evans@st-andrews. ac.uk)1, James Bull2, Nick Burroughs2, David Chandler3, Jess Fannon2, Adite Kibe2, Andrew Mead2, Chris Moffat1, Jonathan Moore2, Eugene Ryabov2, and Graham Wood2, 1Univ. of St. Andrews, St. Andrews, United Kingdom, 2Univ. of Warwick, Coventry, United Kingdom, 3Univ. of Warwick, Warwick, United Kingdom

1:45 **4145** More than a common cold: An emerging virus genotype causes elevated honey bee loss. **Dino McMahon** (dino.mcmahon@gmail.com)1, Myrsini Natsopoulou2, Vincent Doublet3, Matthias Fürst4, Eva Frey5,

Peter Rosenkranz5, Silvio Weging3, Mark Brown6, Andreas Gogol-Döring3, and Robert Paxton2, 1Federal Institute for Materials Research and Testing, Berlin, Germany, 2Martin Luther Univ., Halle, Germany, 3German Centre for Integrative Biodiversity Research, Leipzig, Germany, 4Institute of Science and Technology Austria, Klosterneuburg, Austria, 5Univ. of Hohenheim, Stuttgart, Germany, 6Royal Holloway, Univ. of London, Egham, United Kingdom

2:00 **4146** Using genome-derived tools to track and trace honey bee killer diseases. **Giles Budge** (giles.budge@ newcastle.ac.uk)1, Victoria Tomkies2, Mark Shirley1, Barbara Morrissey2, Mike Brown3, and Edward Haynes2, 1Newcastle Univ., Newcastle upon Tyne, United Kingdom, 2Fera Science, Ltd., York, United Kingdom, 3Animal and Plant Health Agency, York, United Kingdom

2:15 **4147** Integrative and comparative genome analyses of the honey bee microsporidia parasites, *Nosema ceranae* and *N. apis*: Toward RNAi-mediated nosema disease control. **Yanping Chen** (judy.chen@ars.usda. gov), Wenfeng Li, Jiang Huang, and Jay Evans, USDA - ARS, Beltsville, MD

2:30 **4148** Global patterns of genetic variation of *Nosema* in bumble bees at different genomic scales. **Sydney A. Cameron** (scameron@life.illinois.edu)1, Jeffrey D. Lozier2, Haw Lim3, Michelle Duennes1, and Robbin W. Thorp4, 1Univ. of Illinois, Champaign, IL, 2Univ. of Alabama, Tuscaloosa, AL, 3Smithsonian Institution National Museum of Natural History, Washington, DC, 4Univ. of California, Davis, CA

2:45 **4149** Worldwide patterns of genetic variation in  
the honey bee, *Apis mellifera*. **Matthew Webster** (matthew.webster@imbim.uu.se)1, Andreas Wallberg1, Mike Allsopp2, and Christian Pirk3, 1Uppsala Univ., Uppsala, Sweden, 2Agricultural Research Council, Stellenbosch, South Africa, 3Univ. of Pretoria, Pretoria, South Africa

**3:00 BREAK**

3:15 **4150** Harnessing natural variation to study local adaptation in native pollinators. **Sarah D. Kocher** (skocher@gmail.com), Harvard Univ., Cambridge, MA

3:30 **4151** The honey bee gut symbiont *Frischella perrara*: Friend or foe? **Philipp Engel** (philipp.engel@unil.ch), Univ. of Lausanne, Lausanne, Switzerland

3:45 **4152** New insights into the microbial world of bees and the pollination environment. **Quinn McFrederick** (quinn.mcfrederick@ucr.edu), Univ. of California, Riverside, CA

**Symposium: Integrated Crop Pollination in Theory and Practice**

***Room W414 C (Convention Center)***

**Moderators and Organizers:** Jason Gibbs1, Cory Stanley-Stahr2, and Rufus Isaacs1, 1Michigan State Univ., East Lansing, MI, 2Wildlife International, Gainesville, FL

1:30 **4153** Pollination of European crops — lessons learned across boundaries. Simon Potts, Michael Garratt, and **Tom Breeze** (t.d.breeze@reading.ac.uk), Univ. of Reading, Reading, United Kingdom

2:00 **4154** Factors affecting pollinator diversity and yield in highbush blueberry. **Jason Gibbs** (jgibbs@msu. edu)1, Elizabeth Elle2, George Hoffman3, Sujaya Rao3, and Cory Stanley-Stahr4, 1Michigan State Univ., East Lansing, MI, 2Simon Fraser Univ., Burnaby, BC, Canada, 3Oregon State Univ., Corvallis, OR, 4Univ. of Florida, Gainesville, FL

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2:15 **4155** The economic contributions of wild bees to specialty crops. **James Reilly** (jreilly45@gmail.com) and Rachael Winfree, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

2:30 **4156** Habitat enhancements to support pollinator diversity and pollination service in agricultural lands. **Neal M. Williams** (nmwilliams@ucdavis.edu)1,  
Kimiora Ward1, Rufus Isaacs2, Ola Lundin1, Jason Gibbs2, Julianna Wilson2, Cory Stanley-Stahr3, Shelby J. Fleischer4, and Julia Brokaw2, 1Univ. of California, Davis, CA, 2Michigan State Univ., East Lansing, MI, 3Univ. of Florida, Gainesville, FL, 4Pennsylvania State Univ., University Park, PA

2:45 **4157** The challenge of sustainable pollination of Florida watermelons. **Cory Stanley-Stahr** (cstanley-stahr@ eag.com)1, James D. Ellis2, and Jaret C. Daniels2, 1Wildlife International, Gainesville, FL, 2Univ. of Florida, Gainesville, FL

**3:00 BREAK**

3:15 **4158** The impact and sustainability of blue orchard bees as almond pollinators. **Derek R. Artz** (derek.artz@ ars.usda.gov)1, Theresa Pitts-Singer1, and  
Natalie Boyle2, 1USDA - ARS, Logan, UT, 2Washington State Univ., Prosser, WA

3:30 **4159** Communicating management strategies  
that support crop pollinators. **Katharina Ullmann** (katharina@xerces.org)1, Emily May1, Jennifer L. Hopwood2, and Mace Vaughan1, 1The Xerces Society for Invertebrate Conservation, Portland, OR, 2Univ. of Kansas, Lawrence, KS

3:45 **4160** Knowledge networks for managing pollinators and pollination services in agriculture. **Kelly Garbach** (kgarbach@luc.edu)1, Geoffrey Morgan2, Earvin Balderama1, Emma Zajdela1, and Victoria Reese1, 1Loyola Univ., Chicago, IL, 2Carnegie Mellon Univ., Pittsburgh, PA

4:00 **4161** Spatial modeling of pollinators to support farm management decisions. **Eric Lonsdorf** (eric.lonsdorf@ fandm.edu)1, Taylor Ricketts2, Insu Koh2, Claire Brittain3, Neal M. Williams3, Claire Kremen4, and Rufus Isaacs5, 1Franklin and Marshall College, Lancaster, PA, 2Univ. of Vermont, Burlington, VT, 3Univ. of California, Davis, CA, 4Univ. of California, Berkeley, CA, 5Michigan State Univ., East Lansing, MI

4:15 **4162** The future of Integrated Crop Pollination. **Rufus Isaacs** (isaacsr@msu.edu) and Jason Gibbs, Michigan State Univ., East Lansing, MI

**Symposium: Interactions Between Pollination Services and Agricultural Practices**

***Room W414 B (Convention Center)***

**Moderator and Organizer:** Decio Gazzoni, Embrapa, Londrina, Brazil

1:30 **4163** An overview of the pollination services.  
**Decio Gazzoni** (decio.gazzoni@embrapa.br), Embrapa, Londrina, Brazil

1:45 **4164** Economic importance of the pollination services. **Nicola Gallai** (nicola.gallai@educagri.fr), Univ. of Toulouse, Castanet-Tolosan, France

2:00 **4165** The importance of pollinator diversity for crop production. **Michael Garratt** (m.p.garratt@reading. ac.uk), Univ. of Reading, Reading, United Kingdom

2:15 **4166** Impact of habitat reduction and simplification on pollination services. **Stephen D. Wratten** (wrattens@ lincoln.ac.nz), Lincoln Univ., Christchurch, New Zealand

2:30 **4167** Threats to pollinators from parasites and pathogens. **Qiang Huang** (qiang-huang@live.com), USDA - ARS, Beltsville, MD

2:45 **4168** The impact of the global climate changes and the pollination. Vera Lúcia Fonseca1 and **Blande Viana** (blande.viana@gmail.com)2, 1Univ. of São Paulo,  
São Paulo, Brazil, 2Federal Univ. of Bahia, Salvador, Brazil

**3:00 BREAK**

3:15 **4169** Impacts of introduced pollinators on agriculture. **Marcelo Aizen** (marcelo.aizen@gmail.com), National Univ. of Comahue, San Carlos de Bariloche, Argentina

3:30 **4170** Honey bee colony losses and declines. **Nathalie Steinhauer** (nathalie.steinhauer@gmail.com), Univ. of Maryland, College Park, MD

3:45 **4171** Nutrition, transportation, and other stressors on bees providing commercial pollination services. **Ramesh Sagili** (ramesh.sagili@oregonstate.edu), Oregon State Univ., Corvallis, OR

4:00 **4172** Crop management friendly to pollinators. **Barbara Herren** (barbara.herren@fao.org), Food and Agriculture Organization of the United Nations, Nairobi, Kenya

4:15 **4173** Acute impact of insecticides to pollinators.  
**Jens Pistorius** (jens.pistorius@jki.bund.de), Julius Kühn Institute, Braunschweig, Germany

4:30 **4174** A close look into the future of global agriculture — an eye on pollination services. **Manfred Kern** (info@agriexcellence.de), Agriexcellence Gmbh, Lörzweiler, Germany

4:45 **Discussion and wrap up**

**Symposium: Regulation of Honey Bee Polyethism: Clock, Neuroendocrine System, and Environmental Toxicants**

***Room W315 B (Convention Center)***

**Moderators and Organizers:** Makio Takeda1 and Darrell Moore2, 1Kobe Univ., Kobe, Japan, 2East Tennessee State Univ., Johnson City, TN

1:30 **4175** The interplay between social organization and circadian rhythms in bees. **Guy Bloch** (guy.bloch@mail. huji.ac.il), The Hebrew Univ., Jerusalem, Israel

2:00 **4176** Environmental and experiential influences on expression of time-memory behavior in honey bee foragers. **Darrell Moore** (moored@mail.etsu.edu), East Tennessee State Univ., Johnson City, TN

2:15 **4177** The role of temperature on the development and regulation of circadian rhythms in honey bees. **Jose Agosto** (jose.agosto1@upr.edu), Univ. of Puerto Rico, San Juan, PR

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2:30 **4178** RNA-editing in regulation of circadian rhythms in social insects. **Guojie Zhang** (zhanggjconi@gmail. com), Univ. of Copenhagen, Copenhagen, Denmark

2:45 **4179** Hormonal regulation of gene expression in hypopharyngeal gland of worker honey bees in association with worker behavior. **Takayuki Ueno** (tueno@dwc.doshisha.ac.jp), Doshisha Women’s College of Liberal Arts, Kyoto, Japan

**3:00 BREAK**

3:15 **4180** Regulation system of brain dopamine for reproduction in social insects. **Ken Sasaki** (sasakik@ agr.tamagawa.ac.jp), Tamagawa Univ., Tokyo, Japan

3:30 **4181** Pesticide toxicity varies with honey bee physiological castes. Shudong Luo1 and **Zachary Y. Huang** (bees@msu.edu)2, 1Chinese Academy of Agricultural Sciences, Beijing, China, 2Michigan State Univ., East Lansing, MI

3:45 **4182** Variation in honey bee behavioral regulation and insights into indolamine pathway. **Tugrul Giray** (tgiray2@yahoo.com), Univ. of Puerto Rico, San Juan, PR

4:00 **4183** Regulation of polyethism in honey bee: Indolamines, receptors, and aaNAT. **Makio Takeda** (mtakeda@kobe-u.ac.jp)1, Naznin Nahar2, Quishi Wang1, Tran Quynh1, Ahmed Muhammad1, Susumu Hiragaki1, and Takeshi Ohtani1, 1Kobe Univ., Kobe, Japan, 2Bangladesh Agricultural Univ., Mymensingh, Bangladesh

**Symposium: *Rhipicephalus sanguineus*: Tick without Borders**

***Room W224 H (Convention Center)***

**Moderators and Organizers:** Emma N. I. Weeks and Phillip E. Kaufman, Univ. of Florida, Gainesville, FL

1:30 **4184** *Rhipicephalus sanguineus* lato sensu — new and future opportunities for an improved management. **Frederic Beugnet** (frederic.beugnet@merial.com), Merial S.A.S., Lyon, France

2:00 **4185** The challenges that homeowners and PCOs encounter when managing brown dog tick. **Faith Oi** (foi@ufl.edu)1, Phillip E. Kaufman1, and Amanda L. Eiden2, 1Univ. of Florida, Gainesville, FL, 2Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

2:15 **4186** Detection of acaricide resistance and  
metabolic detoxification mechanisms in *Rhipicephalus sanguineus*. **Amanda L. Eiden** (amanda.eiden@rutgers. edu)1, Phillip E. Kaufman2, Faith Oi2, Michael J. Dark2, and Jeffrey Bloomquist2, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2Univ. of Florida, Gainesville, FL

2:30 **4187** Characterizing sodium channel mutations conferring pyrethroid resistance in the indoor pest *Rhipicephalus sanguineus*. **Nick Tucker** (nicktu@ufl. edu)1, Emma N. I. Weeks1, Jason P. Tidwell2,

Rafael Barreto2, Jessica Rowland1, and Phillip E. Kaufman1, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Edinburg, TX

2:45 **4188** Phylogenetic structure and reproductive separation of ubiquitous brown dog ticks.  
**Galina Zemtsova** (gzemtsova@cdc.gov)1,  
Dmitry Apanaskevich2, Will K. Reeves3, Micah Hahn4, Alyssa Snellgrove1, and Michael Levin1, 1Centers for Disease Control and Prevention, Atlanta, GA, 2Georgia Southern Univ., Statesboro, GA, 3U.S. Air Force School of Aerospace Medicine, Wright-Patterson AFB, OH, 4National Center for Atmospheric Research, Boulder, CO

**3:00 BREAK**

3:15 **4189** Host location cues of the brown dog tick, *Rhipicephalus sanguineus*. **Emma N. I. Weeks** (eniweeks@ufl.edu)1, Brooke Cantrell1, Phillip E. Kaufman1, and Sandra A. Allan2, 1Univ. of Florida, Gainesville, FL, 2USDA - ARS, Gainesville, FL

3:30 **4190** Dynamics of brown dog tick infestations: Environmental, premise, and on-dog populations. **Susan Little** (susan.little@okstate.edu), Oklahoma State Univ., Stillwater, OK

3:45 **4191** *Rhipicephalus sanguineus* importation into the UK: Surveillance, response, and public health awareness. **Kayleigh Hansford** (kayleigh.hansford@ phe.gov.uk), Benjamin Cull, Maaike Pietzsch, and Jolyon Medlock, Public Health England, Salisbury, United Kingdom

4:00 **4192** Ecology and epidemiology of Rocky Mountain spotted fever associated with *Rhipicephalus sanguineus*. **William Nicholson** (wnicholson@cdc.gov), Centers for Disease Control and Prevention, Atlanta, GA

4:15 **4193** Challenges of preventing *Ehrlichia canis* infections in a highly endemic *Rhipicephalus sanguineus* area. **Jennifer Ketzis** (jketzis@rossu.edu), Andrea Peda, James Fairs, Rajeev Nair, Linda Shell, and Diana Scorpio, Ross Univ. School of Veterinary Medicine, Basseterre, St. Kitts and Nevis

**Symposium: Global Status of Native and Invasive Coccinellids**

***Room W224 E (Convention Center)***

**Moderator and Organizer:** Leslie Allee, Cornell Univ., Ithaca, NY

1:30 **4194** Sexual selection drives the evolution of limb regeneration in *Harmonia axyridis*. **J. P. Michaud** (jpmi@ksu.edu), Kansas State Univ., Manhattan, KS

2:00 **4195** Lady beetles (Coleoptera: Coccinellidae) of the Indian Region: Diversity and utilization in biological control of crop pests. **Janakiraman Poorani** (pooranij@ gmail.com), Project Directorate of Biological Control, Bangalore, India

2:15 **4196** How has global diversity of predacious coccinellids changed over time? **Leslie Allee** (lla1@ cornell.edu) and John Losey, Cornell Univ., Ithaca, NY

2:30 **4197** Implications for loss of coccinellid diversity and “service” at local, regional, and global levels: Predictions and plans for conservation. **Rebecca R. Smyth** (rrs7@ cornell.edu) and John Losey, Cornell Univ., Ithaca, NY

**3:00 BREAK**

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3:00 **4198** Establishing a coccinellid specialist group in the International Union for Conservation of Nature  
– Species Survival Commission (IUCN SSC).  
**John Losey** (jel27@cornell.edu), Leslie Allee, Todd Ugine, and Rebecca R. Smyth, Cornell Univ., Ithaca, NY

3:30 **Panel Discussion**

**Symposium: Resource Management and Biodiversity in Cockroach and Termite Lineages: Exploring the Common Ground in Their Nutrition, Biodiversity, and Systematics**

***Room W414 A (Convention Center)***

**Moderators and Organizers:** Donald Mullins1, Aaron Mullins2, Clifford Keil3, Christine Nalepa4, and Jessica Ware5, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Univ. of Florida, Ft. Lauderdale, FL, 3Pontifical Catholic Univ., Quito, Ecuador, 4North Carolina State Univ., Raleigh, NC, 5Rutgers, The State Univ. of New Jersey, Newark, NJ

1:30 **Panel Discussion: Exploring the common ground of cockroach and termite lineages**

1:45 **4199** Termite diversity in Ecuador — biogeography to microbiology. **Clifford Keil** (keil617@yahoo.com), Pontifical Catholic Univ., Quito, Ecuador

2:00 **4200** Landscape ecology of cockroach communities in the land of many waters. **Dominic Evangelista** (dominicev@gmail.com) and Jessica Ware, Rutgers, The State Univ. of New Jersey, Newark, NJ

2:15 **4201** A species-rich genus of “desert” cockroaches and some factors contributing to species niche.  
**Heidi Hopkins** (cockroachdoc@gmail.com)1 and  
Jacek Giermakowski2, 1Ithaca College, Ithaca, NY, 2Univ. of New Mexico, Albuquerque, NM

2:30 **4202** Subsocial cockroach to eusocial termite: Economics of the transition. **Christine Nalepa** (cnalepa@ ncsu.edu), North Carolina State Univ., Raleigh, NC

2:45 **4203** Symbionts and the rise of termites to ecological dominance in the tropics. **David Bignell** (d.bignell@ qmul.ac.uk), Queen Mary Univ. of London, London, United Kingdom

**3:00 BREAK**

3:15 **4204** The evolution of diverse feeding and nesting strategies in Australian Nasutitermitinae. **Nathan Lo** (nathan@usyd.au), The Univ. of Sydney, Sydney, Australia

3:30 **4205** Castes and fat body in termites.  
**Ana Maria Costa-Leonardo** (amcl@rc.unesp.br)1, Lara Laranjo2, and Ives Haifig3, 1São Paulo State Univ., Rio Claro, Brazil, 2São Paulo State Univ., Rio Claro, Brazil, 3Federal Univ. of Uberlândia, Monte Carmelo, Brazil

3:45 **4206** Nitrogen resource management in cockroaches. **Donald Mullins** (mullinsd@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

4:00 **4207** Nitrogenase activity in wood-feeding termites and cockroaches. **Aaron Mullins** (amull81@ufl.edu), Univ. of Florida, Ft. Lauderdale, FL

4:15 **4208** Genome sequencing and transcriptome analyses during caste differentiation of lower termites. **Kiyoto Maekawa** (kmaekawa@sci.u-toyama.ac.jp), Hajime Yaguchi, and Yudai Masuoka, Univ. of Toyama, Toyama, Japan

4:30 **4209** Microbial community dynamics and host evolution in dictyopteran lineages. **Zakee Sabree** (sabree.8@osu.edu), The Ohio State Univ., Columbus, OH

4:45 **4210** Genomic and metabolic transitions of the intracellular symbiont during evolution of the wood-feeding cockroaches, *Cryptocercus* spp. **Gaku Tokuda** (tokuda@comb.u-ryukyu.ac.jp),

Tropical Biosphere Research Center, Okinawa, Japan

5:00 **4211** Evolution and transmission of cockroach and termite hindgut symbiotic protozoa. **Gillian Gile** (ggile@asu.edu), Arizona State Univ., Tempe, AZ

**Symposium: Industry-Academia Collaborative Research and Development in Biological Control of Arthropod Pests: Results from Four Years of Marie-Curie Staff Exchange, and Perspectives**

***Room W222 B (Convention Center)***

**Moderator and Organizer:** Thibaut Malausa, INRA, Sophia Antipolis, France

1:30 **4212** Four years of Marie-Curie staff-exchange on innovation in biological control: Overview and perspectives. **Thibaut Malausa** (tmalausa@sophia.inra. fr) and Nicolas Ris, INRA, Sophia Antipolis, France

1:45 **4213** Molecular and morphological characterization of scale insects and associated natural enemies in Chile and France. **Paul Amouroux** (pamourou@yahoo.fr)1, Margarita Correa1,2,3, Jimena Ampuero2, Paula Javiera Molina2, Philippe Kreiter3, Géraldine Groussier Bout3, Didier Crochard3, Thibaut Malausa3, and Tania Zaviezo1, 1Pontifical Catholic Univ., Santiago, Chile, 2Anasac Xilema, Quillota, Chile, 3INRA, Sophia Antipolis, France

2:00 **4214** Research and development of a new biological control agent against the San José scale, *Diaspidiotus perniciosus*, in Chile. **Margarita Correa** (maggiecorrea@ gmail.com)1,2, María Fernanda Flores3, Carola Roman1, Jimena Ampuero1, Aurélie Blin2, Paul Amouroux4,

Paula Javiera Molina1, Sergio Salvador1, Felipe Sandoval1, Philippe Kreiter2, and Thibaut Malausa2, 1Anasac Xilema, Quillota, Chile, 2INRA, Sophia Antipolis, France, 3Pontifical Catholic Univ., Curauma, Chile, 4Pontifical Catholic Univ., Santiago, Chile

2:15 **4215** Disentangling taxonomic issues and reproductive isolation patterns in complexes of cryptic species in the genus *Trichogramma*. **Nicolas Ris** (nicolas.ris@sophia.inra.fr)1, Paloma Martinez-Rodriguez1, Astrid Cruaud2, Thibaut Malausa1, Jean-Yves Rasplus2, Géraldine Groussier Bout1, Sylvie Warot1, and Julien Seguret3, 1INRA, Sophia Antipolis, France, 2INRA, Montferrier-sur-Lez, France, 3Biotop, Valbonne, France

2:30 **4216** Exploring and exploiting intraspecific diversity in the genus *Trichogramma*. **Paloma Martinez-Rodriguez** (pmartinez@paca.inra.fr)1, Cyndel Berger1, Géraldine Groussier Bout1, Thierry Dumbardon-Martial1,2,

Thomas Lepilleur2, Pascal Maignet2, Thibaut Malausa1,

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Nicolas Ris1, Virginia Sanchez-Martin2, Julien Seguret2, Valentin Vergès1, Sylvie Warot1, and Tania Zaviezo3, 1INRA, Sophia Antipolis, France, 2Biotop, Valbonne, France, 3Pontifical Catholic Univ., Santiago, Chile

2:45 **4217** Coupling chemistry and entomology to setup mass-rearing methods for *Chrysoperla externa*, *Cryptolaemus montrouzieri*, and *Rhyzobius lophantae*. **Géraldine Groussier Bout** (geraldine.groussier-bout@ sophia.inra.fr)1, Paulina Godoy2, Felipe Sandoval Briones3, Carola Roman3, María Fernanda Flores2, Francisca Belen Lopez Saavedra3, Paula Javiera Molina3, and Margarita Correa1,3,4, 1INRA, Sophia Antipolis, France, 2Pontifical Catholic Univ., Curauma, Chile, 3Anasac Xilema, Quillota, Chile, 4Pontifical Catholic Univ., Santiago, Chile

**SD4218** BINGO: Breeding Invertebrates for Next Generation BioControl. Bart Pannebakker1 and **Leo Beukeboom** (l.w.beukeboom@rug.nl)2, 1Wageningen Univ. and Research Centre, Wageningen, Netherlands, 2Univ. of Groningen, Groningen, Netherlands

**3:00 BREAK AND POSTER SESSION**

3:15 **4219** Inbreeding and outbreeding in biological control agents: Do they actually matter? **Bastien Quaglietti** (bquaglietti@sophia.inra.fr)1,2,3, Apostolos Pekas3,  
Felix Wackers3, Didier Crochard2, Paul Amouroux4, Ferran Palero2, and Thibaut Malausa2, 1Anasac Xilema, Quillota, Chile, 2INRA, Sophia Antipolis, France, 3Biobest, Westerlo, Belgium, 4Pontifical Catholic Univ., Santiago, Chile

3:30 **4220** Exploring the microbiome of biological control agents: First insights and perspectives. **Ferran Palero** (fpalero@paca.inra.fr)1, Bastien Quaglietti1,2, Apostolos Pekas2, Aurelie Blin1, Michela Ion-Scotta1, Jean-Claude Streito3, Nicolas Ris1, Thibaut Malausa1, and Felix Wackers2, 1INRA, Sophia Antipolis, France, 2Biobest, Westerlo, Belgium, 3INRA, Montferrier-sur- Lez, France

3:45 **4221** Integrated pest management in citrus in Spain: Recent results and current challenges for the biological control community. **Antonia Soto** (asoto@ eaf.upv.es)1, Cristina Navarro Campos2, Altea Calabuig1, Ferran Garcia-Marí1, Felix Wackers2, Apostolos Pekas2, and Aleixandre Beltra1, 1Polytechnic Univ. of València, Valencia, Spain, 2Biobest, Westerlo, Belgium

4:00 **4222** Novel strategies increase the population density of local beneficial phytoseiid mite populations. **Felix Wackers** (felix.wackers@biobest.be), Biobest, Westerlo, Belgium

4:15 **4223** Food supplements enhance phytoseiid mite populations in citrus. **Aleixandre Beltra** (albeliv@etsia. upv.es)1, Cristina Navarro-Campos2, Altea Calabuig1, Antonia Soto1, Ferran Garcia-Marí1, Felix Wackers2, and Apostolos Pekas2, 1Polytechnic Univ. of València, Valencia, Spain, 2Biobest, Westerlo, Belgium

4:30 **4224** Advances in biological control using soil-dwelling mites. **Cristina Navarro-Campos** (cristina.navarro@ biobest.be)1, Altea Calabuig2, Aleixandre Beltra2, Antonia Soto2, Ferran Garcia-Marí2, Felix Wackers1, and Apostolos Pekas1, 1Biobest, Westerlo, Belgium, 2Polytechnic Univ. of València, Valencia, Spain

4:45 **4225** Attract and distract: Alternative sugars disrupt the ant-hemipteran mutualism and improve biological control. **Apostolos Pekas** (tolis@biobest.be)1,  
Cristina Navarro-Campos1, Aleixandre Beltra2,

Kurt Put1, and Felix Wackers1, 1Biobest, Westerlo, Belgium, 2Polytechnic Univ. of València, Valencia, Spain

5:00 **4226** Decision-support tools for the monitoring of arthropod pests and integration of biological control products: A case-study in Chile. **Alexandre Bout** (alexandre.bout@paca.inra.fr)1, Felipe Morales Rubio2, Kevin Simon1, and Hugo Herrera Garay2, 1INRA, Sophia Antipolis, France, 2Anasac Xilema, Quillota, Chile

**Symposium: Ecology, Biodiversity, and Geography of Gall-Inducing Insects: Now and Beyond**

***Room W330 B (Convention Center)***

**Moderator and Organizer:** G. Wilson Fernandes, Federal Univ. of Minas Gerais, Belo Horizonte, Brazil

1:30 **4227** Presentation withdrawn

1:45 **4228** Canopy stress and galling species richness. **G. Wilson Fernandes** (gw.fernandes@gmail.com), Federal Univ. of Minas Gerais, Belo Horizonte, Brazil

2:00 **4229** Patterns in gall species diversity across altitudinal and precipitation gradients in northern Patagonia, Argentina: Explanatory variables switch between alpha and beta diversity. **Carolina Quintero** (quintero.carolina@gmail.com), National Univ. of Comahue, Bariloche, Argentina

2:15 **4230** On the diversity and host relations of galling lepidopterans in South America. **Gilson Moreira** (gilson. moreira@ufrgs.br), Federal Univ. of Rio Grande, Porto Alegre, Brazil

2:30 **4231** Indirect secondary effects of species removal from galler-parastioid food web: An experimental approach. **Milton Barbosa** (miltonbsjunior@gmail. com), Univ. of Oxford, Oxford, United Kingdom

2:45 **4232** The complex life cycle and niche use of four *Daphnephila* species (Diptera: Cecidomyiidae) on the leaves of *Machilus thunbergii* (Lauraceae) in Northern Taiwan. **Man-Miao Yang** (mmy.letsgall@gmail.com), National Chung Hsing Univ., Taichung, Taiwan

**3:00 BREAK**

3:15 **4233** Taxonomic status of a gall midge (Diptera: Cecidomyiidae) associated with *Symplocos cochinchinensis* (Symplocaceae) in Japan: The first example of *Rabdophaga* on a host plant other than Salicaceae. **Ayman Elsayed** (ayman.khamis77@gmail. com), Kagoshima Univ., Kagoshima, Japan

3:30 **4234** Life history and host manipulation mechanism by a gall-inducing psyllid *Stenopsylla nigricornis* (Hemiptera). **Makoto Tokuda** (tokudam@cc.saga-u. ac.jp), Saga Univ., Saga, Japan



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**Symposium: Host Relations of Gall-Inducing Insects**

***Room W231 C (Convention Center)***

**Moderators and Organizers:** Donald Miller1 and Anantanarayanan Raman2, 1California State Univ., Chico, CA, 2Charles Sturt Univ., Orange, Australia

1:30 **4235** What we have learned from the interactions between gall-inducing insects and their host plants. **Junichi Yukawa** (jzs02305@nifty.ne.jp), Kyushu Univ., Fukuoka, Japan

2:00 **4236** Cleanliness may lead to sociality in the gall- inducing thrips on Australian *Acacia*. **Tom Chapman** (tomc@mun.ca), Memorial Univ. of Newfoundland, St. John’s, NF, Canada

2:15 **4237** Host specificity of gall-inducing *Calophya* spp. (Hemiptera: Calophyidae): Implications for biological control of Brazilian peppertree. **Rodrigo Diaz** (rdiaz@ agcenter.lsu.edu)1, Patricia Prade2, Bill Overholt3, James P. Cuda2, and Marcelo D. Vitorino4, 1Louisiana State Univ., Baton Rouge, LA, 2Univ. of Florida, Gainesville, FL, 3Univ. of Florida, Ft. Pierce, FL, 4Regional Foundation Univ. of Blumenau, Santa Catarina, Brazil

2:30 **4238** The big and small of defense in the social aphid *Pemphigus spyrothecae*. **Holly Caravan** (hcaravan@mun.ca), Memorial Univ. of Newfoundland, St. John’s, NF, Canada

2:45 **4239** The *Tamalia* gall-inducing aphid as intermediary between host plant and inquiline. **Donald Miller** (dgmiller@csuchico.edu), California State Univ., Chico, CA

**3:00 BREAK**

3:15 **4240** Why do the species of *Synglycaspis* (Hemiptera: Psylloidea: Aphalaridae) induce galls only on *Eucalyptus macrorhyncha* (Myrtaceae)? **Anantanarayanan Raman** (araman@csu.edu.au), Charles Sturt Univ., Orange, Australia

3:30 **4241** Diversification of lasiopterine gall midges (Diptera: Cecidomyiidae) on plants of the genus *Suaeda* (Chenopodiaceae) – a role for plant life-form and anatomy? **Netta Dorchin** (ndorchin@tauex.tau.ac.il), Gilad Danon, and Roi Dor, Tel Aviv Univ., Tel Aviv, Israel

3:45 **4242** Host relations and colonization of Taiwanese *Bruggmanniella* species (Diptera: Cecdomyiidae) on *Litsea* Lam. and *Cinnamomum* Schaeffer (Lauraceae). **Sheng-Feng Lin** (sane654@yahoo.com.tw), National Chung Hsing Univ., Taichung, Taiwan

4:00 **4243** A multiplicity of galls: How do so many galler wasp species co-exist within a fig microcosm? **Renee Borges** (renee@ces.iisc.ernet.in) and  
Ananya Jana, Indian Institute of Science, Bangalore, India

4:15 **4244** Recent topics in the life history and host relations of gall wasps (Cynipidae) in Asia.  
**Yoshihisa Abe** (y\_abe@scs.kyushu-u.ac.jp)1 and Tatsuya Ide2, 1Kyushu Univ., Fukuoka, Japan, 2Forestry and Forest Products Research Institute, Tsukuba, Japan

4:30 **4245** Insight on evolution of gall induction from species of Lepidoptera and Diptera that appear to evade host-plant defenses similarly by altering phytohormone levels. **John Tooker** (tooker@psu.edu), Pennsylvania State Univ., University Park, PA

4:45 **4246** Host relations of gall-inducing Cynipoidea. **Fredrik Ronquist** (fredrik.ronquist@nrm.se), Swedish Museum of Natural History, Stockholm, Sweden

**Symposium: Monitoring and Forecasting of Migratory Insect Movements**

***Room W232 A (Convention Center)***

**Moderators and Organizers:** Haikou Wang1 and Baoping Zhai2, 1Australian Plague Locust Commission, Canberra, Australia, 2Nanjing Agricultural Univ., Nanjing, China

1:30 **4247** Forecasting field outbreaks of pests using suction-traps. **Chris Shortall** (chris.shortall@rothamsted. ac.uk)1, Sam Cook1, Alice Mauchline2, Julian Park2, and James Bell1, 1Rothamsted Research, Harpenden, United Kingdom, 2Univ. of Reading, Reading, United Kingdom

2:00 **4248** Ecology and management of migratory *Helicoverpa punctigera* in Australia. **Alice Del Socorro** (adelsoc2@une.edu.au), Peter Gregg, and Kris Le Mottee, Univ. of New England, Armidale, Australia

2:15 **4249** Long term changes in host plants of *Helicoverpa punctigera* in inland Australia: Effects on migration patterns. **Kris Le Mottee** (krislemottee@gmail.com), Peter Gregg, and Alice Del Socorro, Univ. of New England, Armidale, Australia

2:30 **4250** The migration potential of the new maize pest *Athetis lepigone*. **Jianrong Huang** (hjr130705@126.com)1, Xiaowei Fu2, Hongqiang Feng1, and Guoping Li1, 1Henan Academy of Agricultural Sciences, Zhengzhou, China, 2Chinese Academy of Agricultural Sciences, Beijing, China

2:45 **4251** Wind-related orientation patterns in migratory insects in Australia. **Zhenhua Hao** (zhenhua.hao@ student.adfa.edu.au), Univ. of New South Wales, Canberra, Australia

**3:00 BREAK**

3:15 **4252** How many nights do rice leaf roller moths fly? **Gao Hu** (huago@njau.edu.cn), Fan Yang, Fengying Wang, and Baoping Zhai, Nanjing Agricultural Univ., Nanjing, China

3:30 **4253** Dispersion of the common cutworm, *Spodoptera litura,* observed in western Japan with a VLR-type entomological radar and a pheromone trap. **Akira Otuka** (aotuka@affrc.go.jp) and Masaya Matsumura, NARO Kyushu Okinawa Agricultural Research Center, Kumamoto, Japan

4:00 **4254** New techniques for monitoring agricultural pests in China. **Hongqiang Feng** (fenghongqiang@msn. com)1, Juan Zen2, Qing Yao3, Hongbo Qiao4, and Jianrong Huang1, 1Henan Academy of Agricultural Sciences, Zhengzhou, China, 2National Agro-Technical Extension and Service Centre, Beijing, China, 3Zhejiang Sci-Tech Univ., Hangzhou, China, 4Henan Agriculture Univ., Zhengzhou, China

**4255** Do spur-throated locusts, *Austracris guttulosa* (Walker), return to the tropics for winter? **Haikou Wang** (haikou.wang@agriculture.gov.au)1 and V. Alistair Drake2, 1Australian Plague Locust Commission, Canberra, Australia, 2Univ. of New South Wales, Canberra, Australia

4:30 **4256** Desert locust forecasting: Art or science? **Keith Cressman** (keith.cressman@fao.org), Food and Agriculture Organization of the United Nations, Rome, Italy

**Symposium: Biotechnologically-Based Insect Control Strategies**

***Room W230 D (Convention Center)***

**Moderators and Organizers:** Angharad M. R. Gatehouse1 and Gongyin Ye2, 1Newcastle Univ., Newcastle upon Tyne, United Kingdom, 2Zhejiang Univ., Hangzhou, China

1:30 **4257** Novel transgenes for plant resistance to aphids from plant virus-aphid vector molecular interactions. **Bryony Bonning** (bbonning@iastate.edu), Iowa State Univ., Ames, IA

2:00 **4258** Discovery of novel strains and genes from *Bacillus thuringiensis* against sucking insects.  
**Jie Zhang** (jzhang@ippcaas.cn), Chinese Academy of Agricultural Sciences, Beijing, China

2:15 **4259** Transgenic tobacco expressing a viral cystatin gene, CpBV-CST1, exhibits insect resistance. **Yonggyun Kim** (hosanna@andong.ac.kr) and Eunseong Kim, Andong National Univ., Andong, South Korea

2:30 **4260** Functions of parasitoid venom proteins/ peptides and their potential for pest control.  
**Gongyin Ye** (chu@zju.edu.cn)1, Qi Fang1, Zhichao Yan1, Lei Wang2, and Yu Zhu1, 1Zhejiang Univ., Hangzhou, China, 2Anhui Agricultural Univ., Hefei, China

2:45 **4261** Novel control strategies based on manipulation and exploitation of insect antagonistic associations. **Silvia Caccia** (silvia.caccia@unina.it), Ilaria Di Lelio, and Francesco Pennacchio, Univ. of Napoli Federico II, Napoli, Italy

**3:00 BREAK**

3:15 **4262** Role of host translation-inhibitory factor in molecular interaction between host and parasitoid. **Kaijun Luo** (kaijun\_luo@ynu.edu.cn), Ming Li, Jiansheng Hu, and Yang Yang, Yunnan Univ., Kunming, China

3:30 **4263** Glycoprotein hemomucin protects embryos of polyembryonic parasitoid *Macrocentrus cingulum* to evade the encapsulation of host hemocytes. **Jian Hu** (lsshj@mail.sysu.edu.cn)1, Qiuyun Xu1, Shengfeng Hu1, Xiao-Qiang Yu2, Zhikun Liang1, and Wenqing Zhang1, 1Sun Yat-sen Univ., Guangzhou, China, 2Univ. of Missouri, Kansas City, MO

3:45 **4264** Natural insecticides from spider venom  
for the control of crop pests and disease vectors. **Glenn F. King** (glenn.king@imb.uq.edu.au), Univ. of Queensland, Brisbane, Australia

4:15 **4265** Fusion protein-based biopesticides.  
**John Gatehouse** (j.a.gatehouse@dur.ac.uk) and  
Elaine Fitches, Durham Univ., Durham, United Kingdom

4:30 **4266** RNAi-based biopesticides. **Guy Smagghe** (guy.smagghe@ugent.be), Ghent Univ., Ghent, Belgium

4:45 **4267** RNAi-mediated knockdown of the voltage- gated sodium ion channel (paralytic A) causes mortality in *Tribolium castaneum*. **Martin Edwards** (martin. edwards@newcastle.ac.uk)1, Hesham Abd El Halim2, and Angharad M. R. Gatehouse1, 1Newcastle Univ., Newcastle upon Tyne, United Kingdom, 2Benha Univ., Benha, Egypt

5:00 **4268** Screening new specific inhibitors using heterologous expressed honey bee ion channels. **Matthieu Rousset** (matthieu.rousset@crbm.cnrs.fr), Thierry Cens, and Pierre Charnet, National Center for Scientific Research, Montpellier, France

**Symposium: Key Challenges with Bt Crops in Latin America**

***Room W231 B (Convention Center)***

**Moderators and Organizers:** Ana Vélez1, Amit Sethi2, and Analiza P. Alves2, 1Univ. of Nebraska, Lincoln, NE, 2DuPont Pioneer, Johnston, IA

1:30 **4269** Challenges for IPM and IRM in intensive cropping systems in Brazil. **Silvana de Paula-Moraes** (silvana.moraes@embrapa.br) and Alexandre Specht, Embrapa Cerrados, Planaltina, Brazil

1:45 **4270** Situation and perspectives of insect resistance management (IRM) in Bt crops in Argentina. **Maria Murúa** (gmurua@eeaoc.org.ar), Maria Garcia Degano,  
Augusto Casmuz, Sofia Fogliata, María Herrero, Alejandro Vera, Eduardo Willink, and Gerardo Gastamiza, National Council for Scientific and Technical Research, Tucumán, Argentina

2:00 **4271** Socio-economic barriers to the durable deployment of Bt crops: Can they be knocked down? **Terrance Hurley** (tmh@umn.edu), Univ. of Minnesota, St. Paul, MN

2:15 **4272** Characterizing resistance to Bt corn in fall armyworm strains from Brazil. **Eliseu Pereira** (eliseu.pereira@ufv.br)1, Oscar Santos-Amaya1, Natália Leite1, Fernanda Feitas1, Simone Mendes2, and Analiza P. Alves3, 1Federal Univ. of Viçosa, Viçosa, Brazil, 2Embrapa Maize and Sorghum, Sete Lagoas, Brazil, 3DuPont Pioneer, Johnston, IA

2:30 **4273** Field adaptation of the fall armyworm to xenobiotics: Risk for corn production. **David Mota-Sanchez** (motasanc@msu.edu)1, Rebeca Gutierrez1, and  
Carlos A. Blanco2, 1Michigan State Univ., East Lansing, MI, 2USDA - APHIS, Riverdale, MD

2:45 **4274** Modeling the evolution of resistance to Bt maize in *Spodoptera frugiperda* in Brazil. **David Onstad** (david.onstad@pioneer.com), Zaiqi Pan, J. Lindsey Flexner, and Philip Crain, DuPont, Wilmington, DE

**3:00 BREAK**

3:15 **4275** Bioecological aspects of *Spodoptera frugiperda*: Current knowledge and future needs to support IPM. **Odair Aparecido Fernandes** (oafernandes@ fcav.unesp.br), São Paulo State Univ., Jaboticabal, Brazil

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3:30 **4276** IRM strategy for Intacta RR2 PRO in Brazil. **Samuel Martinelli** (samuel.martinelli@monsanto.com)1, Patrick Dourado2, Renato A. de Carvalho2, and  
Graham P. Head1, 1Monsanto Company, St. Louis, MO, 2Monsanto do Brasil, Ltda., São Paulo, Brazil

3:45 **4277** The fall armyworm (*Spodoptera frugiperda*): The greatest challenge in Latin America. **Carlos A. Blanco** (carlos.a.blanco@aphis.usda.gov)1, Willy Chiaravalle2, Marco Dalla-Rizza3, Juilano Farias4, Maria Garcia Degano5, Gerardo Gastamiza5, Maria Murúa5, Celso Omoto4,

Jairo Rodriguez-Chalarca6, David Mota-Sanchez7,  
J. Concepcion Rodriguez8, Henry Teran Santofimio9, Antonio Terán-Vargas10, Sandra Valencia6, and  
Eduardo Willink5, 1USDA - APHIS, Riverdale, MD,  
2Ento Agro, Carmelo, Uruguay, 3National Institute of Agricultural Research, Canelones, Uruguay, 4Univ.  
of São Paulo, Piracicaba, Brazil, 5National Council of Scientific and Technical Research, Tucumán, Argentina, 6International Center for Tropical Agriculture, Palmira, Colombia, 7Michigan State Univ., East Lansing, MI, 8Graduate College, Montecillo, Mexico, 9DuPont Pioneer, Salinas, PR, 10INIFAP, Cuauhtemoc, Mexico

4:00 **4278** Best management practices for sustaining the durability of MIR162 in Latin America. **Anthony D. Burd** (tony.burd@syngenta.com)1 and Julio Fatoretto2, 1Syngenta Plant Protection, Greensboro, NC, 2Syngenta Crop Protection, Ltda., São Paulo, Brazil

**Symposium: Aquatic Entomology Around the World**

***Room W240 D (Convention Center)***

**Moderators and Organizers:** Kayla I. Perry1 and Kyndall Dye2, 1The Ohio State Univ., Wooster, OH, 2Univ. of Kentucky, Lexington, KY

1:30 **4279** Bt maize and streams: Risk of exposure and hazard to aquatic insects. **William O. Lamp** (lamp@ umd.edu), Cerruti Hooks, Qin Wang, and Galen Dively, Univ. of Maryland, College Park, MD

1:45 **4280** Distribution and potential effects of water beetles in lakes recovering from acidification. **Yves G. Alarie** (yalarie@laurentian.ca)1 and Shelley E. Arnott2, 1Laurentian Univ., Sudbury, ON, Canada, 2Queen’s Univ., Kingston, ON, Canada

2:00 **4281** The living stream: A functional approach. **Richard Merritt** (merrittr@msu.edu)1,

Kenneth W. Cummins2, and Mollie D. McIntosh3, 1Michigan State Univ., East Lansing, MI, 2Humboldt State Univ., Arcata, CA, 3Xavier Univ., Cincinnati, OH

2:30 **4282** Beyond pins and vials: Gigpixel specimens annotated for reference and teaching purposes.  
**Andrea Kautz** (kautza@carnegiemnh.org)1, Marti Louw2, John Wenzel1, and John C. Morse3, 1Carnegie Museum of Natural History, Rector, PA, 2Center for Learning in Out-of-School Environments, Pittsburgh, PA, 3Clemson Univ., Clemson, SC

2:45 **4283** Diversity and phenology of aquatic beetles in three localities of Tlaxcala state, central Mexico. **Magali Luna-Luna** (magui\_ll89@hotmail.com)1,2 and Atilano Contreras-Ramos2, 1Autonomous Univ. of Tlaxcala, Tlaxcala, Mexico, 2National Autonomus Univ. of México, Mexico City, Mexico

**3:00 BREAK**

3:15 **4284** Legacy effects of emerald ash borer (*Agrilus planipennis*) on stream ecosystems. **Courtney Larson** (larso126@msu.edu), Jennifer L. Pechal,

Deborah G. McCullough, and M. Eric Benbow, Michigan State Univ., East Lansing, MI

3:30 **4285** Presentation withdrawn

**Symposium: Connecting with the World’s Best Talent: Attracting and Retaining Diverse Entomologists**

***Room W340 A (Convention Center)***

**Moderators and Organizers:** Bill Hendrix1 and Gail Kampmeier2, 1Dow AgroSciences, Indianapolis, IN, 2Illinois Natural History Survey (Ret.), Champaign, IL

1:30 **Reception**

2:00 **4286** Data-driven decisions: Use of a demographic model to optimize recruiting and retention efforts to enhance diversity in the Entomological Society of America. **Robert N. Wiedenmann** (rwieden@uark.edu)1, S. Raghu2, Debi Sutton3, and Katherine Matthews3, 1Univ. of Arkansas, Fayetteville, AR, 2CSIRO, Brisbane, QLD, Australia, 3Entomological Society of America, Annapolis, MD

2:15 **4287** Women as bellwethers of diversity in entomology. **Gail Kampmeier** (gkamp@illinois.edu), Illinois Natural History Survey (Ret.), Champaign, IL

2:30 **4288** On discovery, comradery, and disability in entomology. **Richard Mankin** (richard.mankin@ars. usda.gov), USDA - ARS, Gainesville, FL

2:45 **4289** A look at the minority experience in entomology. **Michelle Samuel-Foo** (mfoo@ufl.edu), Univ. of Florida, Gainesville, FL

**3:00 BREAK**

3:15 **4290** Chasing rainbows with a net: Entomologists breaking LGBT barriers. **Bill Hendrix** (wmhendrix@ dow.com), Dow AgroSciences, Indianapolis, IN

3:30 **4291** Inclusiveness: Planting, cultivating, and harvesting the insights of a multi-national team. **Scott Hutchins** (shhutchins@dow.com), Dow AgroSciences, Indianapolis, IN

3:45 **4292** Cultural shock: Tales of an expat entomologist. **Jessica Gillung** (jpgillung@ucdavis.edu), Univ. of California, Davis, CA

4:00 **4293** Attraction of young diverse communities to entomology. **Jessica Hartshorn** (jahartsho@uark.edu)1 and Molly Darr2, 1Univ. of Arkansas, Fayetteville, AR, 2Virginia Polytechnic Institute and State Univ., Blacksburg, VA

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4:15 **4294** Leading to foster diversity. **Michelle S. Smith** (mssmith@dow.com), Dow AgroSciences, Indianapolis, IN

4:30 **4295** The Entomological Society of America Diversity and Inclusion Committee – working to engage more diverse entomologists. **Vernard Lewis** (urbanpests@berkeley.edu), Univ. of California, Richmond, CA

4:45 The importance of diversity and inclusion in the sciences. **Wanda Ward** (wanda\_e\_ward@ostp.eop.gov), White House, Washington, DC

5:00 **Panel Discussion**

**Symposium: Tales from the Understory: Unraveling Secrets behind Tropical Butterfly Communication, Behavior, Wing Patterns, and Diversity**

***West Hall F3 (WF3) (Convention Center)***

**Moderators and Organizers:** Susan Finkbeiner1 and  
Adrea Susan Gonzalez-Karlsson2, 1Boston Univ., Boston, MA, 2Univ. of California, Los Angeles, CA

1:30 **4296** Variations in toxin concentrations within *Heliconius* butterfly communities: Evolutionary causes and consequences. Monica Arias,  
Aimilia Meichanetzoglou, Marianne Elias, Bastien Nay, and **Violaine Llaurens** (llaurens@mnhn.fr), National Museum of Natural History, Paris, France

1:45 **4297** Wing patterns and tropical butterfly community diversity. **Keith R. Willmott** (kwillmott@flmnh.ufl.edu), Univ. of Florida, Gainesville, FL

2:00 **4298** Fluorescence complements UV as a visual signal for butterflies but not for predators.  
**Susan D. Finkbeiner** (sfinkbei@bu.edu), Boston Univ., Boston, MA

2:15 **4299** Color vision in the butterfly *Heliconius erato*: Genes and physiology. **Adriana D. Briscoe** (abriscoe@uci.edu), Univ. of California, Irvine, CA

2:30 **4300** Gender as an evolutionary battleground: The remarkable dynamics of sex ratio in Australian *Eurema* butterflies. **Darrell Kemp** (darrell.kemp@mq.edu.au)1 and Nina Wedell2, 1Macquarie Univ., Sydney, Australia, 2Univ. of Exeter, Cornwall, United Kingdom

2:45 **4301** Signaling strategies and mimetic fidelity in ithomiine butterflies. **Adrea Susan Gonzalez-Karlsson** (adrea@ucla.edu), Univ. of California, Los Angeles, CA

* **SD4302**Presentation withdrawn
* **SD4303**Presentation withdrawn
* **SD4304**Presentation withdrawn
* **SD4305**Interactions in ithomiine aggregations by wing pattern, species identity, and gender. **Talavai Denipah-Cook** (tldenipahcook@fortlewis.edu)1 and Adrea Susan Gonzalez-Karlsson2, 1Ft. Lewis College, Durango, CO, 2Agricultural Research Organisation, Bet-Dagan, Israel

**3:00 BREAK AND POSTER SESSION**

3:30 **4306** Effect on the phenotype when hybridizing two subspecies of *Morpho helenor* (Nymphalidae) from Costa Rica. **Ricardo Murillo-Hiller** (murillohiller@gmail. com), Univ. of Costa Rica, San Jose, Costa Rica

3:45 **4307** Speciation and wing pattern diversification in tropical *Papilio* swallowtail butterflies. **Krushnamegh Kunte** (krushnamegh@ncbs.res.in), National Center for Biological Sciences, Bangalore, India

4:00 **4308** Multiple sources of reproductive isolation in *Heliconius* butterflies. Chris Jiggins and **Richard Merrill** (r.merrill@zoo.cam.ac.uk), Univ. of Cambridge, Cambridge, United Kingdom

4:15 **4309** Signalling escaping ability to predators: The evidence from Neotropical butterflies. **Carlos Pinheiro** (cegp@unb.br), Univ. of Brasília, Brasília, Brazil

4:30 **4310** Multiple signal components in mimetic ithomiine butterflies. **Ryan Hill** (rhill@pacific.edu), Univ. of the Pacific, Stockton, CA

4:45 **Panel Discussion**

**Symposium: Crop Domestication Effects on Plant-Insect Interactions: Patterns, Mechanisms, and Future Directions**

***Room W314 A (Convention Center)***

**Moderators and Organizers:** Katja Poveda and Susan Whitehead, Cornell Univ., Ithaca, NY

1:30 **4311**

2:00 **4312**  
interactions, and challenges for sustainable agriculture. **Yolanda Chen** (yolanda.chen@uvm.edu)1, Rieta Gols2, and Betty Benrey3, 1Univ. of Vermont, Burlington, VT, 2Wageningen Univ. and Research Centre, Wageningen, Netherlands, 3Univ. of Neuchâtel, Neuchâtel, Switzerland

2:15 **4313** Facilitation by domestication? Susceptibility  
of wild and cultivated blueberries to an invasive pest. **Cesar Rodriguez-Saona** (crodriguez@rce.rutgers.edu)1, Monica Giusti2, Fernando Sanchez-Pedraza3,

Yucheng Zhou2, Manuel Chacon-Fuentes4, and  
Betty Benrey5, 1Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, 2The Ohio State Univ., Columbus, OH, 3Antonio Narro Agrarian Autonomous Univ., Saltillo, Mexico, 4Univ. of La Frontera, Temuco, Chile, 5Univ. of Neuchâtel, Neuchâtel, Switzerland

2:30 **4314** Fine-tuning the “plant domestication-reduced defense” hypothesis: Co-evolved specialist versus generalist herbivores. **Mickaël Gaillard** (mickael. gaillard@unine.ch)1, Gaetan Glauser1, Christelle Robert2, and Ted Turlings1, 1Univ. of Neuchâtel, Neuchâtel, Switzerland, 2Univ. of Bern, Bern, Switzerland

2:45 **4315** Domestication of tomato has reduced attraction of herbivore natural enemies. **Juli Carrillo** (carrillj@ purdue.edu)1, Xiaohong Li2, Michael Garvey1, and  
Ian Kaplan1, 1Purdue Univ., West Lafayette, IN, 2Nanjing Agricultural Univ., Nanjing, China

**3:00 BREAK**

3:15 **4316** Effects of crop domestication on herbivore defense: A meta-analysis. **Susan Whitehead** (susan. whitehead@cornell.edu)1, Martin Turcotte2, and Katja Poveda1, 1Cornell Univ., Ithaca, NY, 2Institute for Integrative Biology, Zürich, Switzerland

Presentation withdrawn

Crop domestication, naturally-selected species



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3:30 **4317** Tissue specific effects of plant domestication on chemical defenses: The case of beans and *Brassica*. **Betty Benrey** (betty.benrey@unine.ch)1, J. Gwen Shlichta1, Maximilien Cuny1, Diana La Forgia1, and Gaylord Desurmont2, 1Univ. of Neuchâtel, Neuchâtel, Switzerland, 2European Biological Control Laboratory, Montpellier, France

3:45 **4318** Crop evolution and temporal dynamics of resistance to herbivory. **Bhupendra Chaudhary** (bhupendrach@gmail.com), Gautam Buddha Univ., Uttar Pradesh, India

4:00 **4319** Patterns in phytochemical changes from the domestication and diversification of crops. **Rachel Meyer** (rm181@nyu.edu), New York Univ., New York, NY

4:15 **4320** Maize domestication and spread drove the emergence of contemporary pests. **Ana Fontes-Puebla** (aurorafontes@gmail.com), Raul Medina, and  
Julio S. Bernal, Texas A&M Univ., College Station, TX

4:30 **4321** The impact of plant domestication on the performance and evolution of generalist herbivores. **Martin M. Turcotte** (mart.turcotte@gmail.com)1, Amaneet Lochab2, Nash Turley3, and Marc Johnson4, 1Institute for Integrative Biology, Zürich, Switzerland, 2Harvard Univ., Cambridge, MA, 3Michigan State Univ., East Lansing, MI, 4Univ. of Toronto, Mississauga, ON, Canada

4:45 **Discussion**  
**Symposium: Entomology in the Digital Age**

***Room W222 A (Convention Center)***

**Moderators and Organizers:** Barbara J. Sharanowski1, Ana Dal Molin1, Miles Zhang2, and Leanne Peixoto1, 1Univ. of Manitoba, Winnipeg, MB, Canada, 2Univ. of Central Florida, Orlando, FL

1:30 **4322** Get out of your exoskeleton: Using social media tools to research, teach, and communicate about entomology. Christopher Buddle and **Christopher Cloutier** (christopher.cloutier@mail.mcgill.ca),

McGill Univ., Sainte-Anne-de-Bellevue, QC, Canada

1:45 **4323** Insights from the Thematic Collections Networks and beyond on using digitized specimens for education and outreach. Talia Karim1, Misha Leong2, **Molly Phillips** (mphillips@flmnh.ufl.edu)3, Mari Roberts4, and

Katja C. Seltmann5, 1Univ. of Colorado, Boulder, CO, 2California Academy of Sciences, San Francisco, CA, 3Florida Museum of Natural History, Gainesville, FL, 4New York Botanical Garden, New York, NY, 5Univ. of California, Santa Barbara, CA

2:00 **4324** Technology and butterfly citizen science: It’s not just about getting data! **Karen Oberhauser** (oberh001@ umn.edu) and Eva Lewandowski, Univ. of Minnesota, St. Paul, MN

2:15 **4325** Taking entomological research from the swamps to the suburbs with social media. **Cameron Webb** (cameron.webb@swahs.health.nsw.gov.au), The Univ. of Sydney, Westmead, Australia

2:30 **4326** The SIWOTI syndrome: How to fight entomological misinformation. **Doug Yanega** (dyanega@ucr.edu), Univ. of California, Riverside, CA

2:45 **4327** What’s bugging you? Ask an entomologist! Science engagement through blogging. **Nancy Miorelli** (miorelln@uga.edu)1 and Joe Ballenger2, 1Univ. of Georgia, Athens, GA, 2Randstad, Florissant, MO

**3:00 BREAK**

3:15 **4328** Relax, I’m an entomologist: A Facebook page  
to discuss pertinent topics in entomology and science. **Jake E. Bova** (jbova86@vt.edu)1 and Rea Manderino2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2State Univ. of New York, Syracuse, NY

3:30 **4329** MyPestGuide – the ‘BEST’ suite of Biosecurity Engagement and Surveillance Tools. **Robert Emery** (rob.emery@agric.wa.gov.au)1, Laura Fagan1,  
Rosalie McCauley1, Darryl Hardie1, Nichole Hammond1, David Cook1, Dominie Wright1, David Cousins1,

Jeff Russell2, and Nicolas Garel3, 1Dept. of Agriculture and Food, South Perth, Australia, 2Plant Health Australia, Deakin, Australia, 3Ngperceptive, Cloverdale, Australia

3:45 **4330** Mobile-IPM: Real-time pest management in the digital age. Barbara J. Sharanowski1, **Ana Dal Molin** (adalmolin@tamu.edu)2, Amber Bass2, Douglas Cattani2, John Gavloski3, Robert H. Gulden2, Leah Irwin2,

Kale McKay2, Julia Leeson4, Scott Meers5, Owen Olfert4, Jennifer Otani6, Kelly Turkington7, Ross Weiss4, and Leanne Peixoto2, 1Univ. of Central Florida, Orlando, FL, 2Univ. of Manitoba, Winnipeg, MB, Canada, 3Manitoba Agriculture, Food and Rural Initiatives, Carman,

MB, Canada, 4Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, 5Alberta Agriculture and Rural Development, Brooks, AB, Canada, 6Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, 7Agriculture and Agri-Food Canada, Lacombe, AB, Canada

4:00 **4331** Biodiversity informatics skills for collections and research in the 21st century. **Deborah Paul** (dpaul@ fsu.edu)1,2, Pamela Soltis3, and Matthew Collins4, 1Integrated Digitized Biological Collections (iDigBio), Tallahassee, FL, 2Florida State Univ., Tallahassee, FL, 3Integrated Digitized Biological Collections (iDigBio), Gainesville, FL, 4Univ. of Florida, Gainesville, FL

4:15 **4332** Where do we come from, where do we go to?: 20 years of Open Access to biodiversity knowledge. **Donat Agosti** (agosti@plazi.org), Plazi GmbH, Bern, Switzerland

4:30 **Discussion**



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**Symposium: Next-Generation Ecology, Morphology, and Genomics: What can We Learn about the Evolution of Odonata?**

***Room W224 G (Convention Center)***

**Moderators and Organizers:** Maren Wellenreuther1,  
Sebastian Büsse2,3, and Seth Bybee2, 1Lund Univ., Lund, Sweden, 2Brigham Young Univ., Provo, UT, 3Univ. of Kiel, Kiel, Germany

1:30 **4333** Next-generation ecology: Odonata, a non-model system to bridge the gaps between genomes and environment. **Heike Hadrys** (heike.hadrys@yale.edu)1,2,3, 1Univ. of Veterinary Medicine, Hannover, Germany, 2American Museum of Natural History, New York, NY, 3Yale Univ., New Haven, CT

1:45 **4334** The social dimension: Agonistic behaviour in larvae. **Richard Rowe** (richard.rowe.dragonflies@gmail. com), The Australian National Univ., Canberra, Australia

2:00 **4335** Non-adaptive radiation in damselflies.  
**Maren Wellenreuther** (maren.wellenreuther@biol.lu.se) and Rosa Sánchez-Guillén, Lund Univ., Lund, Sweden

2:15 **4336** Temperature body control is associated to climatic and geographic variables but not wing pigmentation in two rubyspot damselflies (Odonata: Calopterygidae). **Alex Cordoba** (acordoba@ecologia. unam.mx) and Miguel Rivas, National Autonomus Univ. of México, Mexico City, Mexico

2:30 **4337** Dragonfly wings: A complex hierarchical composite system. **Esther Appel** (eappel@zoologie. uni-kiel.de)1, Lars Heepe1, Chung-Ping Lin2, and Stanislav N. Gorb4, 1Univ. of Kiel, Kiel, Germany, 2National Taiwan Normal Univ., Taipei, Taiwan, 3Christian Albrechts Univ., Kiel, Germany

2:45 **4338** The functional morphology of the thorax of Odonata — review and prospects. **Sebastian Büsse** (sbuesse@zoologie.uni-kiel.de) and Stanislav N. Gorb, Christian Albrechts Univ., Kiel, Germany

**3:00 BREAK**

3:15 **4339** New insights into the functional morphology of the claspers and copulatory organs of selected  
male damselflies. **Jana Willkommen** (jwillkommen@ zoologie.uni-kiel.de)1, Jan Michels1, and Stanislav N. Gorb2, 1Univ. of Kiel, Kiel, Germany, 2Christian Albrechts Univ., Kiel, Germany

3:30 **4340** A role for ecology in the evolution of color variation and sexual dimorphism in Hawaiian damselflies. **Idelle Cooper** (cooperia@jmu.edu), James Madison Univ., Harrisonburg, VA

3:45 **4341** Opsin and color evolution among the most molecularly complex terrestrial visual system (Odonata). **Seth Bybee** (seth.bybee@byu.edu), Anton Suvorov, and Camilla Sharkey, Brigham Young Univ., Provo, UT

4:00 **4342** Opsins have evolved under the permanent heterozygote model: Insights from phylotranscriptomics of Odonata. **Anton Suvorov** (antony.suvorov@gmail. com), Brigham Young Univ., Provo, UT

4:15 **4343** Phylogenetic and morphological structure of odonate communities along broad-scale environmental gradients. **Jean-Philippe Lessard** (jp.lessard@concordia. ca), Univ. of Concordia, Montréal, QC, Canada

4:30 **4344** Genetic architecture of the hybridization: Insights from damselflies. **Rosa Sanchez Guillen** (rguillenuvigo@hotmail.com)1, Bengt Hansson1, Jesús Chaves Ríos2, and Maren Wellenreuther1, 1Lund Univ., Lund, Sweden, 2National Autonomous Univ. of México, Mexico City, Mexico

4:45 **4345** Genomic adaptation along an environmental gradient in range-expanding damselflies (*Ischnura elegans*). **Rachael Dudaniec** (rachael.dudaniec@ mq.edu.au), Macquarie Univ., Sydney, Australia

5:00 **4346** Sex-biased gene expression in *Ischnura elegans* (Odonata: Zygoptera). **Bengt Hansson** (bengt.hansson@biol.lu.se), Pallavi Chauhan, and Maren Wellenreuther, Lund Univ., Lund, Sweden

**Symposium: Wood Borer-Fungus Alliances and Conflicts: The Frontier of Forest Entomology**

***Room W414 D (Convention Center)***

**Moderator and Organizer:** Jiri Hulcr, Univ. of Florida, Gainesville, FL

1:30 **4347** Bark beetle/tree pathogen interactions: More than meets the eye. Michael Wingfield1, Tuan Duong2, Stephen Taerum2, and **Wilhelm de Beer** (wilhelm. debeer@fabi.up.ac.za)2, 1Univ. of Pretoria, Pretoria, South Africa, 2Forestry and Agricultural Biotechnology Institute, Pretoria, South Africa

1:45 **4348** *Geosmithia*: Ubiquitous associates of subcortical insects. **Miroslav Kolarik** (miroslavkolarik@seznam.cz)1, Martin Kostovcik1, Jiri Hulcr2, and Robert Jankowiak3, 1Czech Academy of Sciences, Prague, Czech Republic, 2Univ. of Florida, Gainesville, FL, 3Agricultural Univ. of Cracow, Cracow, Poland

2:00 **4349** Top-down controls of the ambrosia beetle symbiont fidelity. **James Skelton** (skelto3@gmail.com) and Jiri Hulcr, Univ. of Florida, Gainesville, FL

2:15 **4350** The *Sirex* woodwasp: Complex interactions and evolving management paradigms of a globally invasive forest pest. **Bernard Slippers** (bernard.slippers@fabi. up.ac.za), Brett Hurley, and Michael Wingfield, Univ. of Pretoria, Pretoria, South Africa

2:30 **4351** Why does the Japanese oak wilt occur only in Japan? **Naoto Kamata** (kamatan@uf.a.u-tokyo.ac.jp), The Univ. of Tokyo, Furano, Japan

2:45 **4352** Time to stop studying them and start killing them? Tree-killing bark beetles and modern forest management. **Kier Klepzig** (kklepzig@fs.fed.us)1, Brian L. Strom2, and John T. Nowak1, 1USDA - Forest Service, Asheville, NC, 2USDA - Forest Service, Pineville, LA

**3:00 BREAK**

3:15 **4353** Know your farmer: Genome sequencing and phylogenomics of ambrosia beetle fungal cultivars. **Dan Vanderpool** (ddvanderpool@gmail.com) and John McCutcheon, Univ. of Montana, Missoula, MT

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3:30 **4354** Horizontal transfer of a phytopathogenic symbiont among native and exotic ambrosia beetles. **Daniel Carrillo** (dancar@ufl.edu)1, Randy Ploetz1, Julio Mantilla1, Jose Saucedo1, Octavio Menocal1, Joshua Konkol1, Rita E. Duncan1, Juliette Hubbard1, Luis Ibarra2, and Luisa Cruz1, 1Univ. of Florida, Homestead, FL, 2Institute of Ecology, Xalapa, Mexico

3:45 **4355** Thousand cankers disease research: The good, the bad, and the ugly. **Denita Hadziabdic** (purdash@gmail.com)1, Romina Gazis1, Emel Oren1, William Klingeman1, Lisa Vito1, Mark T. Windham1, Laura Poplawski1, Paris L. Lambdin1, Jerome F. Grant1, Gregory J. Wiggins1, Phillip Wadl1,2, Bonnie Ownley1, Margaret Staton1, John K. Moulton1, Paul Merten3,

Jay Pscheidt4, Whitney Cranshaw5, Massimo Faccoli6, Jennifer Juzwik7, Matthew Ginzel8, and Robert Trigiano1, 1Univ. of Tennessee, Knoxville, TN, 2USDA - ARS, Charleston, SC, 3USDA - Forest Service, Asheville, NC, 4Oregon State Univ., Corvallis, OR, 5Colorado State Univ., Fort Collins, CO, 6Dept. of Agronomy, Food, Natural Resources, Animals, and Environment, Legnaro, Italy, 7USDA - Forest Service, St. Paul, MN, 8Purdue Univ., West Lafayette, IN

4:00 **4356** The infection process of *Xyleborus glabratus*, vector of laurel wilt. **Marc Hughes** (mhughes741@ufl. edu)1, Xavier Martini2, Lukasz Stelinski2, and J  
ason A. Smith1, 1Univ. of Florida, Gainesville, FL, 2Univ. of Florida, Lake Alfred, FL

4:15 **4357** A tale of three *Euwallacea*: From a species to a complex. **Miriam Cooperband** (miriam.f.cooperband@ aphis.usda.gov)1, Richard Stouthamer2, Allard Cossé3, Daniel Carrillo4, and Tappey H. Jones5, 1USDA - APHIS, Buzzards Bay, MA, 2Univ. of California, Riverside, CA, 3USDA - ARS, Peoria, IL, 4Univ. of Florida, Homestead, FL, 5Virginia Military Institute, Lexington, VA

4:30 **4358** Transmission and function of the major fungal symbiont of the Asian longhorned beetle (*Anoplophora glabripennis*). Charles Mason, Alex Campbell, and  
**Kelli Hoover** (kxh25@psu.edu), Pennsylvania State Univ., University Park, PA

**Symposium: Optical Manipulation of Arthropod Pests and Beneficials**

***Room W331 D (Convention Center)***

**Moderators and Organizers:** David Ben-Yakir1 and Irene Vänninen2, 1Agricultural Research Organisation, Bet-Dagan, Israel, 2Natural Resources Institute, Helsinki, Finland

1:30 **4359** An entirely new kind of visual system in the honey bee. **Adrian Horridge** (horridge@netspeed.com. au), The Australian National Univ., Canberra, Australia

2:00 **4360** The molecular basis for light entrainment of insect clocks. **Ying Li** (yhli@ucdavis.edu), Univ. of California, Davis, CA

2:15 **4361** Induced resistance in plants against pests  
with specific photon fluxes generated using LEDs.  
**Ole Rechner** (rechner@ipp.uni-hannover.de)1, Sasa Wu2, Susanne Neugart2, Monica Schreiner2, and Hans-Michael Poehling1, 1Leibniz Univ., Hannover, Germany,  
2Leibniz Institute for Vegetable and Ornamental Crops, Großbeeren, Germany

2:30 **4362** LED-based screening of the color choice behavior of the greenhouse whitefly (*Trialeurodes vaporariorum*): Proof of blue-green opponency and trichromatic vision. **Niklas Stukenberg** (stukenberg@ ipp.uni-hannover.de) and Hans-Michael Poehling, Leibniz Univ., Hannover, Germany

2:45 **4363** Visual responses of the spotted wing drosophila and their use for monitoring tools and management tactics. **Brent Short** (brent.short@ars. usda.gov), USDA - ARS, Kearneysville, WV

**3:00 BREAK**

3:15 **4364** Pest control using the predatory bug  
*Orius sauteri* with lighting devices. **Masami Shimoda** (shimoda1@affrc.go.jp)1, Takumi Ogino1, Takuya Uehara1, Terumi Yamaguchi1, Takahisa Ichihashi2, Takahiro Suzuki2, and Yooichi Kainoh3, 1National Institute of Agrobiological Sciences, Tsukuba, Japan, 2SHIGRAY, Inc., Tokyo, Japan, 3Univ. of Tsukuba, Tsukuba, Japan

3:30 **4365** Spectral preference of the predatory bug *Orius sauteri*, a biological control agent against agricultural pests. **Takumi Ogino** (hirundorustica@affrc.go.jp)1,2, Takuya Uehara1, Terumi Yamaguchi1, Takahisa Ichihashi3, Takahiro Suzuki3, Yooichi Kainoh2, and Masami Shimoda1, 1National Institute of Agrobiological Sciences, Tsukuba, Japan, 2Univ. of Tsukuba, Tsukuba, Japan, 3SHIGRAY, Inc., Tokyo, Japan

3:45 **4366** Optical manipulations of whiteflies, aphids, and thrips. **David Ben-Yakir** (benyak@agri.gov.il), Agricultural Research Organisation, Bet-Dagan, Israel

4:00 **4367** Optical manipulation of arthropod pests in northern greenhouses — state of the art. **Nina Johansen** (nina.johansen@nibio.no)1, Irene Vanninen2, and Roselyne Labbe3, 1Norwegian Institute of Bioeconomy, Ås, Norway, 2Natural Resources Institute, Helsinki, Finland, 3Agriculture and Agri-Food Canada, Harrow, ON, Canada

**Symposium: Arthropod Population Genomics**

***Room W331 A (Convention Center)***

**Moderator and Organizer:** David G. Heckel, Max Planck Institute for Chemical Ecology, Jena, Germany

1:30 **4368** Molecular population genomics of chromosomal inversions in *Drosophila pseudoobscura.* **Stephen Richards** (stephenr@bcm.edu)1, Zachary Fuller2, Gwilym Haynes2, Shannon Duggan1, Dianhuiz Zhu1, and Stephen Schaeffer2, 1Baylor College of Medicine, Houston, TX, 2Pennsylvania State Univ., University Park, PA

1:45 **4369** Microevolutionary patterns in the generalist herbivore *Tetranychus urticae* as revealed by large-scale strain sequencing. **Richard Clark** (clark@biology.utah. edu)1, Andre Kurlovs1, Robert Greenhalgh1, Huyen Bui1, Joshua Steffen2, Wannes Dermauw3, Astrid Bryon3, Sabina Bajda3, and Thomas Van Leeuwen3, 1Univ. of Utah, Salt Lake City, UT, 2Colby-Sawyer College, New London, NH, 3Ghent Univ., Ghent, Belgium

2:00 **4370** The genetic and neural basis of female mate preference and species isolation in *Drosophila*. **Amanda Moehring** (amoehrin@uwo.ca), Western Univ., London, ON, Canada

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2:15 **4371** The genetics of monarch butterfly migration and warning coloration. **Shuai Zhan** (szhan@sibs. ac.cn)1, Wei Zhang2, Kristjan Niitepõld3, Jeremy Hsu4, Juan Fernández Haeger5, Myron Zalucki6, Sonia Altizer7, Jacobus C. De Roode8, Steven Reppert9, and

Marcus Kronforst2, 1Chinese Academy of Sciences, Shanghai, China, 2Univ. of Chicago, Chicago, IL, 3Univ. of Helsinki, Helsinki, Finland, 4Stanford Univ., Stanford, CA, 5Univ. of Córdoba, Córdoba, Spain, 6Univ. of Queensland, Brisbane, Australia, 7Univ. of Georgia, Athens, GA, 8Emory Univ., Atlanta, GA, 9Univ. of Massachusetts, Worcester, MA

2:30 **4372** The genomics of population divergence:  
Across the speciation boundary in *Rhagoletis* fruit flies. **Jeffrey Feder** (jfeder@nd.edu), Univ. of Notre Dame, South Bend, IN

2:45 **4373** Genome-wide introgression among distantly related *Heliconius* butterfly species. **Marcus Kronforst** (mkronforst@uchicago.edu)1, Wei Zhang1, Kanchon Dasmahapatra2, James Mallet3, and Gilson Moreira4, 1Univ. of Chicago, Chicago, IL, 2Univ. of York, York, United Kingdom, 3Harvard Univ., Cambridge, MA, 4Federal Univ. of Rio Grande, Porto Alegre, Brazil

**3:00 BREAK**

3:15 **4374** How the evolution of anopheline reproductive traits influenced malaria vectorial capacity. **Sara Mitchell** (snmitchell@google.com), Evdoxia Kakani, Adam South and Flaminia Catteruccia, Harvard School of Public Health, Boston, MA

3:30 **4375** *Helicoverpa armigera*: A global perspective on the species population genetics. **Tom Walsh** (tom. walsh@csiro.au)1, J. Arnemann2, Karl Gordon3,  
Alisha Anderson1, and Wee Tek Tay3, 1CSIRO, Acton, Australia, 2Federal Univ. of Santa Maria, Santa Maria, Brazil, 3CSIRO, Canberra, Australia

3:45 **4376** The evolution and genomic consequences  
of adaptive inversion polymorphism in butterflies. **Mathieu Joron** (mathieu.joron@cefe.cnrs.fr)1,2, Annabel Whibley3, Angeles de Cara3, Paul Jay4,  
Yann Le Poul3, Florence Prunier3, Barbara Huber3, and Violaine Llaurens3, 1National Center for Scientific Research, Montpellier, France, 2National Center for Scientific Research, Paris, France, 3National Museum of Natural History, Paris, France, 4Univ. Paul Valéry, Montpellier, France,

**Symposium: Global Research and Development of Insect Repellents**

***Room W224 C (Convention Center)***

**Moderator and Organizer:** Mustapha Debboun, Harris County Public Health & Environmental Services, Houston, TX

1:30 **4377** Biorepellents: Natural and biorational terpenes. Joel R. Coats1, **Edmund Norris** (ejnorris@iastate.edu)1, Lyric Bartholomay2, and James Klimavicz1, 1Iowa State Univ., Ames, IA, 2Univ. of Wisconsin, Madison, WI

1:45 **4378** Mosquito repellent research at Florida State University. **John Smith** (jsmith@pc.fsu.edu), Florida State Univ., Panama City, FL

2:00 **4379** Threshold linking insecticides and spatial repellents. **Kamlesh R. Chauhan** (kamal.chauhan@ars. usda.gov), USDA - ARS, Beltsville, MD

2:15 **4380** The taste of repellents in mosquitoes. **Joseph C. Dickens** (joseph.dickens@ars.usda.gov), USDA - ARS, Beltsville, MD

2:30 **4381** Spatial tsetse repellents from un-preferred hosts for enhancing livestock productivity and improving livelihoods. **Rajinder Saini** (rsaini@icipe. org), International Centre of Insect Physiology and Ecology, Nairobi, Kenya

2:45 **4382** Saltidin — broad spectrum and highly efficacious repellent. **G. K. (Ghona) Sangha** (sangha8@ roadrunner.com), Lanxess Corporation, Pittsburg, PA

**3:00 BREAK**

3:15 **4383** Long-lasting repellent formulations for effective insect pest management. Kavita Sharma1, Agenor Mafra-Neto1, Rodrigo Alves Silva2, Carmem Bernardi1, and **Jesse Saroli** (jessesaroli@iscatech.com)1, 1ISCA Technologies, Inc., Riverside, CA, 2Embrapa Rice and Beans, Santo António de Goiás, Brazil

3:30 **4384** The case for using topical repellents against malaria. **Anthony Kiszewski** (akiszewski@bentley.edu), Bentley Univ., Waltham, MA

3:45 **4385** Natural products as repellents: Bioassay systems for screening and evaluation against mosquitoes. **Abbas Ali** (aali@olemiss.edu), Mississippi State Univ., Mississippi State, MS

**Symposium: Eco-Immunology of Invertebrates**

***Room W224 D (Convention Center)***

**Moderators and Organizers:** Kenneth Wilson1, Fleur Ponton2, and Sheena Cotter3, 1Lancaster Univ., Lancaster, United Kingdom, 2The Univ. of Sydney, Sydney, Australia, 3Univ. of Lincoln, Lincoln, United Kingdom

1:30 **4386** Immune defense in context — the missing piece. **Paul Schmid-Hempel** (paul.schmid-hempel@env.ethz. ch), ETH Zürich, Zürich, Switzerland

2:00 **4387** Environmental determinants of resistance: Theoretical models and *Plodia interpunctella* vs PiGV. **Mike Boots** (m.boots@exeter.ac.uk), Univ. of California, Berkeley, CA

2:15 **4388** Host and symbiont jointly control gut microbiota during complete metamorphosis. **Paul Johnston** (paul.johnston@fu-berlin.de) and Jens Rolff, Freie Univ., Berlin, Germany

2:30 **4389** Stress responses reconfigure the immune system network, optimizing defense in an ever-changing world. **Shelley A. Adamo** (sadamo@dal.ca), Dalhousie Univ., Halifax, NS, Canada

2:45 **4390** Reproductive influences on the kinetics of infection in *Drosophila.* **Brian Lazzaro** (bplazzaro@ cornell.edu), Cornell Univ., Ithaca, NY

**3:00 BREAK**

3:15 **4391** Cellular immune function — new insights from bed bugs. **Michael T. Siva-Jothy** (m.siva-jothy@ sheffield.ac.uk), Univ. of Sheffield, Sheffield, United Kingdom

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3:30 **4392** Adaptive nutritional ecoimmunology: Evidence that fruit flies mitigate survival costs of infection-driven protein limitation by increasing the protein composition of their diet. **Nick Priest** (n.priest@bath.ac.uk), Univ. of Bath, Bath, United Kingdom

3:45 **4393** Resistance, tolerance, and fitness in *Drosophila melanogaster*. **Sophie Armitage** (sophie.armitage@ uni-muenster.de) and Megan Kutzer, Univ. of Münster, Münster, Germany

4:00 **4394** Diet and migration can compromise immunity. **Robert B. Srygley** (robert.srygley@ars.usda.gov), USDA - ARS, Sidney, MT

4:15 **4395** Climate change and the evolution of insect immunity. **Ken Fedorka** (kenneth.fedorka@ucf.edu), Univ. of Central Florida, Orlando, FL

4:30 **4396** Phytochemistry and immunity influence local and regional networks of host-parasite-pathogen interactions. **Lee A. Dyer** (nolaclimber@gmail.com), Nick Pardikes, Will Lumpkin, Lora Richards,

Matthew L. Forister, Tom Parchman, Christopher Jeffrey, and Angela Smilanich, Univ. of Nevada, Reno, NV

4:45 **4397** Immune priming might have evolved from infection by gram-positive bacterial pathogens in the mealworm beetle, *Tenebrio molitor*. **Yannick Moret** (yannick.moret@u-bourgogne.fr), Univ. of Bourgogne, Dijon, France

5:00 **4398** Host-parasite coevolution and immune memory in the red flour beetle, *Tribolium castaneum*. **Joachim Kurtz** (joachim.kurtz@uni-muenster.de), Univ. of Münster, Münster, Germany

5:15 **4399** Cross-generational immune priming in burying beetles is limited by the nature of the challenge. **Charlotte Miller** (cmiller08@qub.ac.uk), Queen’s Univ., Lincoln, United Kingdom

**Symposium: Insect Symbiosis and Immunity**

Room W330 A (Convention Center)

**Moderators and Organizers:** Bessem Chouaia1 and  
Abdelaziz Heddi2, 1Cornell Univ., Ithaca, NY, 2INRA, Villeurbanne, France

1:30 **4400** Obligate symbiont-generated vitamin B6 is critical to maintain proline homeostasis and fecundity in the tsetse fly (*Glossina morsitans*). **Geoffrey Attardo** (geoffrey.attardo@yale.edu), Yale Univ., New Haven, CT

1:45 **4401** Testing the balancing act of innate immunity, the microbiome, and the environment. **Robert Brucker** (brucker@rowland.harvard.edu), Rowland Institute at Harvard Univ., Cambridge, MA

2:00 **4402** Host regulation of its co-primary symbiont metabolisms. **Bessem Chouaia** (bc335@cornell.edu), Cornell Univ., Ithaca, NY

2:15 **4403** Honey bee bacterial symbionts: Probiotic effect against the causal agent of American foulbrood disease. **Elena Crotti** (elena.crotti@unimi.it)1,  
Elena Gonella2, Alberto Alma2, Daniele Daffonchio1,3, and Ameur Cherif4, 1Univ. of Milan, Milan, Italy, 2Univ. of Torino, Grugliasco, Italy, 3King Abdullah Univ. of Science and Technology, Thuwal, Saudi Arabia, 4Univ. of Manouba, Ariana, Tunisia

2:30 **4404** When your host shuts down — microbiota dynamics and host immunity during larval diapause in *Nasonia* wasp. **Jessica Dittmer** (dittmer@rowland. harvard.edu), Rowland Institute at Harvard Univ., Cambridge, MA

2:45 **4405** Symbiotic chimeras: Novel immunological properties of *Asaia* symbionts engineered to be covered by the *Wolbachia* surface protein. **Sara Epis** (sara.epis@unimi.it), Univ. of Milan, Milan, Italy

**3:00 BREAK**

3:15 **4406** How protective symbionts alter aphid immune responses. **Nicole Gerardo** (nicole.gerardo@emory. edu), Emory Univ., Atlanta, GA

3:30 **4407** Immune and cellular processes controlling endosymbiont dynamics in insects. **Abdelaziz Heddi** (abdelaziz.heddi@insa-lyon.fr), INRA, Villeurbanne, France

3:45 **4408** Fighting malaria with engineered symbiotic bacteria from vector mosquitoes. **Marcelo Jacobs-Lorena** (mlorena@jhsph.edu), Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

4:00 **4409** Immune interactions between the pea aphid and its primary and secondary symbionts.  
Marylène Poirié and **Jean-Luc Gatti** (jean-luc.gatti@ sophia.inra.fr), Univ. Nice Sophia Antipolis, Nice, France

4:15 **4410** Presentation withdrawn

4:30 **4411** Immunity, digestion, and resource defense in burying beetles: Host-microbiota collaboration?  
**Heiko Vogel** (hvogel@ice.mpg.de)1, Shantanu Shukla1, Chris Jacobs1, Martin Kaltenpoth1, Sandra Steiger2, David Heckel1, and Andreas Vilcinskas3,4, 1Max Planck Institute for Chemical Ecology, Jena, Germany, 2Univ. of Ulm, Ulm, Germany, 3Fraunhofer Institute for Molecular Biology and Applied Ecology, Gießen, Germany, 4Justus Liebig Univ., Gießen, Germany

**Symposium: Vector Immunology**

***Room W240 C (Convention Center)***

**Moderator and Organizer:** Petros Ligoxygakis, Univ. of Oxford, Oxford, United Kingdom

1:30 **4412** Novel and surprising players in innate immunity. **Sarah Short** (sshort7@jhu.edu), Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

1:45 **4413** Function of complement-like molecules in tick immune system. **Petr Kopacek** (kopajz@paru.cas.cz), Veronika Urbanova, Radek Sima, and Ondrej Hajdusek, Czech Academy of Sciences, České Budějovice, Czech Republic

2:15 **4414** *Rhodnius prolixus* immune responses following parasite infection and interactions with microbiota. **Daniele Castro** (didan.castro@gmail.com), Oswaldo Cruz Foundation, Rio de Janeiro, Brazil

2:30 **4415** How tsetse fly immunity controls the transmission of the trypanosome parasite. **Jan Van Den Abbeele** (jvdabbeele@itg.be), Institute of Tropical Medicine, Antwerp, Belgium

**3:00 BREAK**

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3:15 **4416** A *Drosophila-Herpetomonas* model to pinpoint the evolutionary conserved component of the dipteran insect-trypanosomid parasite interaction. **Petros Ligoxygakis** (petros.ligoxygakis@bioch.ox.ac. uk), Univ. of Oxford, Oxford, United Kingdom

3:30 **Discussion**

**Symposium: Genetically Modified Insecticidal Crops and Sustainable Pest Management: An Ecological Perspective of Their Compatibility in Sustainable Agriculture**

***Room W340 B (Convention Center)***

**Moderators and Organizers:** Salvatore Arpaia1, Jian Duan2, and Jonathan G. Lundgren3, 1ENEA, Rotondella, Italy, 2USDA - ARS, Newark, DE, 3USDA - ARS, Brookings, SD

1:30 **4417** Genetically modified crops and biological control: An ecological perspective of their compatibility in sustainable pest management. **Jian Duan** (jian.duan@ ars.usda.gov)1 and Jonathan G. Lundgren2, 1USDA - ARS, Newark, DE, 2USDA - ARS, Brookings, SD

1:45 **4418** Non-target organisms and genetically modified agro-ecosystems: Does the receiving environment matter? **Salvatore Arpaia** (salvatore.arpaia@enea.it), ENEA, Rotondella, Italy

2:00 **4419** Adoption of Bt crops and their impact on pest management in China. **Wangpeng Shi** (wpshi@cau.edu. cn), China Agricultural Univ., Beijing, China

2:15 **4420** Can Bt-maize be successfully integrated in the context of IPM in Europe? **Ludovit Cagan** (ludovit. cagan@gmail.com)1, Peter Bokor1, Tina D’Hertenfeld2, and Lars Petterson2, 1Slovak Agricultural Univ.,

Nitra, Slovakia, 2Lund Univ., Dalby, Sweden

2:30 **4421** Integrating insect resistant GM crops into IPM systems in Europe. **Heikki Hokkanen** (heikki.hokkanen@ helsinki.fi) and Ingeborg Menzler-Hokkanen, Univ. of Helsinki, Helsinki, Finland

2:45 **4422** *Diatraea saccharalis*: A target organism  
after fifteen years of GMO adoption in Argentina. **Daniela Tosto** (tosto.daniela@inta.gob.ar)1,  
Diego Zavallo1, Lucila Peluffo1, Cynthia Cagnotti1, Fernando Flores2, Noelia Ulrich1, Mariana Viscarret1, Silvia Lopez1, Silvana Sede3, and Esteban Hopp1, 1INTA, Hurlingham, Argentina, 2INTA, Marcos Juarez, Argentina, 3Instituto Darwinion, San Isidro, Argentina

**3:00 BREAK**

3:15 **4423** Sustainability of genetically modified crops in the context of pest management in Brazil. **Carmen Pires** (carmen.pires@embrapa.br),  
Edison Sujii, and Eliana Fontes, Emprapa Genetic Resources and Biotechnology, Brasília, Brazil

3:30 **4424** Farm-level socioeconomics of adopting GM crops in Europe. **Ingeborg Menzler-Hokkanen** (ingeborg.menzler-hokkanen@helsinki.fi), Univ. of Helsinki, Helsinki, Finland

3:45 **4425** Bt cotton adoption promotes biocontrol services in agricultural landscapes. **Nicolas Desneux** (nicolas.desneux@sophia.inra.fr)1, Yanhui Lu2, and

Kongming Wu2, 1INRA, Sophia Antipolis, France, 2Chinese Academy of Agricultural Sciences, Beijing, China

4:00 **4426** Ecological network analysis for selection of indicator species for insecticide risk assessment. **Kelton Welch** (keltodouglaswelch@gmail.com) and Jonathan G. Lundgren, USDA - ARS, Brookings, SD

4:15 **4427** Risks of pesticidal RNAi to honey bees. **Christina Mogren** (cmogren@gmail.com), Louisiana State University AgCenter, Baton Rouge, LA

4:30 **4428** Modelling effects of Bt crops on non-target organisms at the landscape level: Implications for risk management and monitoring. **Antoine Messéan** (antoine.messean@grignon.inra.fr)1, Emily Walker2, Melen Leclerc3, Jean-François Rey2, Remy Beaudoin4, and Samuel Soubeyrand2, 1INRA, Thiverval-Grignon, France, 2INRA, Avignon, France, 3INRA, Le Rheu, France, 4INERIS, Verneuil en Halatte, France

4:45 **4429** Effects of GM crops on pollinators and pollination services in agro-ecosystems.  
**Ingolf Steffan-Dewenter** (ngolf.steffan-dewenter@ uni-wuerzburg.de) and Stephan Härtel, Univ. of Würzburg, Würzburg, Germany

**Symposium: Globalizing Sustainable Pest Management in Agriculture**

***Room W224 A (Convention Center)***

**Moderator and Organizer:** Ismaila Aderolu1,2, 1Kwara State Univ., Ilorin, Nigeria, 2Entomological Society of Nigeria, Ilorin, Nigeria

1:30 **4430** Prospects of botanical lures and dusts in sustainable management of field arthropod pests on white yam in Nigeria. **Eunice Okoroafor** (okoroafor. eunice@gmail.com)1 and Isah Onu2, 1Univ. of Agriculture, Makurdi, Nigeria, 2Ahmadu Bello Univ., Zaria, Nigeria

1:45 **4431** Is organophosphate an answer to increasing insecticide resistance? Empirical evidence from the susceptibility status of *Anopheles coluzzi* mosquitoes in Lagos, Nigeria. **Adedayo Oduola** (oduola.ao@ unilorin.edu.ng), Adeolu Ande, and James Adelaja, Univ. of Ilorin, Ilorin, Nigeria

2:00 **4432** Identification of members of *A. gambiae* complex and their role in *Plasmodium falciparum* transmission in selected rural communities in Ilorin West Local Government, Kwara State. **Adeolu Taiwo Ande** (andeolu@yahoo.com), Adedayo Oduola, and

James Adelaja, Univ. of Ilorin, Ilorin, Nigeria

2:15 **4433** Influence of improved maize genotypes on the survival of maize weevil, *Sitophilus zeamais* (Motschulsky) (Coleoptera: Curculionidae), in storage. **Abdulrasak Musa** (akmusa2013@gmail.com), Univ. of Ilorin, Ilorin, Nigeria

2:30 **4434** Maximizing bee pollinator potentials for global environmental conservation, sustainability, and species diversity. **Ismaila Aderolu** (adeisma@yahoo.com)1, Ajao Adeyemi2, and Yusuf Oladimeji3, 1Entomological Society of Nigeria, Ilorin, Nigeria, 2Kwara State Univ., Ilorin, Nigeria, 3Ahmadu Bello Univ., Zaria, Nigeria

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* **SD4435**Efficacy of two diatomaceous earths as dressing and admixture to protect cowpea against *Callosobruchus maculatus* (Chrysomelidae) infestation. **Moses Ogundare** (ogundaremoses@gmail.com)1 and Robert Uddin2, 1Nigerian Stored Products Research Institute, Ilorin, Nigeria, 2Univ. of Ilorin, Ilorin, Nigeria
* **SD4436**Species composition and seasonal abundance of anthropophilic malaria mosquitoes in Ilorin, North-Central Nigeria. **James Adelaja** (kayadelaja@ gmail.com), Adeolu Ande, and Adedayo Oduola, Univ. of Ilorin, Ilorin, Nigeria
* **SD4437**Comparative assessment of the insecticidal potentials of two diatomaceous earth powders against *Sitophilus zeamais* Motschulsky (Coleoptera: Curculionidae) on sorghum grains. **Grace O. Otitodun** (funkeotis@yahoo. com)1 and Adeyinka Adesiyun2, 1Nigerian Stored Products Research Institute, Ilorin, Nigeria, 2Univ. of Ilorin, Kwara, Nigeria
* **SD4438**Determination of insect pests associated with yam (*Dioscorea* spp.) in Guinea savanna zone of Nigeria. **Shatu Asala** (shatuasala@yahoo.com), Univ. of Abuja, Abuja, Nigeria
* **SD4439**Susceptibility of the life stages of *Callosobruchus maculatus* (F.) in stored cowpea grains to fumigation with essential oil vapour of *Ocimum basilicum* leaves. Adebayo Ojumoola, **Adeyinka Adesiyun** (yinkussiyun@ gmai.com), and Lamidi Usman, Univ. of Ilorin, Ilorin, Nigeria
* **SD4440**Identifying the microbial population diversity in the gut of cashew stem girdler, *Analeptes trifasciata* Fabricius (Coleoptera: Cerambycidae). **Victor Oyedokun** (gokman.dee@gmail.com) and Dele Adeniyi, Cocoa Research Institute of Nigeria, Ibadan, Nigeria
* **SD4441**Species richness, diversity, and molecular characterization of termites at the University of Lagos, Akoka, Lagos, Nigeria. **Shakirudeen Balo**g**un** (shakbal2003@yahoo. com)1, Augustine Ohadwe1, Chuks Nwanade2, and Kayode Awolowo1, 1Univ. of Lagos, Lagos, Nigeria, 2Nigerian Stored Products Research Institute, Lagos, Nigeria
* **SD4442**Comparative effectiveness of pirimiphos-methyl and Spintor 0.125D dusts in the management of *Sitophilus zeamais* Motch (Coleoptera: Curculionidae) attacking stored maize grains. **Yinus Umar** (abumar2003@ yahoo.com)1 and Kehinde Kemabonta2, 1Bayero Univ., Kano, Nigeria, 2Univ. of Lagos, Lagos, Nigeria
* **SD4443**Food preference, growth, and damage of *Lasioderma serricorne* Fab. (Coleoptera: Anobiidae) on five packaged cereals in Nigeria. **Godwin Ihionu** (ghooziz@ yahoo.com)1, Kehinde Kemabonta2, and Patricia Pessu1, 1Nigerian Stored Products Research Institute, Lagos, Nigeria, 2Univ. of Lagos, Lagos, Nigeria
* **SD4444**Survey of the abundance of the larger grain borer, *Prostephanus truncatus* (Horn) (Coleoptera: Bostrichidae), in three south-western states of Nigeria. **Bukola Sadiku** (enitimi@gmail.com)1, Kehinde Kemabonta2, and Winifred Ayinke Makanjuola2, 1Lagos State Agricultural Development Authority, Lagos, Nigeria, 2Univ. of Lagos, Lagos, Nigeria

**SD4445** Estimates of genetic correlations of some important quantitative traits in cowpea, *Vigna unguiculata* (L.) Walp., under drought stress. **Amos Olajide** (olamosfolarin@yahoo.com)1 and Christopher Ilori2, 1Wesley Univ. of Science and Technology, Ondo, Nigeria, 2Univ. of Ibadan, Ibadan, Nigeria

**3:00 BREAK AND POSTER SESSION**

3:15 **4446** Diversity, nutritional characteristics, and associated pathogens of maggots (Diptera) with potential as feed supplement for livestock feed in Ibadan, Nigeria. **Adebayo Omoloye** (bayoomoloye@ yahoo.com) and Olumide Ojelabi, Univ. of Ibadan, Ibadan, Nigeria

3:45 **4447** SpinTorTM dust: A substitute to Gammalin-20 in the control of major insect pests of stored kolanuts and dried fish in Nigeria. **Winifred Ayinke Makanjuola** (ayinkemaks@yahoo.com)1, Kehinde Kemabonta1,

and Bukola Sadiku2, 1Univ. of Lagos, Lagos, Nigeria, 2Lagos State Agricultural Development Authority, Lagos, Nigeria

4:00 **4448** *Piper nigrum* (black pepper) and *Curcuma longa* (turmeric) extracts as insecticides in the  
control of *Anopheles gambiae*. **Kehinde Kemabonta** (kkemabonta@unilag.edu.ng)1, Kafayat Ajelara2, Olusola Yusuff1, and Babasola Adu3, 1Univ. of Lagos, Lagos, Nigeria, 2Entomological Society of Nigeria, Ojo, Nigeria, 3Ondo State Univ. of Science and Technology, Okitipupa, Nigeria

4:30 **4449** Indigenous pesticidal plants: Status and future prospects in pest management in Nigeria. **Akeem Oyerinde** (oyerindehyphae2002@gmail.com), Univ. of Abuja, Abuja, Nigeria

4:45 **4450** Assessment of honey bee health stressors and suggested management strategies for sustainable pollination, improved crop yield, and food security in North-Central Nigeria. **Ajao Adeyemi** (adeyemi.ajao@ kwasu.edu.ng)1 and Yusuf Oladimeji2, 1Kwara State Univ., Ilorin, Nigeria, 2Ahmadu Bello Univ., Zaria, Nigeria

5:00 **4451** Bioecology, pest management, and control of insect pests of cotton, cowpea, groundnut, and cereal crops using IPM and botanicals for sustainable agriculture. **Anna Malgwi** (annamalgwi@yahoo.co.uk), Federal Univ. of Technology, Yola, Nigeria

**Symposium: Greenhouse Insect Management Around the World: Common Problems and Solutions from Scientific Collaborations**

***Room W223 A (Convention Center)***

**Moderators and Organizers:** Luis A. Cañas1 and Erfan Vafaie2, 1The Ohio State Univ., Wooster, OH, 2Texas A&M AgriLife Extension Service, Overton, TX

1:30 **4452** Silicon supplementation and its utility in IPM. **Daniel Klittich** (dsklittich@ucdavis.edu) and  
Michael P. Parrella, Univ. of California, Davis, CA

1:45 **4453** Developing an IPM strategy for a new scale pest of crapemyrtles in Texas, *Eriococcus lagerstroemiae*. **Erfan Vafaie** (erfan.vafaie@ag.tamu.edu)1,  
Michael Merchant2, Mengmeng Gu3, Xiaoya Cai3,

John D. Hopkins4, and Jim Robbins4, 1Texas A&M Univ.,



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Overton, TX, 2Texas A&M AgriLife Extension Service, Dallas, TX, 3Texas A&M Univ., College Station, TX, 4Univ. of Arkansas, Little Rock, AR

2:00 **4454** Influence of fertilizer method on aphid population growth and biological control. **John P. Sanderson** (jps3@cornell.edu), Neil Mattson, Betsy Lamb, and Liza White, Cornell Univ., Ithaca, NY

2:15 **4455** Cashing in: The role of banker plants in greenhouse IPM. **Eric Rebek** (eric.rebek@okstate.edu), Oklahoma State Univ., Stillwater, OK

2:30 **4456** Rove beetle (*Dalotia coriaria*) predation on  
the fungus gnat, *Bradysia* sp. nr. *coprophila*.  
**Raymond Cloyd** (rcloyd@ksu.edu), Erik Echegaray, and Jim Nechols, Kansas State Univ., Manhattan, KS

2:45 **4457** System approaches to management of arthropod pests in ornamental crops. **Kevin Heinz** (kevin.heinz@ag.tamu.edu), Texas A&M Univ., College Station, TX

**3:00 BREAK**

3:15 **4458** Effects of various insecticides on common biological control agents used in greenhouses.  
**Nuris Acosta** (acosta.26@osu.edu)1, Luis A. Cañas1, and Nancy Rechcigl2, 1The Ohio State Univ., Wooster, OH, 2Syngenta Professional Products, Bradenton, FL

3:30 **4459** Improving the management of mite and other pests of greenhouses through enhanced natural enemies. **Phyllis G. Weintraub** (phyllisw@volcani. agri.gov.il)1 and Eric Palevsky2, 1Agricultural Research Organisation, Gilat, Israel, 2Agricultural Research Organisation, Ramat Yishay, Israel

3:45 **4460** Production of biological control agents in Honduras. **Rogelio Trabanino** (rtrabanino@zamorano. edu), Escuela Agricola Panamericana, Tegucigalpa, Honduras

4:00 **4461** Development of greenhouse biological control in Colombia. **Edison Torrado-León** (etorradol@unal. edu.co), National Univ. of Colombia, Cundinamarca, Colombia

4:15 **4462** New insights in side-effects of biological and chemical plant protection products on beneficial organisms in IPM greenhouses. **Guido Sterk** (guido. sterk@skynet.be), IPM Impact, Hasselt, Belgium

4:30 **4463** It started with thrips...and it didn’t end there: The success of biocontrol-based IPM in Ontario greenhouse floriculture. **Rose Buitenhuis** (rose. buitenhuis@vinelandresearch.com), Vineland Research and Innovation Centre, Vineland Station, ON, Canada

4:45 **4464** Profitability and sustainability of IPM program in a large scale multi-crop greenhouse. **Renato Zardo** (rzardo@greencirclegrowers.com), Green Circle Growers, Oberlin, OH

5:00 **4465** Management of arthropods during shipping:  
A collaboration among entomologists associated  
with ornamental plant production. **James A. Bethke** (jabethke@ucanr.edu)1, Lance Osborne2, Arnold Hara3, and Cristi L. Palmer4, 1Univ. of California Cooperative Extension, San Diego, CA, 2Univ. of Florida, Apopka, FL, 3Univ. of Hawai’i, Hilo, HI, 4Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

5:15 **4466** Use of biological control in greenhouse ornamentals. **Suzanne Wainwright** (buglady@ bugladyconsulting.com), Buglady Consulting, Slatingon, PA

**Symposium: IPM: The Lucrative Bridge Connecting the Ever-Emerging Knowledge Islands of Genetics and Ecology**

***Room W231 A (Convention Center)***

**Moderators and Organizers:** Xinzhi Ni1, Zhongren Lei2, and Kang-Lai He2, 1USDA - ARS, Tifton, GA, 2Chinese Academy of Agricultural Sciences, Beijing, China

*This symposium is generously sponsored by the USDA-ARS.*

1:30 **4467** BIK1, a *Botrytis*-induced kinase, modulates *Arabidopsis* resistance against aphids via PAD4. **Keyan Zhu-Salzman** (ksalzman@tamu.edu)1, Jiaxin Lei1, Scott A. Finlayson1, Ron Salzman1,2, and Libo Shan1, 1Texas A&M Univ., College Station, TX, 2Stoller Enterprises, Houston, TX

1:45 **4468** How do insect herbivores “spy” on their host plants? **Xianchun Li** (lxc@email.arizona.edu), Univ. of Arizona, Tucson, AZ

2:00 **4469** Interspecific competition and displacement between two invasive leafminer species in Hainan, China. **Zhongren Lei** (leizhr@sina.com)1, Haihong Wang1, Kaige Wang1, and Hao Yi2, 1Chinese Academy of Agricultural Sciences, Beijing, China, 2Shaanxi Normal Univ., Xi’an, China

2:15 **4470** Deducing the mechanism for elicitation of chlorotic foliar injury by the black pecan aphid.  
**Ted Cottrell** (ted.cottrell@ars.usda.gov), USDA - ARS, Byron, GA

2:30 **4471** Is stalk strength involved in maize resistance  
to Asian corn borer, *Ostrinia furnacalis* (Guenée) (Lepidoptera: Crambidae), injury? **Zhen-Ying Wang** (wangzy61@163.com)1, Jingfei Guo2, Kang-Lai He1, Richard Hellmich3, and Shaojiang Chen4, 1Chinese Academy of Agricultural Sciences, Beijing, China, 2Chinese Academy of Sciences, Beijing, China, 3USDA - ARS, Ames, IA, 4China Agricultural Univ., Beijing, China

2:45 **4472** Use of native genes to improve drought tolerance and insect resistance in corn. **Wenwei Xu** (we-xu@tamu.edu)1, Zhizhai Liu2, Xinzhi Ni3,  
Thomas Marek2, and Gary N. Odvody2, 1Texas A&M AgriLife Research, Lubbock, TX, 2Texas A&M AgriLife Extension Service, Lubbock, TX, 3USDA - ARS, Tifton, GA

**3:00 BREAK**

3:15 **4473** Milestones in developing sorghum hybrids for midge resistance. **Mukesh Dhillon** (mukeshdhillon@ rediffmail.com)1 and Hari Sharma2, 1Indian Agricultural Research Institute, New Dehli, India, 2Dr. YS Parmar Univ. of Horticulture & Forestry, Nauni, Solan, India

3:30 **4474** Developing new maize germplasm lines with insect and disease resistance and reduced aflatoxin contamination. **Xinzhi Ni** (xinzhi.ni@ars.usda.gov)1, Alisa Huffaker2, Eric A. Schmelz3, Wenwei Xu4, and W. Paul Williams5, 1USDA - ARS, Tifton, GA, 2Univ. of California, La Jolla, CA, 3USDA - ARS, Gainesville, FL,



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4Texas A&M AgriLife Research, Lubbock, TX, 5USDA - ARS, Mississippi State, MS

3:45 **4475** Temperature and climatic effects on Hessian fly infestation and plant resistance of winter wheat  
in the Southeastern United States. **G. David Buntin** (gbuntin@uga.edu)1, Prem Woli2, Brenda Ortiz2, and Kathy Flanders2, 1Univ. of Georgia, Griffin, GA, 2Auburn Univ., Auburn, AL

4:00 **4476** Nutritional role of host plants in adult feeding preference of two invasive wood borers. **Yigen Chen** (ygchen2007@gmail.com)1, Therese Poland2,  
Tom W. Coleman3, Michael Jones4, and Steven Seybold5, 1Univ. of California, Davis, CA, 2USDA - Forest Service, Lansing, MI, 3USDA - Forest Service, Albuquerque, NM, 4State Univ. of New York, Syracuse, NY, 5USDA - Forest Service, Davis, CA

4:15 **4477** Impact of transient high temperature during egg development on subsequent development, reproduction, and sex ratio in *Ostrinia furnacalis*. **Kang-Lai He** (klhe@ippcaas.cn)1, Yudong Quan2,3, Zhenying Wang2, and Hongyi Wei3, 1Chinese Academy of Agricultural Sciences, Beijing, China, 2Chinese Academy of Sciences, Beijing, China, 3Jiangxi Agricultural Univ., Nanchang, China

4:30 **4478** Orchard-based IPM standardization served as the fruit safety insurance of apple production. **Xin Li** (lixin57@hotmail.com)1, Juntao Qu2, Jiamin Gan1, Shandong Meng1, and Chunyou Li3, 1Northwest A&F Univ., Yangling, China, 2Fruit Industry Bureau of Luochuan County, Luochuan, China, 3Center of Zhouzhi County Agricultural Technique Extension, Zhouzhi, China

4:45 **4479** Candidate genes expressed in tolerant common wheat genotype XN98-10-35 with resistant to English grain aphid. **Kun Luo** (luok1985@nwafu.edu.cn) and Huiyan Zhao, Northwest A&F Univ., Yangling, China

**Symposium: An Invasive Planthopper Goes Global: Shedding Light on the Spotted Lanternfly (*Lycorma delicatula*)**

***Room W232 C (Convention Center)***

**Moderators and Organizers:** Gregory Setliff and Cathryn Pugh, Kutztown Univ., Kutztown, PA

1:30 **4480** Update on spotted lanternfly in Pennsylvania. **Sven-Erik Spichiger** (sspichiger@pa.gov), Pennsylvania Dept. of Agriculture, Harrisburg, PA

2:00 **4481** Using DNA sequence data to investigate the invasive spotted lanternfly’s origin, parasitoids, and microbial associates. **Julie Urban** (julie.urban@ naturalsciences.org)1, Julia Stevens1, and

Heather Farrington2, 1North Carolina Museum of Natural Sciences, Raleigh, NC, 2Cincinnati Museum Center, Cincinnati, OH

2:15 **4482** Host alternation and dispersal of *Lycorma delicatula* in South Korea. **Kwang-Ho Kim** (ecomanager@ korea.kr), National Academy of Agricultural Science, Suwon, South Korea

2:30 **4483** Potential impact and chemical control of spotted lanternfly in vineyards. **Erica Smyers** (ecs5026@psu.edu), Lindsay Erndwein, and Michael C. Saunders, Pennsylvania State Univ., University Park, PA

2:45 **4484** The comprehensive management of spotted lanternfly, *Lycorma delicatula* (Hemiptera: Fulgoridae), in Republic of Korea. **Myung-Kyu Song** (sinbaat@ korea.kr)1, Jae-sung Park1, Seok-Ho Lee1, Jae-Wung Lee1, Seung-Duck Kim1, Won-Ho Choi1, Eui-Yon Hong2, Gil-Hah Kim3, and Jong-Ho Park4, 1Chungbuk Agricultural Research and Extension Services, Okcheon, South Korea, 2Chungbuk Agricultural Research and Extension Services, ChungJu,  
South Korea, 3Chungbuk National Univ., Cheongju, South Korea, 4National Academy of Agricultural Science, Wanju, South Korea

**3:00 BREAK**

3:15 **4485** Strangers in strange lands: The spotted lanternfly and tales of other invasive planthoppers. **Stephen W. Wilson** (swwilson@ucmo.edu), Univ. of Central Missouri, Warrensburg, MO

3:30 **4486** A success story: State and federal agencies, universities, municipalities, and citizens working together. Dana Rhodes and **Alan Deppen** (adeppen@ pa.gov), Pennsylvania Dept. of Agriculture, Harrisburg, PA

3:45 **4487** Biology and natural enemies of the spotted lanternfly, *Lycorma delicatula,* in North America. **Houping Liu** (hliu@pa.gov), Pennsylvania Dept. of Conservation and Natural Resources, Harrisburg, PA

4:00 **4488** Evolution and sexual dimorphism of antennal sensory units of the new invasive lanternfly, *Lycorma delicatula* (Hemiptera: Fulgoromorpha: Fulgoridae). Rong-Rong Wang1, Jia-Jia Liu1,2, Xin-yu Li1,2,

Aiping Liang1, and **Thierry Bourgoin** (bourgoin@mnhn. fr)3, 1Chinese Academy of Sciences, Beijing, China, 2Beijing Forestry Univ., Beijing, China, 3National Museum of Natural History, Paris, France

**Symposium: Pink Hibiscus Mealybug (*Maconellicoccus hirsutus*) Invasions: What We Have Learned...What We Need to Re-Learn**

***Room W331 C (Convention Center)***

**Moderators and Organizers:** Juang Horng Chong1 and Mark Culik2, 1Clemson Univ., Florence, SC, 2Incaper, Linhares, Brazil

Presentation withdrawn

Seasonal phenology and natural enemies of *Maconellicoccus hirsutus* in Australia. **John A. Goolsby** (john.goolsby@ars.usda.gov), USDA - ARS, Edinburg, TX

2:00 **4491** Management of pink hibiscus mealybug (*Maconellicoccus hirsutus*) with emphasis on biological control by parasitoids. **Shaaban Abd-Rabou** (shaaban1959@yahoo.com), Ministry of Agriculture, Dokki, Egypt

2:15 **4492** Invasive mealybugs in Tunisia: *Maconellicoccus hirsutus* (Green), *Phenacoccus peruvianus* (Granara  
de Willink), and *Phenacoccus madeirensis* (Green).  
**M. Halima-Kamel** (kamonia\_tn@yahoo.fr) and L. Mdellel, Institute of Superior Agronomics, Chott Mariem, Tunisia

1:30 **4489** 1:45 **4490**

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2:30 **4493** Status of biological control of pink hibiscus 2:15 mealybug (*Maconellicoccus hirsutus*) in the Pacific  
Islands. **Gadi V. P. Reddy** (reddy@montana.edu)1 and Rangaswamy R. Muniappan2, 1Montana State Univ.,

**4504** Managing a weevil invader in south Florida: *Myllocerus undecimpustulatus undatus* Marshall. **Catharine M. Mannion** (cmannion@ufl.edu), Univ. of Florida, Homestead, FL

Conrad, MT, 2Virginia Polytechnic Institute and State Univ., Blacksburg, VA

2:45 **4494** Pink hibiscus mealybug in Hawaii: History and current status. **Arnold Hara** (arnold@hawaii.edu), Univ. of Hawai’i, Hilo, HI

**3:00 BREAK**

2:30 **4505** Alien invasive scolytines from old growth forest on the Osa Peninula, Costa Rica. **Jhunior Morillo** (morillojhunior@gmail.com) and Amy Berkov, City College of New York, New York, NY

2:45 **4506** Biology, chemical ecology, and sexual dimorphism of the Sri Lankan weevil, *Myllocerus undecimpustulatus undatus* Marshall (Coleoptera: Curculionidae). **Justin George** (justin.george@ars.usda. gov) and Stephen L. Lapointe, USDA - ARS, Ft. Pierce, FL

**BREAK**

3:15 **4507** Emergent and possible invasive pest species  
of weevils in Mexico. **Robert Jones** (rjones@uaq.mx)1, Carlos Illescas-Riquelme2, Víctor López-Martínez3, Néstor Bautista-Martínez2, and Charles W. O’Brien4, 1Autonomous Univ. of Querétaro, Santiago de Querétaro, Mexico, 2Graduate College, Montecillo, Mexico, 3Autonomous State Univ. of Morelos, Mexico, 4Univ. of Arizona, Tucson, AZ

3:15 **4495** Bugs without borders: Developing strategies  
to prevent the entrance and movement of invasive  
mealybugs in the greater Caribbean region.  
**Amy L. Roda** (amy.l.roda@aphis.usda.gov), USDA - **3:00** APHIS, Miami, FL

3:30 **4496** Management of pink hibiscus mealybug on ornamental plants in the southern United States. **Juang Horng Chong** (juanghc@clemson.edu), Clemson Univ., Florence, SC

3:45 **4497** The pink hibiscus mealybug in Mexico: IPM  
and the biological control program. **Héctor González- Hernández** (hgzzhdz@colpos.mx)1, Hugo Arredondo-  
Bernal2, and Zulema Calleja-Gómez3, 1Graduate College, 3:30 Montecillo, Mexico, 2Secretary of Agriculture, Livestock,

Rural Development, Fishing, and Food, Tecoman, Mexico, 3Jalisco State Committee of Plant Health, Guadalajara, Mexico

4:00 **4498** Pink hibiscus mealybug — how our regulatory  
response and understanding of PHM has changed over  
time. **Daniel Borchert** (daniel.m.borchert@aphis.usda. 3:45 gov), USDA - APHIS, Raleigh, NC

4:15 **4499** Invasive potential of PHM for Chile: A quarantine  
pest at the edge. **Valentina Jara Contreras** (vijara@  
uc.cl), Pontifical Catholic Univ., Santiago, Chile 4:00

4:30 **4500** Pink hibiscus mealybug (*Maconellicoccus hirsutus*) and other invasive insects in Brazil: Can classical biological control help save Neotropical biodiversity? **Mark Culik** (markculik3@yahoo.com)1, José Ventura2, and David Martins2, 1Incaper, Linhares, Brazil, 2Incaper, Vitória, Brazil

**Symposium: Potential Invasive Pest Weevil Species of the World**

***Room W240 A (Convention Center)***

**Moderators and Organizers:** Runzhi Zhang1, Muhammad Haseeb2, and Charles O’Brien3, 1Chinese Academy of Sciences, Beijing, China, 2Florida A&M Univ., Tallahassee, FL, 3Univ. of Arizona, Tucson, AZ

1:30 **4501** Weevils, prime invasive pest species! Why? **Charles O’Brien** (cobrien6@cox.net), Univ. of Arizona, Tucson, AZ

1:45 **4502** Potential invasive pest weevil species of  
the world: Cooperative network for taxonomists. **Runzhi Zhang** (zhangrz@ioz.ac.cn), Chinese Academy of Sciences, Beijing, China

2:00 **4503** Cowpea curculio, *Chalcodermus aeneus*, historical pest status, potential for spread, and current management. **David Riley** (dgr@uga.edu) and Alton N. Sparks, Jr., Univ. of Georgia, Tifton, GA

**4508** Colonization of invasive weevils with different reproductive modes. **Viviana Confalonieri** (bibilu@ege. fcen.uba.ar)1, Marcela Rodriguero1, Noelia Guzmán2, and Analía Lanteri3, 1Univ. of Buenos Aires, Buenos Aires, Argentina, 2Institute of Ecology, Genetics and Evolution (UBA-CONICET), Buenos Aires, Argentina, 3Univ. of

La Plata, La Plata, Argentina

**4509** Chinese weevils contributing to potential invasive weevil species of the world. **Zhiliang Wang** (zlwang@ioz.ac.cn) and Runzhi Zhang, Chinese Academy of Sciences, Beijing, China

**4510** Monitoring of activity patterns of early-instar *Rhynchophorus ferrugineus* (Olivier) and *R. cruentatus* (Fabricius) over multi-week periods: Implications for early detection of infestations. **Omotola Dosunmu** (toladosunmu@gmail.com)1, Johari Jalinas2,3, Berenice Agulló2,4, L. V. Lopez Llorca2,4, and

Richard Mankin5, 1Univ. of Florida, Gainesville, FL, 2Univ. of Alicante, San Vicente del Raspeig, Spain, 3Univ. Kebangsaan Malaysia, Bangi, Malaysia, 4Glen Biotech, Alicante, Spain, 5USDA - ARS, Gainesville, FL

4:15 **4511** A phylogenetic study delimiting the genus *Baris*. **Steve Davis** (sdavis@amnh.org), American Museum of Natural History, New York, NY

4:30 **4512** Potential geographic distributions of parthenogenetic broad-nosed weevils native to South America. **María Guadalupe del Rio** (guadalupedelrio@ yahoo.com)1, Noelia Guzmán2, Analía Lanteri3, and Viviana Confalonieri4, 1La Plata Museum, La Plata, Argentina, 2Institute of Ecology, Genetics and Evolution (UBA-CONICET), Buenos Aires, Argentina, 3Univ. of  
La Plata, La Plata, Argentina, 4Univ. of Buenos Aires, Buenos Aires, Argentina

4:45 **4513** Easily ignored pest weevils with potential invasive ability: Entimines in China (Coleoptera: Curculionoidea). **Li Ren** (renl@ioz.ac.cn) and  
Runzhi Zhang, Chinese Academy of Sciences, Beijing, China



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5:00 **4514** Potential invasive dryophthorines of the world — beyond the usual suspects. **Maria Lourdes Chamorro** (lourdes.chamorro@ars.usda.gov), USDA - ARS, Washington, DC

5:15 **4515** Potential invasive pest weevils from the Caribbean basin to the United States. **Muhammad Haseeb** (muhammad.haseeb@famu.edu), Florida A&M Univ., Tallahassee, FL

**Symposium: Anti-Tick Vaccine Development: Possibilities in the Post-Genomics Era**

***Room W224 F (Convention Center)***

**Moderators and Organizers:** Albert Mulenga1 and Itabajara Vaz2, 1Texas A&M Univ., College Station, TX, 2Federal Univ. of Rio Grande, Porto Alegre, Brazil

1:30 **4516** Presentation withdrawn

1:45 **4517** Tick vaccines: Current status and future directions. **Jose de la Fuente** (jose\_delafuente@yahoo. com)1,2, 1Oklahoma State Univ., Stillwater, OK, 2IREC, Ciudad Real, Spain

2:15 **4518** Identifying important molecular targets in *Amblyomma*-*Rickettsia* interaction and possibility of vaccine potential. **Khemraj Budachetri** (khem.bc@ eagles.usm.edu) and Shahid Karim, Univ. of Southern Mississippi, Hattiesburg, MS

2:30 **4519** Identification of immunomodulatory factors in *Ixodes persulcatus* Schulze, the vector for Lyme disease and relapsing fever in Japan. **Satoru Konnai** (konnai@vetmed.hokudai.ac.jp)1, Shiro Murata2, Itabajara Vaz3, and Kazuhiko Ohashi2, 1Hokkaido Univ., Sapporo, Japan, 2Hokkaido Univ., Hokkaido, Japan, 3Federal Univ. of Rio Grande, Porto Alegre, Brazil

2:45 **4520** Presentation withdrawn

**3:00 BREAK**

3:30 **4521** Research on development of anti-tick vaccine against the Chinese dominant tick *Rhipicephalus haemaphysaloides*. **Jinlin Zhou** (jinlinzhou@shvri. ac.cn), Shanghai Veterinary Research Institute, Shanghai, China

4:00 **4522** Prediction and design of protective recombinant peptides to prevent infestations by the cattle tick *Rhipicephalus microplus* (Acari: Ixodidae).  
**Rodrigo Rosario-Cruz** (rockdrig@yahoo.com.mx)1, Delia Domínguez-García1, Héctor Romero2,

Moisés Velázquez3, and Rodolfo Quintanilla4, 1Autonomous Univ. of Guerrero, Petaquillas, Mexico, 2National Autonomous Univ. of México, Mexico City, Mexico, 3Center of Research and Assistance in Technology and Design from the State of Jalisco, Guadalajara, Mexico, 4National Center of Disciplinary Research in Veterinary Parasitology, Jiutepec, Mexico

**Symposium: Diptera Systematics: Deciphering Evolutionary Relationships with Diverse and Novel Data**

***Room W230 A (Convention Center)***

**Moderators and Organizers:** Torsten Dikow1 and Thomas Pape2, 1Smithsonian Institution National Museum of Natural History, Washington, DC, 2Natural History Museum, Copenhagen, Denmark

1:30 **4523** Old sources of information, new characters: Thorax and wings adding solutions for the basal Diptera phylogeny. **Dalton Amorim** (dsamorim@usp.br)1 and Guilherme Ribeiro2, 1Univ. of São Paulo,

Ribeirão Preto, Brazil, 2Federal Univ. of ABC, Santo Andre, Brazil

1:45 **4524** Phylogenomics of fly-microorganism relationships in the Bibionomorpha. **Seunggwan Shin** (sshin4@memphis.edu), Keith Bayless, and  
Brian Wiegmann, North Carolina State Univ., Raleigh, NC

2:00 **4525** The transformation of head structures in dipteran larvae. **Katharina Schneeberg** (katharina. schneeberg@gmx.de)1, Stefan Löwe1, David Yeates2, Christine Mißbach3, Ewald Grosse-Wilde3, and

Rolf Beutel1, 1Friedrich Schiller Univ., Jena, Germany, 2CSIRO, Acton, Australia, 3Max Planck Institute for Chemical Ecology, Jena, Germany

2:15 **4526** Extraordinary diversity of Cretaceous Brachycera (Diptera) in Burmese amber. **David Grimaldi** (grimaldi@amnh.org), American Museum of Natural History, New York, NY

2:30 **4527** Reconstructing the phylogeny of the soldier flies (Diptera: Stratiomyidae). **Bryan Lessard** (bryan. lessard@csiro.au)1, Norman Woodley2, Martin Hauser3, and David Yeates1, 1CSIRO, Acton, Australia, 2USDA - ARS, Washington, DC, 3California Dept. of Food and Agriculture, Sacramento, CA

2:45 **4528** Inferring the relationships of early brachyceran lineages with phylogenomic and comprehensive morphological data. **David Yeates** (david.yeates@csiro. au)1, Karen Meusemann1, Katharina Schneeberg2,

Rolf Beutel2, and Bernhard Misof3, 1CSIRO, Acton, Australia, 2Friedrich Schiller Univ., Jena, Germany, 3Zoological Research Museum Alexander Koenig, Bonn, Germany

**3:00 BREAK**

3:15 **4529** Molecular phylogeny of asiloid flies based on target-enrichment methods. **Mauren Turcatel** (mauturcatel@gmail.com) and Torsten Dikow, Smithsonian Institution National Museum of Natural History, Washington, DC

3:30 **4530** Anchored hybrid enrichment of world Syrphidae: New technologies produce a highly- resolved phylogeny. **Andrew Young** (adyoung@gmail. com)1, Jeffrey Skevington1, Ximo Mengual2,

Gunilla Ståhls3, Menno Reemer4, Kurt Jordaens5,  
Scott Kelso1, Alan Lemmon6, Emily Lemmon6,  
Brian Wiegmann7, Martin Hauser8, Marc de Meyer5, and Bernhard Misof2, 1Agriculture and Agri-Food Canada,



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**FRIDAY**

**Friday, September 30 • AFTERNOON •**

Ottawa, ON, Canada, 2Zoological Research Museum Alexander Koenig, Bonn, Germany, 3Finnish Museum of Natural History, Helsinki, Finland, 4Naturalis Biodiversity Center, Leiden, Netherlands, 5Royal Museum for Central Africa, Tervuren, Belgium, 6Florida State Univ., Tallahassee, FL, 7North Carolina State Univ., Raleigh, NC, 8California Dept. of Food and Agriculture, Sacramento, CA

3:45 **4531** Unravelling the phylogeny of the lower Cyclorrhapha using morphology, Sanger sequencing, and anchored phylogenetic data. **Jeffrey Skevington** (jeffrey.skevington@agr.gc.ca)1, Jeffrey Cumming1, Bradley Sinclair2, Brian Wiegmann3, Scott Kelso1, John Moulton4, Brian Cassel3, Emily Lemmon5, and Alan Lemmon5, 1Agriculture and Agri-Food Canada, Ottawa, ON, Canada, 2Canadian Food Inspection Agency, Ottawa, ON, Canada, 3North Carolina State Univ., Raleigh, NC, 4Univ. of Tennessee, Knoxville, TN, 5Florida State Univ., Tallahassee, FL

4:00 **4532** Bot fly ancestry — a calyptrate conundrum. **Thomas Pape** (tpape@snm.ku.dk)1, Sujatha Kutty2, Dong Zhang3, Liping Yan3, Brian Wiegmann4, and Rudolf Meier2, 1Natural History Museum, Copenhagen, Denmark, 2National Univ. of Singapore, Singapore, Singapore, 3Beijing Forestry Univ., Beijing, China, 4North Carolina State Univ., Raleigh, NC

4:15 **4533** Rogue taxa identification and exclusion in  
the molecular phylogeny of the hyperdiverse genus *Sarcophaga* (Diptera: Sarcophagidae). **Eliana Buenaventura** (elianabuenaventura@gmail.com)1, Daniel Whitmore2, and Thomas Pape1, 1Natural History Museum, Copenhagen, Denmark, 2The Natural History Museum, London, United Kingdom

4:30 **4534** Phylogeny and diversification of world Tachinidae (Diptera). **John Stireman III** (john.stireman@ wright.edu)1, John Moulton2, Pierfilippo Cerretti3, James E. O’Hara4, Isaac Winkler5, and Jeremy Blaschke6, 1Wright State Univ., Dayton, OH, 2Univ. of Tennessee, Knoxville, TN, 3Univ. of Padova, Legnaro, Italy, 4Agriculture and Agri-Food Canada, Ottawa, ON, Canada, 5Cornell College, Mount Vernon, IA, 6Union Univ., Jackson, TN

4:45 **4535** The evolution of reproductive strategies  
in tachinid parasitoids (Diptera: Tachinidae). **Pierfilippo Cerretti** (pierfilippocerretti@yahoo.it)1, John Stireman III2, James E. O’Hara3, John Moulton4, Isaac Winkler5, and Jeremy Blaschke6, 1Univ. of Padova, Legnaro, Italy, 2Wright State Univ., Dayton, OH, 3Agriculture and Agri-Food Canada, Ottawa, ON, Canada, 4Univ. of Tennessee, Knoxville, TN, 5Cornell College, Mount Vernon, IA, 6Union Univ., Jackson, TN

5:00 **4536** From Malaise traps to phylogenetic diversity: Developing rapid biodiversity assessment techniques based on NGS. **Rudolf Meier** (meier@nus.edu.sg)1, Darren Yeo1, Wendy Wang1, Amrita Srivathsan1, and Patrick Grootaert2, 1National Univ. of Singapore, Singapore, Singapore, 2Royal Belgian Institute of Natural Sciences, Brussels, Belgium

5:15 **4537** Enhancing Diptera systematics: From single researcher to global specimen data network.  
**Torsten Dikow** (dikowt@si.edu), Smithsonian Institution National Museum of Natural History, Washington, DC

**Symposium: Evolution, Classification, and Biology of Cucujoid Beetles (Coleoptera: Cucujoidea)**

***Room W225 B (Convention Center)***

**Moderators and Organizers:** Adam Slipinski1, Richard A. B. Leschen2, and Joseph V. McHugh3, 1CSIRO, Canberra, Australia, 2Landcare Research, Auckland, New Zealand, 3Univ. of Georgia, Athens, GA

1:30 **4538** Phylogeny and classification of Cucujoidea and the recognition of a new superfamily Coccinelloidea (Coleoptera: Cucujiformia). James Robertson1,  
Adam Slipinski2, Matthew J. Moulton3, Floyd Shockley4, Jose Adriano Giorgi5, Nathan Lord3, Duane D. McKenna6, Wioletta Tomaszewska7, Juanita A. Forrester8,

Kelly Miller9, Michael F. Whiting3, and **Joseph V. McHugh** (mchugh.jv@gmail.com)10, 1Univ. of Arizona, Tucson, AZ, 2CSIRO, Canberra, Australia, 3Brigham Young Univ., Provo, UT, 4Smithsonian Institution National Museum of Natural History, Washington, DC, 5Federal Univ. of Pará, Altamira, Brazil, 6Univ. of Memphis, Memphis, TN, 7Polish Academy of Sciences, Warszawa, Poland, 8Chattahoochee Technical College, Canton, GA, 9Univ. of New Mexico, Albuquerque, NM, 10Univ. of Georgia, Athens, GA

2:00 **4539** Mesozoic cucujoid beetles from Northeastern China. **Hong Pang** (lsshpang@mail.sysu.edu.cn)1 and Adam Slipinski2, 1Sun Yat-sen Univ., Guangzhou, China, 2CSIRO, Canberra, Australia

2:15 **4540** Developing novel nuclear markers for beetle phylogenetics, tested at both inter-family and intra- family levels. Li-Heng Che1, Shao-Qian Zhang1, Yun Li1, Dan Liang1, Hong Pang1, Adam Slipinski2, and **Peng Zhang** (alarzhang@gmail.com)1, 1Sun Yat-sen Univ., Guangzhou, China, 2CSIRO, Canberra, Australia

2:30 **4541** Presentation withdrawn

2:45 **4542** From Rhizophagidae to Monotomidae: Bringing clarity to a misunderstood family of beetles. **Thomas McElrath** (tmcelrat@uga.edu) and  
Joseph V. McHugh, Univ. of Georgia, Athens, GA

**3:00 BREAK**

3:15 **4543** Update on the systematics and taxonomy of Phalacridae (Cucujoidea): Where are we now? **Matthew Gimmel** (phalacrid@gmail.com),  
Santa Barbara Museum of Natural History, Santa Barbara, CA

3:30 **4544** The genus *Pharaxanotha* (sensu lato), Erotylidae that pollinate cycads. **Paul Skelley** (paul. skelley@freshfromflorida.com), Florida State Collection of Arthropods, Gainesville, FL

3:45 **4545** Phylogeny and classification of Coccinellidae (Coleoptera) — where are we now? **Adam Slipinski** (adam.slipinski@csiro.au), CSIRO, Canberra, Australia



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4:00 **4546** Phylogeny and classification of Coccinellini (Coleoptera: Coccinellidae). **Wioletta Tomaszewska** (wiola@wa.home.pl)1, Adam Slipinski2, Hermes Escalona2, Xingmin Wang3, and Jiahui Li4, 1Polish Academy of Sciences, Warszawa, Poland, 2CSIRO, Canberra, Australia, 3South China Agricultural Univ., Guangzhou, China, 4Hainan Univ., Haikou, China

4:15 **4547** Chrysomelidophagous ladybirds (Coleoptera: Coccinellidae: Coccinellini): You are what you eat.  
**Jose Adriano Giorgi** (coccinellid@gmail.com)1 and Natalia J. Vandenberg2, 1Federal Univ. of Pará, Altamira, Brazil, 2USDA - ARS, Washington, DC

4:30 **4548** Can Brazilian Coccinellidae species be used  
as biological control agents? **Lucia de Almeida** (lalmeida51@gmail.com) and Camila Fediuk de Castro- Guedes, Federal Univ. of Paraná, Curitiba, Brazil

4:45 **4549** Systematics and natural history of Anamorphidae (Coccinelloidea): Seeking patterns of evolution within a heterogeneous assemblage of “little brown beetles”. **Floyd Shockley** (shockleyf@si.edu), Smithsonian Institution National Museum of Natural History, Washington, DC

**Symposium: Molecular Endocrinology**

***Room W240 B (Convention Center)***

**Moderators and Organizers:** Marek Jindra1 and Tetsuro Shinoda2, 1Czech Academy of Sciences, České Budějovice, Czech Republic, 2National Institute of Agrobiological Sciences, Tsukuba, Japan

1:30 **4550** Neuroendocrine control of developmental transitions in *Drosophila*. Mary Jane Shimell, Xueyang Pan, and **Michael O’Connor** (moconnor@umn.edu), Univ. of Minnesota, Minneapolis, MN

1:45 **4551** A genome-wide *in vivo* RNAi screen in *Drosophila* identifies regulators of cholesterol trafficking and steroid production. Morten Moller1, Erik Danielsen1, Naoki Yamanaka2, Kirst King-Jones3, Michael O’Connor4, and **Kim Rewitz** (kim.rewitz@bio.ku.dk)1, 1Univ. of Copenhagen, Copenhagen, Denmark, 2Univ. of California, Riverside, CA, 3Univ. of Alberta, Edmonton, AB, Canada, 4Univ. of Minnesota, Minneapolis, MN

2:00 **4552** The endocrine role of the POU factor ventral veins lacking in insects. CeCe Cheng1, Amy Ko1,  
Prioty Sarwar1, Victoria Wang1, Zhou Wang1,  
Wendy Smith2, Takashi Koyama3, and **Yuichiro Suzuki** (ysuzuki@wellesley.edu)1, 1Wellesley College, Wellesley, MA, 2Northeastern Univ., Boston, MA, 3Gulbenkian Institute of Science, Oeiras, Portugal

2:15 **4553** Neural and endocrine control of mating-induced germline stem cell proliferation in female *Drosophila*. Tomotsune Ameku1, Yuto Yoshinari1, Shu Kondo2, and **Ryusuke Niwa** (ryusuke-niwa@umin.ac.jp)1,3, 1Univ.

of Tsukuba, Tsukuba, Japan, 2National Institute of Genetics, Mishima, Japan, 3PRESTO Japan Science and Technology Agency, Kawaguchi, Japan

2:30 **4554** Nutrition, insulin, and larval body growth: How is the fly insulin production regulated? **Naoki Okamoto** (naoki.okamoto@ucr.edu)1,2 and Takashi Nishimura2, 1Univ. of California, Riverside, CA, 2RIKEN Center for Developmental Biology, Kobe, Japan

2:45 **4555** Impact of elevated insulin signaling on the growth potential of imaginal disc cells. Suzanna Hempel, Katarzyna Nowak, Elisabeth Fischer, Malgorzata Parniewska, Avantika Gupta, and  
**Hugo Stocker** (stocker@imsb.biol.ethz.ch), ETH Zürich, Zürich, Switzerland

**3:00 BREAK**

3:15 **4556** Role of insulin-like peptides in regulating reproduction and longevity in the ant *Harpegnathos saltator*. **Hua Yan** (hua.yan@nyumc.org)1,  
Comzit Opachaloemphan1, Giacomo Mancini2,  
Jürgen Liebig3, Shelley Berger4, Claude Desplan2, and Danny Reinberg2, 1New York Univ. School of Medicine, New York, NY, 2New York Univ., New York, NY,  
3Arizona State Univ., Tempe, AZ, 4Univ. of Pennsylvania, Philadelphia, PA

3:30 **4557** Breath control: The hormonal regulation  
of growth in response to hypoxia in *Drosophila*. **Alexander Shingleton** (shingleton@lakeforest.edu)1, Yuging Zhu1, Hailey Broeker1, Parth Tank1,  
Christopher Petranek1, and Jon Harrison2, 1Lake Forest College, Lake Forest, IL, 2Arizona State Univ., Tempe, AZ

3:45 **4558** 20E-induced autophagy activates fat body lipid degradation for insect metamorphic development. **Ling Tian** (tianling@sibs.ac.cn) and Sheng Li, Chinese Academy of Sciences, Shanghai, China

4:00 **4559** Evolution of insect metamorphosis: Functional analysis of the metamorphic toolkit formed by E93, Krüppel homolog 1, and Broad-Complex transcription factors. Enric Ureña, Silvia Chafino, Elena Casacuberta, Xavier Franch-Marro, and **David Martin** (david.martin@ ibe.upf-csic.es), Pompeu Fabra Univ., Barcelona, Spain

4:15 **4560** The MEKRE93 pathway in *Bombyx*. **Takaaki Daimon** (daimontakaaki@affrc.go.jp), Miwa Uchibori, and Tetsuro Shinoda, National Institute of Agrobiological Sciences, Tsukuba, Japan

4:30 **4561** How does juvenile hormone prevent pupal metamorphosis in holometabolous insects? Takumi Kayukawa and **Tetsuro Shinoda** (shinoda@affrc.go.jp), National Institute of Agrobiological Sciences, Tsukuba, Japan

4:45 **4562** Intermediate factors of juvenile hormone/ methoprene-tolerant mediated gene repression: Evidence from adult female mosquito *Aedes aegypti*. **Tusar Saha** (tsaha001@ucr.edu)1, Sang Woon Shin1, Wei Dou1,2, Sourav Roy1, Bo Zhao1, Zhen Zou3, and Alexander Raikhel1, 1Univ. of California, Riverside, CA, 2Southwest Univ., Chongqing, China, 3Chinese Academy of Sciences, Beijing, China

5:00 **4563** Molecular function of Kr-h1 in juvenile hormone- induced gene expression. **Reyhaneh Ojani** (reyhan@ vt.edu) and Jinsong Zhu, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

5:15 **4564** Exquisite ligand selectivity contrasts with broad agonist repertoire of the juvenile hormone receptor. Pavel Jedlicka1, Lenka Bittova2, Robert Hanus1, and **Marek Jindra** (jindra@entu.cas.cz)2, 1Institute of Organic Chemistry and Biochemistry, Prague, Czech Republic, 2Czech Academy of Sciences,

České Budějovice, Czech Republic



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**FRIDAY**

**Friday, September 30 • AFTERNOON •**

**Symposium: Molecular Pharmacology and Physiology of Membrane Transport and Signaling Processes**

***Room W330 C (Convention Center)***

**Moderators and Organizers:** Yoshihisa Ozoe1, Masaaki Azuma2, and Jeffrey R. Bloomquist3, 1Shimane Univ., Matsue, Japan, 2Tottori Univ., Tottori, Japan, 3Univ. of Florida, Gainesville, FL

1:30 **4565** Molecular and functional characterization  
of histamine-gated chloride channels from the  
house fly, *Musca domestica*. **Yoshihisa Ozoe** (ozoe-y@ life.shimane-u.ac.jp), Tomo Kita, Takahiro Irie, Kazuki Nomura, and Fumiyo Ozoe, Shimane Univ., Matsue, Japan

1:45 **4566** Voltage- and calcium-activated chloride channels in insect physiological systems. **Lacey Jenson** (ljenson@vt.edu)1, Troy Anderson1, and Jeffrey Bloomquist2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Univ. of Florida, Gainesville, FL

2:00 **4567** *Apis mellifera* voltage-gated Ca2+ channels: Cloning and *in vivo* and *in vitro* characterization. **Pierre Charnet** (pierre.charnet@crbm.cnrs.fr)1, Thierry Cens1, Matthieu Rousset1, Claudine Menard1, Jean-Baptiste Thibaud1, and Claude Collet2, 1National Center of Scientific Research, Montpellier, France, 2INRA, Avignon, France

2:15 **4568** Modulation of native ionic channels by nitric oxide and acetylcholine signaling pathways in Kenyon cells isolated from the mushroom body of the cricket brain. **Masami Yoshino** (myoshi@u-gakugei.ac.jp), Tokyo Gakugei Univ., Koganei, Japan

2:30 **4569** Comparative and evolutionary insights into physiology and neuroendocrine control of renal function. **Julian Dow** (julian.dow@glasgow.ac.uk) and Shireen Davies, Univ. of Glasgow, Glasgow, United Kingdom

2:45 **4570** The molecular physiology of inward rectifier potassium (Kir) channels in mosquitoes. **Peter Piermarini** (piermarini.1@osu.edu)1, Klaus Beyenbach2, and  
Jerod Denton3, 1The Ohio State Univ., Wooster, OH, 2Cornell Univ., Ithaca, NY, 3Vanderbilt Univ., Nashville, TN

**3:00 BREAK**

3:15 **4571** V-ATPase and Na+/K+-ATPase energize postprandial fluid absorption from the isolated midgut of female yellow fever mosquitoes (*Aedes aegypti*). **Horst Onken** (horst.onken@wagner.edu)1 and  
David Moffett2, 1Wagner College, Staten Island, NY, 2Washington State Univ., Pullman, WA

3:30 **4572** Epithelial and cellular mechanisms of aquaporins (AQPs) in lepidopteran caterpillar. **Masaaki Azuma** (azuma@muses.tottori-u.ac.jp), Tottori Univ., Tottori, Japan

3:45 **4573** G-protein-coupled receptor controls steroid hormone signaling in cell membrane. Di Wang, Wen-Li Zhao, Mei-Juan Cai, Jin-Xing Wang, and **Xiao-Fan Zhao** (xfzhao@sdu.edu.cn), Shandong Univ., Jinan, China

4:00 **4574** The roles of biogenic amine G-protein-coupled receptors in insect feeding behavior. **Hiroto Ohta** (hiohta@gpo.kumamoto-u.ac.jp), Kumamoto Univ., Kumamoto, Japan

4:15 **4575** Roles of biogenic amine receptors in insect hemocytes to regulate cellular immunity. **Jia Huang** (huangj@zju.edu.cn)1, Yi-xiang Qi1, and Shun-fan Wu2, 1Zhejiang Univ., Hangzhou, China, 2Nanjing Agricultural Univ., Nanjing, China

4:30 **4576** Cockroach GABAB receptor subtypes: Molecular characterization, pharmacological properties, and tissue distribution. **Wolfgang Blenau** (wblenau@uni-koeln. de)1, Stefanie Blankenburg2, and Arnd Baumann3, 1Univ. of Köln, Köln, Germany, 2Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, 3Jülich Research Center, Jülich, Germany

**Symposium: Neuro-Endocrine Regulation of Reproduction in Insects**

***Room W224 B (Convention Center)***

**Moderators and Organizers:** Jozef Vanden Broeck1 and  
Neil Audsley2, 1Catholic Univ., Leuven, Belgium, 2The Food and Environment Research Agency, York, United Kingdom

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1:30

2:00

2:15

2:30

**3:00**

3:30

3:45

**4577** Regulation of reproductive diapause in the linden bug, *Pyrrhocoris apterus*. **David Dolezel** (david. dolezel@entu.cas.cz), Czech Academy of Sciences, České Budějovice, Czech Republic

**4578** Male sex peptide and the behaviour of post-mated females of *Drosophila* species. Elwyn Isaac1, **Calum Ferguson** (c.t.j.ferguson@leeds.ac.uk)1, Tara O’Neill1, and Neil Audsley2, 1Univ. of Leeds, Leeds, United Kingdom, 2The Food and Environment Research Agency, York, United Kingdom

**4579** Origin and function of seminal-fluid derived adipokinetic hormone in *Aedes* mosquitoes.  
**Laura Sirot** (lsirot@wooster.edu), College of Wooster, Wooster, OH

**4580** Oxytocin-like neuropeptide signaling in invertebrates. **Christian Gruber** (christian.w.gruber@ meduniwien.ac.at)1,2, 1Medical Univ. of Vienna, Vienna, Austria, 2Queensland Univ., St. Lucia, Australia

**BREAK**

**4581** Targeting reproduction and development as a control strategy for pest Diptera. **Neil Audsley** (neil.audsley@fera.co.uk) and Rachel Down, Fera Science, Ltd., York, United Kingdom

**4582** Cross-talk between the ecdysteroid, insulin, and juvenile hormone pathway in the desert locust, *Schistocerca gregaria*. **Elisabeth Marchal** (elisabeth. marchal@bio.kuleuven.be)1, Cynthia Lenaerts1, Marijke Gijbels2, Pieter Van Wielendaele1, and

Jozef Vanden Broeck1, 1Catholic Univ., Leuven, Belgium, 2Univ. of Leuven, Leuven, Belgium



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**Friday, September 30 • AFTERNOON •**



**Symposium: New Insights into Biology, Resistance Mechanisms, and the Management of the Modern Bed Bug**

***West Hall F4 (WF4) (Convention Center)***

**Moderators and Organizers:** Stephen Doggett1, Chow-Yang Lee2, Dini Miller3, and Changlu Wang4, 1Westmead Hospital, Westmead, Australia, 2Univ. of Science, Penang, Malaysia, 3Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 4Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

1:30 **4583** Behavioral ecology of the common bed bug, *Cimex lectularius*, and its implications in the management of bed bugs. **Richard Cooper** (rick.cooper. rutgers@cooperpest.com)1 and Changlu Wang2, 1Bed Bug Central, Lawrenceville, NJ, 2Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

2:00 **4584** Current bed bug (*Cimex* spp.) resurgence and management in China and US. **Changlu Wang** (cwang@ aesop.rutgers.edu)1, Chen Zha1, Richard Cooper2,  
and Desen Wang3, 1Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, 2Cooper Pest Solutions, Lawrenceville, NJ, 3South China Agricultural Univ., Guangzhou, China

2:15 **4585** Novel insecticide resistant mechanisms in the common bed bug, *Cimex lectularius*. **David Lilly** (david. lilly@ecolab.com), Ecolab Australia, Macquarie Park, Australia

2:30 **4586** Molecular mechanisms and detection of pyrethroid resistance in bed bugs (*Cimex* spp.). **Kai Dang** (kaidang@mail.nankai.edu.cn), Univ. of Science, Penang, Malaysia

2:45 **4587** Insecticide resistance in the common bed bug, *Cimex lectularius*, eggs and first instars. **Brittany Campbell** (bedelong@ufl.edu), Univ. of Florida, Gainesville, FL

**3:00 BREAK**

3:15 **4588** Integrated insecticide resistance management in the common bed bug, *Cimex lectularius.*  
**Fang (Rose) Zhu** (fang.zhu@wsu.edu)1 and  
Douglas Walsh2, 1Washington State Univ., Pullman, WA, 2Washington State Univ., Prosser, WA

3:30 **4589** Fitness costs associated with selection for insecticide resistance in the bed bug. **Jennifer Gordon** (jgord13@gmail.com), Univ. of Kentucky, Lexington, KY

3:45 **4590** Evaluating the efficacy of “Whole Home Heat Systems”: Determining the bed bug (*Cimex lectularius* L.) time to mortality using different commercial heating systems in apartment units of difference size. **Ian Sandum** (celeborn@vt.edu) and Dini Miller, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

4:00 **4591** The maligned human bed bug, a masterpiece in adaptation and survival. **Gale E. Ridge** (gale.ridge@ ct.gov), Connecticut Agricultural Experiment Station, New Haven, CT

4:15 **4592** Systemic effects of ivermectin and moxidectin on the common bed bug, *Cimex lectularius* L. **Johnathan Sheele** (jsheele@gmail.com)1 and  
Gale E. Ridge2, 1Case Western Reserve Univ., Cleveland, OH, 2Connecticut Agricultural Experiment Station, New Haven, CT

4:30 **4593** Observances of bed bugs in the real world. **Paul Bello** (paul.bello@att.net), PJB Pest Management Consulting LLC, Alpharetta, GA

**Contributed Papers: Apidology, Sericulture, and Social Insects: Management**

***Room W314 B (Convention Center)***

**Moderators:** Robert Coulson1 and Dipali Devi2, 1Texas A&M Univ., College Station, TX, 2Institute of Advanced Study in Science and Technology, Guwahati, India

1:30 **4594** The social regulation of worker-reproductive transition in the eastern subterranean termite.  
**Qian Sun** (qian.sun@uky.edu), Kenneth F. Haynes, and Xuguo Zhou, Univ. of Kentucky, Lexington, KY

1:45 **4595** Quantification of the floral landscape in agro-ecosystems and its effect on bumble bee colonies. **Ellen Rotheray** (ellenrotheray@googlemail.com), Univ. of Sussex, Brighton, United Kingdom

2:00 **4596** Judging pesticide safety to honey bees  
(*Apis mellifera* L.): Environmental toxicology, risk assessment, and the regulatory process. **Vincent Kramer** (vjkramer@dow.com), Dow AgroSciences, Indianapolis, IN

2:15 **4597** The transportation of fluids by capillary action in butterfly proboscises. **Matthew Lehnert** (mlehner1@ kent.edu), Ashley Lash, Candace Oprien, Michael Cannon, and Kristen Reiter, Kent State Univ., North Canton, OH

2:30 **4598** Integument constitutes an active component of innate immunity in the silkworm, *Bombyx mori*. **Jinmei Wu** (jwuus@hotmail.com), Chinese Academy of Agricultural Sciences, Zhenjiang, China

2:45 **4599** A spatially explicit enterprise system for monitoring and evaluating diseases and pests of honey bees, *Apis mellifera*. **Robert Coulson** (r-coulson@ tamu.edu) and Mark Dykes, Texas A&M Univ., College Station, TX

**3:00 BREAK**

3:15 **4600** Primary polygyny in the honey ant, *Myrmecocystus mendax*. **Ti Eriksson** (th3@asu.edu), Bert Hoelldobler, and Jürgen Gadau, Arizona State Univ., Tempe, AZ

3:30 **4601** Pathogenicity of bacteria isolated from the gut of diseased silkworm *Antheraea assamensis* Helfer (Lepidoptera: Saturniidae). **Dipali Devi** (dipali. devi@gmail.com), Institute of Advanced Study in Science and Technology, Guwahati, India

3:45 **4602** TA/TYR regulates division of labor at both larval and adult stages. **Ying Wang** (ying.wang.6@asu. edu) and Robert E. Page, Jr., Arizona State Univ., Tempe, AZ

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4:00 **4603** The evolution and reproductive consequences of queen cooperation in a harvester ant. **Brian Haney** (brhaney@asu.edu) and Jennifer H. Fewell, Arizona State Univ., Tempe, AZ

4:15 **4604** Pollination biology of bitter gourd (*Momordica charantia* L.). **Tharini K. B.** (tharinikraj@gmail.com), Khan H. Khader, and Vasuki Belavadi, Univ. of Agricultural Sciences, Bangalore, India

4:30 **4605** Genetic diversity of Puerto Rican *Heterotermes* (Isoptera: Rhinotermitidae) revealed by phylogenetic analyses of mitochondrial and nuclear genes.  
**Susan C. Jones** (Jones.1800@osu.edu)1, Tyler D. Eaton1, and Tracie M. Jenkins2, 1The Ohio State Univ., Columbus, OH, 2Univ. of Georgia, Athens, GA

4:45 **4606** The Schmidt Sting Pain Scale: Is theoretical science of stinging insects compatible with public outreach? **Justin Schmidt** (ponerine@dakotacom.net), Southwestern Biological Institute, Tucson, AZ

5:00 **4607** Group size effects on social organization and productivity in cooperative associations of ant queens. **Jennifer H. Fewell** (j.fewell@asu.edu), Arizona State Univ., Tempe, AZ

**Contributed Papers: Biodiversity, Biogeography, and Conservation of Arthropods: Hymenoptera**

***West Hall F2 (WF2) (Convention Center)***

**Moderators:** Damayanti Buchori1 and Michael Orr2, 1Bogor Agricultural Univ., Bogor, Indonesia, 2Utah State Univ., Logan, UT

1:30 **4608** Preliminary results of Lagodekhi Reserves Hymenoptera diversity. **George Japoshvili** (giorgij70@ yahoo.com), Invertebrate Research Center, Tbilisi, Georgia

1:45 **4609** Salvemos Nuestro Abejorro, a Chilean model  
of citizen science for the conservation of *Bombus dahlbomii* (Hymenoptera: Apidae). **Jose Montalva** (montalva.jose@yahoo.es)1,2, Lorena Vieli1,3,  
Benjamin Castro1, Valeria Amigo1,4, and Joaquin Sepulveda1, 1Salvemos Nuestro Abejorro, Chile, 2International Union for Conservation of Nature, Chile, 3Univ. of la Frontera, Temuco, Chile, 4Univ. of Concepción, Concepción, Chile

2:00 **4610** Presentation withdrawn

2:15 **4611** Diversity and prevalence of pathogens in native bees in agricultural landscapes. **Sophie Cardinal** (sophie.cardinal@agr.gc.ca), Joel H. Kits, and Teresa Martin, Agriculture and Agri-Food Canada, Ottawa, ON, Canada

3:30 **4615** Does landscape simplification shape community structure, trophic interaction, and traits  
of parasitoids in a tropical agricultural area? **Damayanti Buchori** (damibuchori@yahoo.com)1, Evawaty Ulina1, Pudjianto Pudjianto1, Sjafrida Manuwoto1, and Akhmad Rizali2, 1Bogor Agricultural Univ., Bogor, Indonesia, 2Univ. of Brawijaya, Malang, Indonesia

3:45 **4616** Presentation withdrawn

4:00 **4617** The diversity and conservation status of bees (Hymenoptera: Apoidea) in Canada. **Cory Sheffield** (cory.sheffield@gov.sk.ca), Royal Saskatchewan Museum, Regina, SK, Canada

4:15 **4618** Abundance and diversity of bees in pumpkin fields with and without an imidacloprid pre-bloom soil application in South Dakota. Allen Olmstead1, **Kimberly Huntzinger** (kim.huntzinger@bayer.com)2, and Morgan Scalici2, 1Bayer CropScience, Research Triangle Park, NC, 2Bayer CropScience, Durham, NC

4:30 **4619** An assessment of bee richness and guild structure across agroecosystems on the Southern High Plains (Texas, USA). **Scott Longing** (scott.longing@ttu. edu), Christopher Jewett, Bianca Rendon, Samuel Discua, Robert Cox, Cynthia McKenney, Nancy McIntyre, and Chuck West, Texas Tech Univ., Lubbock, TX

4:45 **4620** A comparison of old and new: Does historical land conversion to agriculture relate to bee diversity on the Southern High Plains of Texas, USA?  
**Samuel Discua** (samuel.discua@ttu.edu) and

Scott Longing, Texas Tech Univ., Lubbock, TX

5:00 **4621** Native bee diversity in mid-Atlantic woodlands. **Grace Savoy-Burke** (gsburke@udel.edu)1, Deborah A. Delaney1, and Sam Droege2, 1Univ. of Delaware, Newark, DE, 2U.S. Geological Survey, Beltsville, MD

5:15 **4622** Bumble bee (*Bombus* spp.) distributions and foraging behavior across an urban-agricultural

gradient. **Vera Pfeiffer** (vpfeiffer@wisc.edu) and Janet Silbernagel, Univ. of Wisconsin, Madison, WI

**Contributed Papers: Biodiversity, Biogeography, and Conservation of Arthropods: Novel Methods**

***West Hall F1 (WF1) (Convention Center)***

**Moderators:** Joel Gibson1 and Robert Kula2, 1Royal British Columbia Museum, Victoria, BC, Canada, 2USDA - ARS, Washington, DC

1:30 **4623** antmaps.org: An interactive client-server mapping application for visualizing the ants of the world. **Julia Janicki** (jhjanicki@gmail.com)1,2,  
Nitish Narula1, Matt Ziegler2, Benoit Guénard3, and Evan Economo1, 1Okinawa Institute of Science and Technology, Onna, Japan, 2Univ. of Wisconsin, Madison, WI, 3Univ. of Hong Kong, Hong Kong, China

1:45 **4624** Using museums and molecules to advance insect biodiversity science. **Joel Gibson** (jfgibson@ uoguelph.ca), Royal British Columbia Museum, Victoria, BC, Canada

2:00 **4625** Identifying insects by specimen image and machine learning method. **Jiangning Wang** (wangjn@ ioz.ac.cn), Aiping Liang, and Liqiang Ji, Chinese Academy of Sciences, Beijing, China

2:30 **4612**

2:45 **4613**  
*Haplogonatopus oratorius* (Hymenoptera: Dryinidae), affected by host’s long-distance dispersal: The case of coastal areas around Japan (Hymenoptera: Dryinidae). **Toshiharu Mita** (t3mita@agr.kyushu-u.ac.jp), Kyushu Univ., Fukuoka, Japan

**3:00 BREAK**

3:15 **4614** Vespid wasps (Hymenoptera: Vespidae) of Canada. **Robert Longair** (longair@ucalgary.ca)1 and Matthias Buck2, 1Univ. of Calgary, Calgary, AB, Canada, 2Royal Alberta Museum, Edmonton, AB, Canada

Presentation withdrawn

Genetic variation of an apterous parasitoid,



2:15 **4626** Cryptic diversity in the globally invasive greenhouse thrips. **Paul F. Rugman-Jones** (paulrj@ucr. edu), Mark S. Hoddle, and Richard Stouthamer, Univ. of California, Riverside, CA

2:30 **4627** Surveying insects in the Atlantic Coastal Plain of the U.S., an underappreciated biodiversity hotspot. **Michael Caterino** (mcateri@clemson.edu)1, Robert Kula2, Jason Cryan3, Jon K. Gelhaus4, Joseph V. McHugh5, Brian G. Scholtens6, Charles R. Bartlett7, Michael Gates2, John C. Morse1, and Peter Adler1, 1Clemson Univ., Clemson, SC, 2USDA - ARS, Washington, DC, 3North Carolina Museum of Natural Sciences, Raleigh, NC, 4Drexel Univ., Philadelphia, PA, 5Univ. of Georgia, Athens, GA, 6College of Charleston, Charleston, SC, 7Univ. of Delaware, Newark, DE

2:45 **4628** Australian jumping plant lice and lerp insects (Hemiptera: Psylloidea): Species richness, systematics, invasives, and conservation. **Gary Taylor** (gary.taylor@ adelaide.edu.au)1, Erinn Fagan-Jeffries1, Melinda Moir2, Martin Steinbauer3, and Andrew Austin1, 1The Univ. of Adelaide, Adelaide, Australia, 2Dept. of Agriculture

and Food, South Perth, Australia, 3La Trobe Univ., Melbourne, Australia

**3:00 BREAK**

3:15 **4629** MAD and the Malagasy Micropezidae. **Stephen Marshall** (samarsha@uoguelph.ca), Univ. of Guelph, Guelph, ON, Canada

3:30 **4630** Biodiversity project at the Central Florida Zoo. **Robert Belmont** (rbelmont@masseyservices.com), Massey Services, Inc., Orlando, FL

3:45 **4631** Diversity, distribution, and horizontal transmission to a parasitoid of symbionts in the *Bemisia tabaci* whitefly complex. **Yin-Quan Liu** (yqliu@ zju.edu.cn), Zhen Zhang, Yu-Heng Lu, Hong-Wei Shan, and Shu-Sheng Liu, Zhejiang Univ., Hangzhou, China

4:00 **4632** The influence of community biodiversity on species interactions: *Drosophila* and their *Leptopilina* parasitoids as a study system. **Chia-Hua Lue** (chia3@ umbc.edu)1, Matthew L. Buffington2, and Jeff Leips1, 1Univ. of Maryland, Baltimore, MD, 2USDA - ARS, Washington, DC

4:15 **4633** Presentation withdrawn

4:30 **4634** “Green to brown”: Quantifying shifts in arthropod trophic structure following plant invasion. **Adam Mitchell** (mitchell.adam.b@gmail.com) and Douglas W. Tallamy, Univ. of Delaware, Newark, DE

4:45 **4635** Juniper-infesting *Rhagoletis* (Diptera: Tephritidae): Potential new North American species and establishment of a worldwide juniper-collecting network. **James Smith** (jimsmith@msu.edu) and Daniel Hulbert, Michigan State Univ., East Lansing, MI

5:00 **4636** Museum specimens document historical changes in stonefly (Plecoptera) assemblages: Fixed sites lose both species and traits. **R. Edward DeWalt** (dewalt@illinois.edu) and Yong Cao, Univ. of Illinois, Champaign, IL

5:15 **4637** Cross-pollination in the 21st century: Integrating entomologists and botanists to explore the island biogeography and conservation of Caribbean orchids. **Peter Houlihan** (phoulihan@ufl.edu), Florida Museum of Natural History, Gainesville, FL

**Contributed Papers: Insect-Plant Interactions in a Changing Climate: Host Plant Interactions**

***Room W232 B (Convention Center)***

**Moderators:** Dayna Collett1 and Elsa Youngsteadt2, 1Oklahoma State Univ., Stillwater, OK, 2North Carolina State Univ., Raleigh, NC

1:30 **4638** Reducing urban tree pests through data-driven planting: What can we learn from municipal tree inventories? **Elsa Youngsteadt** (ekyoungs@ncsu.edu), Kristi Backe, and Steven Frank, North Carolina State Univ., Raleigh, NC

1:45 **4639** Molecular detection of seed DNA in regurgitates of granivorous carabid beetles. **Corinna Wallinger** (corinna.wallinger@uibk.ac.at), Daniela Sint, Rebecca Mayer, Florian Baier, and Michael Traugott, Univ. of Innsbruck, Innsbruck, Austria

2:00 **4640** Isolation, identification, and characterization of Cerambycid beetles and their bacterial symbionts in three New York City urban parks. **Olga Calderon** (ocalderon@lagcc.cuny.edu), City Univ. of New York, Long Island City, NY

2:15 **4641** Oviposition-induced indirect defence trait in wild and cultivated maize against spotted stemborer (*Chilo partellus*). **Daniel Mutyambai** (dmutyambai@ icipe.org)1, Toby Bruce2, Charles Midega1, Johnnie VanDenBerg3, John Pickett2, and Zeyaur Khan1,

1International Centre of Insect Physiology and Ecology, Nairobi, Kenya, 2Rothamsted Research, Harpenden, United Kingdom, 3North-West Univ., Potchefstroom, South Africa

2:30 **4642** Effects of larval rearing, temperature and host plant quality on development, growth, and survival of nutgrass armyworm, *Spodoptera exempta* Walker (Lepidoptera: Noctuidae). **Dianne Joy Aguilon** (ddaguilon@up.edu.ph), Univ. of the Philippines,

Los Baños, Philippines

2:45 **4643** *In vitro* assessment of food consumption, utilization indices, and losses promises of leafworm, *Spodoptera litura* (Fab.), on okra. **Ahmad Nawaz** (nawazrajpoot@yahoo.com)1, Muhammad Arif1, Muhammad Dildar Gogi1, Muhammad Sufyan1, Fatima Mustafa1, Sana Shokat1, Imran Khan1, and Muhammad Binyameen2, 1Univ. of Agriculture, Faisalabad, Pakistan, 2Bahauddin Zakariya Univ., Multan, Pakistan

**3:00 BREAK**

3:15 **4644** The butterfly plant arms-race escalated by gene and genome duplications. **Christopher Wheat** (chris.wheat@zoologi.su.se), Stockholm Univ., Stockholm, Sweden



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3:30 **4645** Standardizing laboratory rearing protocols for the bird cherry-oat aphid (*Rhopalosiphum padi* L.): Incorporation of heteroecious behavior to improve fitness. **Dayna Collett** (dayna.collett@okstate.edu) and Kris Giles, Oklahoma State Univ., Stillwater, OK

3:45 **4646** Application of phytohormone based induced resistance and biological control agents reduces  
the population of aphids on *Brassica napus* L. **Samina Ahmad** (saminatmalik@yahoo.com) and  
Jam Ahmad, Univ. of Agriculture, Faisalabad, Pakistan

4:00 **4647** Plant response to sucking insects: The redox reaction of *Arabidopsis thaliana* to *Myzus persicae*. **Junhuan Xu** (Junhuanx@uark.edu) and Fiona Goggin, Univ. of Arkansas, Fayetteville, AR

4:15 **4648** A salivary protein of the whitefly, *Bemisia tabaci*, affects its phloem-feeding on host plants. **Hong-Xing Xu** (x.h.xing1983@163.com), Yue Hong, Ruo-Xuan Shao, Xing-Wei Wang, Shu-Sheng Liu, and Xiao-Wei Wang, Zhejiang Univ., Hangzhou, China

4:30 **4649** Comparative transcriptome elucidates the molecular basis underlying adaptation of whitefly, *Bemisia tabaci,* to novel host plants. **Wen-Qiang Xia** (wqxia.zj@gmail.com), Xin-Ru Wang, Xiao-Wei Wang, and Shu-Sheng Liu, Zhejiang Univ., Hangzhou, China

**Contributed Papers: Integrated Pest Management and Sustainable Agriculture**

***Room W225 A (Convention Center)***

**Moderators:** Anthony S. DiMeglio1 and Carlos Vassallo2, 1Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 2Dow AgroSciences, Buenos Aires, Argentina

1:30 **4650** Plant-derived volatile essential oils and western flower thrips, *Frankliniella occidentalis*. **Nathan Herrick** (nherrick@ksu.edu) and Raymond Cloyd, Kansas State Univ., Manhattan, KS

1:45 **4651** Sterile Insect Technique (SIT) and Unmanned Aircraft Systems (UAS): Applications and limitations in Area-Wide Integrated Pest Management (AW-IPM). **Nathan Moses-Gonzales** (nmosesgo@m3cg.us), M3 Consulting Group, Dayton, OH

2:00 **4652** Evaluation of insecticide delivery methods for management of cabbage maggot (*Delia radicum*) in the central coast of California. **Shimat Villanassery Joseph** (svjoseph@ucdavis.edu)1, Larry Godfrey2, and Christopher Bettiga1, 1Univ. of California, Salinas, CA, 2Univ. of California, Davis, CA

2:15 **4653** Marking and retention of harlequin bug, *Murgantia histrionica* (Hahn) (Hemiptera: Pentatomidae), on pheromone-baited and unbaited plants. **Guillermo Cabrera Walsh** (gcabrera@fuedei.org)1, Donald Weber2, Ashot Khrimian2, and Anthony S. DiMeglio3, 1Foundation for the Study of Invasive Species, Hurlingham, Argentina, 2USDA - ARS, Beltsville, MD, 3Virginia Polytechnic Institute and State Univ., Blacksburg, VA

2:30 **4654** Survival and reproductive performance of *Diaeretiella rapae* exposed to two narrow-spectrum insecticides. **William Jessie** (w.jessie@okstate.edu) and Kris Giles, Oklahoma State Univ., Stillwater, OK

2:45 **4655** Role of public sector in dissemination of plant protection technologies through participatory extension among maize growers. **Ijaz Ashraf** (gilluaf707@uaf. edu.pk), Univ. of Agriculture, Faisalabad, Pakistan

**3:00 BREAK**

3:15 **4656** Minimizing insect infestations in grain storage facilities prior to harvest. **Edmond L. Bonjour** (edmond. bonjour@okstate.edu) and Carol Jones, Oklahoma State Univ., Stillwater, OK

3:30 **4657** Climate change and pest management: Impact network analysis to evaluate adaptation strategies. **Karen Garrett** (karengarrett@ufl.edu), Univ. of Florida, Gainesville, FL

3:45 **4658** Evolution of resistance of fall armyworm (*Spodoptera frugiperda* Smith*)* to Cry1F protein in Argentina. Nicholas Storer1, Desmi Chandrasena1, Florencia Figueroa Bunge2, Dwain M. Rule1,

Ana Signorini2, Magdalena Lopez Olaciregui2,  
**Carlos Vassallo** (cvassallo@dow.com)2, Analiza P. Alves3, Clinton D. Pilcher3, Gustavo Abratti4, and Andres Beibe5, 1Dow AgroSciences, Indianapolis, IN, 2Dow AgroSciences, Buenos Aires, Argentina, 3DuPont Pioneer, Johnston, IA, 4DuPont Pioneer, Pergamino, Argentina, 5DuPont Pioneer, Buenos Aires, Argentina

4:00 **4659** Presentation withdrawn

4:15 **4660** Development of near real-time weather-based insect pest forecasting system for Alberta, Canada. **Swaroop Kher** (swaroop.kher@gov.ab.ca)1,  
Daniel Itenfisu1, and Scott Meers2, 1Government of Alberta, Edmonton, AB, Canada, 2Alberta Agriculture and Rural Development, Brooks, AB, Canada

4:30 **4661** Potential of the growth-inhibiting activity  
of *Datura innoxia* Mill. (Solanaceae) in the management of tobacco caterpillar, *Spodoptera litura* (Fab.) (Lepidoptera: Noctuidae). **Anupam Sharma** (avsharma@ hindu.du.ac.in), Vagisha Rawal, Ashok Singh, and Tarun Vats, Univ. of Delhi, New Delhi, India

4:45 **4662** Presentation withdrawn

5:00 **4663** The ecological control of citrus pests based  
on predatory mites and bio-rational insecticides. **Xiaoduan Fang** (fangxiaoduan@163.com)1,  
Gecheng Ouyang1, Huilin Lu1, Yulu Xia2, Mingfang Guo1, and Weinan Wu1, 1Guangdong Academy of Agricultural Sciences, Guangzhou, China, 2National Science Foundation Center for Integrated Pest Management, Raleigh, FL

5:15 **4664** Monitoring of insecticide resistance in different populations of pink mealybug,

*Maconellicoccus hirsutus*, from India and quantification of detoxifying enzymes involved in resistance. **Prathibha Mruthunjayaswamy** (pratiba.wodeyar@ gmail.com), Venkatesan Thiruvengadam, Sushil Jalali, and Abraham Verghese, National Bureau of Agricultural Insect Resources, Bangalore, India



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**Contributed Papers: Integrated Pest Management and Sustainable Agriculture: Behavioral Pest Management**

***Room W223 B (Convention Center)***

**Moderators:** Louis E. N. Jackai1 and Kamal Gupta2, 1North Carolina A&T State Univ., Greensboro, NC, 2Univ. of Delhi, New Delhi, India

1:30 **4665** Developing attract-and-kill strategies to manage spotted wing drosophila, *Drosophila suzukii* Matsumara, in organic raspberry and blueberry. **Peter Jentsch** (pjj5@cornell.edu)1 and

Timothy Lampasona2, 1Cornell Univ., HIghland, NY, 2Univ. of Nebraska, Lincoln, NE

1:45 **4666** Raspberry ketone as a promising pre-release supplement for Sterile Insect Technique programs of Queensland fruit fly, *Bactrocera tryoni*. **Humayra Akter** (humayra.akter@students.mq.edu.au) and Phillip W. Taylor, Macquarie Univ., Sydney, Australia

2:00 **4667** Semiochemical-based pest insect management in strawberry and raspberry. **Atle Wibe** (atle.wibe@ norsok.no)1, Catherine Baroffio2, Anna-Karin Borg-Karlson3, Jerry Cross4, Michelle Fountain4, David Hall5, Raimondas Mozuraitis3, Baiba Ralle6, Lene Sigsgaard7, and Nina Trandem8, 1NORSØK Norwegain Centre for Organic Agriculture, Tingvoll, Norway, 2Agroscope, Conthey, Switzerland, 3KTH Royal Institute of Technology, Stockholm, Sweden, 4East Malling Research, Kent, United Kingdom, 5Natural Resources Institute, Kent, United Kingdom, 6Latvian Plant Protection Research Centre, Riga, Latvia, 7Univ. of Copenhagen, Frederiksberg, Denmark, 8Norwegian Institute of Bioeconomy Research, Ås, Norway

2:15 **4668** Evaluating the implementation of trap crops to manage thrips populations in strawberries.  
**Janine Spies** (jrazze@ufl.edu) and Oscar Liburd, Univ. of Florida, Gainesville, FL

2:30 **4669** Effect of extremely low frequency electromagnetic fields on oviposition and development of *Drosophila suzukii*. **Brian Little** (balittle@uga.edu) and Ashfaq Sial, Univ. of Georgia, Athens, GA

2:45 **4670** From lab to field: Development of a pheromone trap for saddle gall midge (*Haplodiplosis marginata*) in the UK. **Charlotte Rowley** (crowley@harper-adams. ac.uk)1, Tom Pope1, Andrew Cherrill1, Simon Leather1,

G Mandela Fernandez-Grandon2, and David R. Hall2, 1Harper Adams Univ., Newport, United Kingdom, 2Univ. of Greenwich, Kent, United Kingdom

**3:00 BREAK**

3:15 **4671** Mustards are veritable “femmes fatales” for the harlequin bug (*Murgantia histrionica*): Exploiting the interaction between mustards, glucosinolates, and  
trap cropping to protect collard. **Louis E. N. Jackai** (lejackai@ncat.edu)1, Beatrice Dingha1, Thomas P. Kuhar2, Anthony S. DiMeglio2, Donald Weber3, and Huiping Zhou1, 1North Carolina A&T State Univ., Greensboro, NC, 2Virginia Polytechnic Institute and State Univ., Blacksburg, VA, 3USDA - ARS, Beltsville, MD

3:30 **4672** Food-based semiochemicals as a potential tool to assess cutworm moth (Lepidoptera: Noctuidae) diversity in prairie agro-ecosystems. **Ronald Batallas** (batallas@ualberta.ca) and Maya L. Evenden, Univ. of Alberta, Edmonton, AB, Canada

3:45 **4673** Greenhouse pest control takes a new push-pull approach. **Ian Scott** (ian.scott@agr.gc.ca)1, Abdelali Hannoufa1, Mark Sumarah1, and Tyler Wist2, 1Agriculture and Agri-Food Canada, London, ON, Canada, 2Agriculture and Agri-Food Canada, Saskatoon, SK, Canada

4:00 **4674** Sperm activity and mating competence as crucial attributes of irradiated males and their F1 progeny in ‘Inherited Sterility’ tactic for suppression of a tropical pest, *Spodoptera litura* (F.) (Lepidoptera: Noctuidae). **Rakesh Kumar Seth** (rkseth57@gmail. com), Zubeda Khan, Dev Kant Rao, Mahtab Zarin, and Ranjana Seth, Univ. of Delhi, New Delhi, India

4:15 **4675** Influence of plant volatiles on mating behaviour and reproductive fitness of *Dysdercus koenigii*.  
**Kamal Gupta** (kamal\_suyash@yahoo.com) and  
Sunil Kayesth, Univ. of Delhi, New Delhi, India

4:30 **4676** Response of *Contarinia nasturtii* (Diptera: Cecidomyiidae) to host plant defense elicitors.  
**Ross Pillischer** (ross.pillischer@uvm.edu),  
Rebecca Roman, Chase Stratton, Elisabeth Hodgdon, and Yolanda Chen, Univ. of Vermont, Burlington, VT

4:45 **4677** Use of companion plants for management of key insect pests and viral incidence in organic squash. **Lorena Lopez** (lorelopezq.257@ufl.edu)1 and  
Oscar Liburd2, 1Univ. of Florida, Wimauma, FL, 2Univ. of Florida, Gainesville, FL

**Contributed Papers: Urban Entomology in a Changing Environment: Unique Challenges**

***Room W230 B (Convention Center)***

**Moderators:** Ryan Leonard1, Nguyen Hoa2, and Michael Merchant3, 1The Univ. of Sydney, Sydney, Australia, 2Laboratory of Behavior and Ecology, Seoul, South Korea, 3Texas A&M AgriLife Extension Service, Dallas, TX

1:30 **4678** Making scents of urban pollination: Does air pollution alter honey bee memory? **Ryan Leonard** (ryan.leonard@sydney.edu.au), Dieter Hochuli, Clare McArthur, and Vanina Vergoz, The Univ. of Sydney, Sydney, Australia

1:45 **4679** Down the 3D rabbit hole: How staring at ticks led me to an Ed-Tech Wonderland. **Joyce Sakamoto** (jms1198@psu.edu), Pennsylvania State Univ., University Park, PA

2:00 **4680** A tale of two studies of cities: Synthesizing arthropod responses to urbanization with complementary meta-analyses. **Holly Martinson** (hmartins@umd.edu) and Michael J. Raupp, Univ. of Maryland, College Park, MD

2:15 **4681** Science outreach to elementary schools: Evaluating impacts of the insect discovery program. **Benjamin Beal** (bdbeal@email.arizona.edu), Peter Warren, Wendy Moore, and Kathleen Walker, Univ. of Arizona, Tucson, AZ

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**Friday, September 30 • AFTERNOON/EVENING •**

2:30 **4682** Presentation withdrawn

2:45 **4683** Adopting IPM for public school settings: The Texas, USA, model. **Michael Merchant** (m-merchant@ tamu.edu) and Janet Hurley, Texas A&M AgriLife Extension Service, Dallas, TX

**3:00 BREAK**

3:15 **4684** Relationship between urban heat island effect and cicada density in metropolitan Seoul. **Nguyen Hoa** (hoanq8x@gmail.com) and Jang Yikweon, Laboratory of Behavior and Ecology, Seoul, South Korea

3:30 **4685** The value of urban greenspaces for conservation: Ground beetle (Coleoptera: Carabidae) and rove beetle (Coleoptera: Staphylinidae) communities in Cleveland, Ohio. **Yvan Delgado de la Flor** (delgadodelaflor.1@osu. edu), The Ohio State Univ., Wooster, OH

3:45 **4686** Arizona school IPM inside and out: Implementation of school integrated pest management programs in Arizona schools. **Shaku Nair** (nairs@email.arizona. edu)1, Dawn Gouge1, Al Fournier1, Kai Umeda2,

David Kopec3, Ursula K. Schuch3, Shujuan Li1,  
Peter Warren3, and Michael Wierda1, 1Univ. of Arizona, Maricopa, AZ, 2Univ. of Arizona, Phoenix, AZ, 3Univ. of Arizona, Tucson, AZ

4:00 **4687** Water limitation alters arthropod protein and lipid intake targets. **Jamie Becker** (jambeck@bgsu. edu) and Kevin McCluney, Bowling Green State Univ., Bowling Green, OH

4:15 **4688** Direct treatment and residual efficacy of FendonaTM CS insecticide, a new insecticide from BASF, on striped bark scorpions, *Centruroides vittatus*. **Robert Davis** (robert.davis@basf.com)1, Robert Hickman2, Joseph Schuh3, and Matthew Lee4, 1BASF, Pflugerville, TX, 2BASF, Maitland, FL, 3BASF, Research Triangle Park, NC, 4Entomology Consultants, Mesilla Park, NM

4:30 **4689** Toward a broad spectrum insect granular bait. **Courtney Capobianco** (courtney@apexbait.com) and Dangsheng Liang, Apex Bait Technologies, Inc., Santa Clara, CA

4:45 **4690** Global uses for sulfuryl fluoride (Vikane®/ ProFume® gas fumigants) for control of structural and public health pests. **Barb Nead-Nylander** (barb. neadnylander@douglasproducts.com)1 and Ellen Thoms2, 1Douglas Products, Rancho Santa Margarita, CA, 2Douglas Products, Gainesville, FL