



BADAN PENERBIT DAN PUBLIKASI
UNIVERSITAS GADJAH MADA



THE 2nd INTERNATIONAL CONFERENCE ON TROPICAL AGRICULTURE

26–27 October 2017 / Yogyakarta, Indonesia

Innovative and Emerging Agricultural Technology and Management

Socio-economic Dimensions in Tropical Agriculture

Sustainable Tropical Agriculture

Sustainable Tropical Animal Production and Health

Sustainable Tropical Forestry



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The 2nd International Conference on Tropical Agriculture
Program and Abstract Book

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Welcoming Remarks from Chairman

On behalf of the organizing committee, I would like to extend a warm welcome to everyone in attendance here today for the 2nd International Conference on Tropical Agriculture (ICTA 2017), hosted by Universitas Gadjah Mada.

This year's conference is held with the theme "integrated and sustainable tropical agriculture", as we turn our eyes to climate change, one of the most pressing yet hotly debated subjects in all of science. While arguments on the impact and mitigation of climate change rage in political circles, researchers are increasingly finding that they are beyond the point of debate. Whether it be in the oceans or on land, in forests or on farmland, we are seeing our planet respond in kind to the actions of its most burdensome inhabitants. Prolonged drought and extreme weather events have become prominent in recent years, and even more eye opening has been the wave of hurricanes that continues to pummel the Caribbean and southeastern United States. Entire islands have been wiped off the map overnight. I can't help but wonder in the wake of these hurricanes what next year will hold. Is the unusual ferocity of these extreme weather events an anomaly? Or is this the new reality of the 21st century?

In my mind, the greatest challenge of this century might prove not to be the prevention of climate change but how we in turn learn, adapt, and innovate to—if not reduce global temperatures—keep pace with an unpredictable climate. In agriculture, which is particularly vulnerable to disease and sudden changes in the weather, we have no choice but to join the frontlines of research, to find new, sustainable ways of maintaining food security, and to lead the way in building socio-ecological resilience amongst the communities most vulnerable to the long- and short-term impacts of climate change through innovation, science-based policy development, and education. It is for this reason that I'm proud to be standing before you today, chairing the ICTA 2017.

In this year's conference, we will have five concurrent symposia: Sustainable Tropical Forestry, Innovative and Emerging Agricultural Technology and Management, Sustainable Tropical Agriculture, Sustainable Tropical Animal Production and Health, and Socio-economic Dimensions in Tropical Agriculture. In each symposium, you will find many intriguing studies that have sought to identify inventive solutions to the aforementioned problems. These ideas will be tested over the next two days.

On behalf of the organizing committee, I would like to thank the Rector of Universitas Gadjah Mada, Prof. Panut Mulyono, for joining us here today, and Dr. Widodo, the

Head of UGM's Badan Penerbit dan Publikasi (BPP), for all the hard work he and BPP put into bringing this conference together. And as I look out from this podium today, I would be remiss not to thank you, our speakers and participants, for taking the time to join us in this endeavor to advance agricultural science in the face of new environmental challenges. We are deeply humbled to find so many scholars eager to share their findings—we accepted 124 abstracts in all—and even some who have come solely to take advantage of the opportunity to listen and converse with colleagues.

I hope you enjoy your time in Yogyakarta. We have an exciting agenda planned for you, and I believe each person in attendance will be inspired by the forthcoming talks. It is in this inspiration that the answers to our questions lie.

Dr. Sena Adi Subrata

Welcoming Remarks from the Rector of Universitas Gadjah Mada

Dear distinguished keynote and invited speakers, participants, ladies and gentlemen,

On behalf of Universitas Gadjah Mada, it is my great honor and privilege to welcome you to Yogyakarta for the 2nd International Conference on Tropical Agriculture (ICTA 2017), hosted by Universitas Gadjah Mada's Badan Penerbit dan Publikasi (BPP UGM).

Thousands of years ago, in the Fertile Crescent, Papua New Guinea, and Mesoamerica, humans independently discovered the power of a seed. They planted wheat, sugarcane, and maize. They also domesticated animals—cows, pigs, and llamas, to name a few. These agrarian communities were separated by thousands of miles and thousands of years, but each in time came to the same conclusion: it was on their farmlands that the first cities were built, and it was from their hands that civilization blossomed. Agriculture is the very bedrock of humanity. Our fate is inextricably tied to it. In recent years, this fact has come into even greater focus with the development of biofuels as an alternative to pollutive fossil fuels, showing that agriculture not only feeds—it clothes, cures, and powers.

It should come as no surprise, then, why we are all here today. In Indonesia, as with many other Southeast Asian nations, agriculture and forestry are key to maintaining the economy, with both sectors making significant contributions to the national GDP. The advent of climate change, however, threatens these sectors, whether it be through natural disasters, changing climate patterns, or by necessitating innovative and sustainable practices to minimize their impact on the environment. And it is this latter point that brings us to the ICTA 2017.

This year's conference places a greater emphasis on dealing with the repercussions of climate change in the tropics through innovation in the agricultural and forestry sectors.

Over its 67 year history, UGM has itself sought to promote innovation, both among its own faculty and students and in the greater academic world, in general. This spirit is reflected in its Annual Conference Series, which brings together the brightest minds from Indonesia and abroad to share and discuss the latest findings in their respective fields. This year, the International Conference on Tropical Agriculture serves as the series' finale, closing out what has been an enormously

successful year of conferences that have shaped the development of scientific networks, increased Indonesian authors' prominence in publications with a global readership, and built the foundation for future international collaboration across an incredibly diverse range of scientific disciplines.

In terms of the ICTA 2017, I'm honored and humbled by the turnout this year. The response from authors and participants has truly been remarkable. I'm also especially proud to see so many of UGM's young students stepping forward to test and debate their ideas with their future colleagues. This international conference will provide you with an excellent opportunity to lay the groundwork for many a friendship, and I highly encourage you to take advantage of the wealth of knowledge in this room today.

On behalf of UGM, I would like to express our gratitude to our keynote and invited speakers, who have traveled from all over the world to speak today and tomorrow. A special thank you as well to the members of the organizing committee, along with the entire staff of BPP UGM, led by Dr. Widodo, for their tireless work to make the ICTA 2017 the best event it could be. And mostly importantly, I would like to thank all of our participants in attendance here today, each of whom will help to make this the most memorable ICTA yet.

Over the next two days, we will have the chance to see what exciting ideas have been germinating in agriculture and forestry. They may be big or small, but each in their own way will come to the same conclusion: they will contribute to securing our future on a vibrant, ever-changing planet. I wish you all a wonderful stay in Yogyakarta, and above all a successful ICTA 2017.

Thank you.

Prof. Ir. Panut Mulyono, M. Eng., D.Eng.

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VENUE



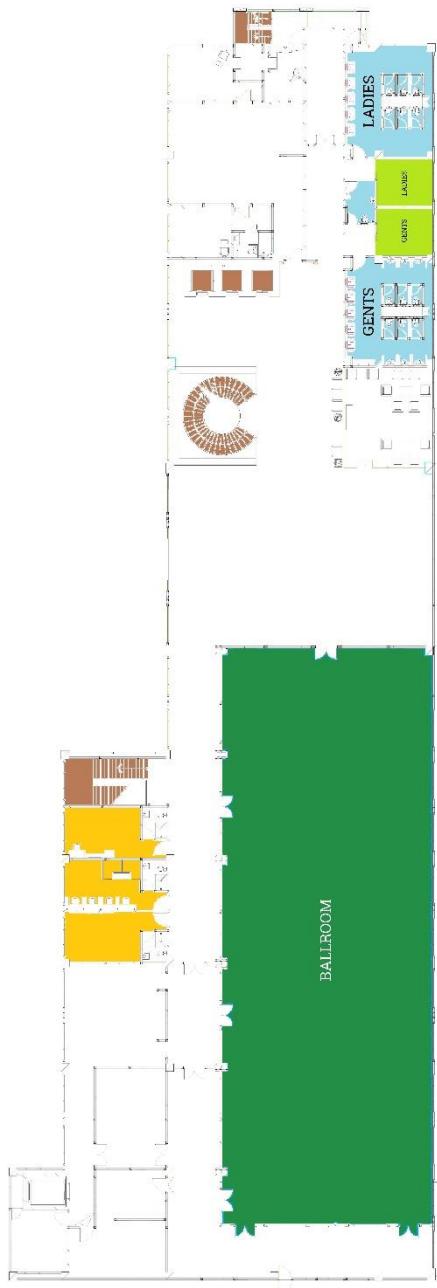
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4th FLOOR

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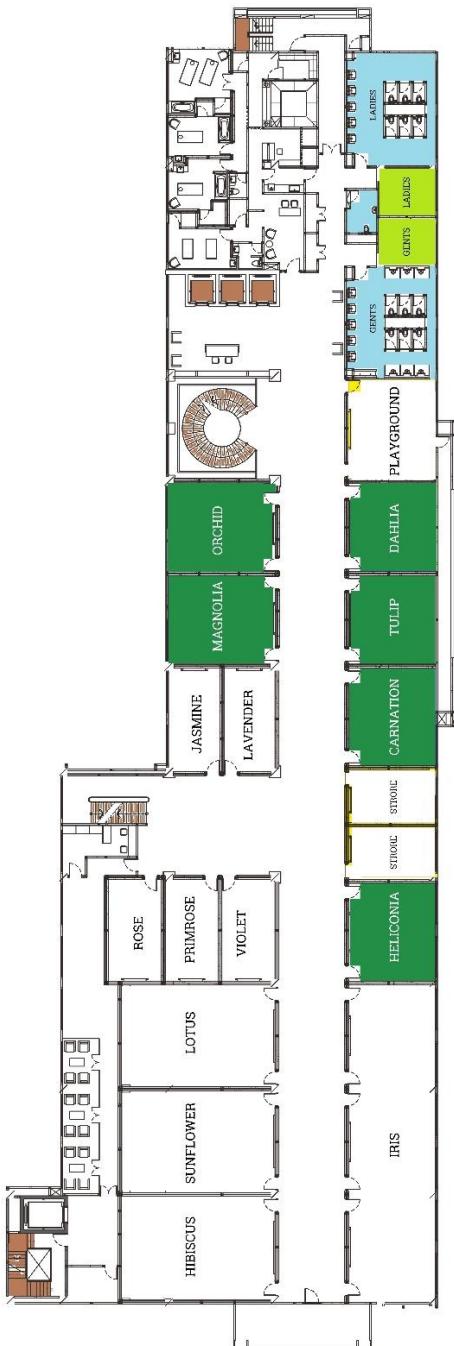
- Conference room
- Committee room
- Prayer room
- Rest room
- Stairs / lifts



3rd FLOOR

THE EASTPARC MAIN BUILDING

- Conference room
- Prayer room
- Rest room
- Stairs / lifts



SCHEDULE

Minggu

1

8

15

22

29

30

Instagram @ugmpress

ptember : Hari Raya Idul Adha 1438 H

ptember : Tahun Baru Islam 1439 H

10. Oktober

Senin	Selasa	Rabu	Kamis	Jumat	Sabtu
2	3	4	5	6	7
9	10	11	12	13	14
16	17	18	19	20	21
23	24	25	26	27	28
31	1	2	3	4	

1

7

Conference schedule

Thursday, 26 October 2017

Time	Program	Venue
07:30 – 08:00	REGISTRATION	Ballroom lobby
OPENING CEREMONY		
08:00 – 08:15	Dr. Sena Adi Subrata ICTA 2017 Chairman	Ballroom
08:15 – 08:30	Prof. Panut Mulyono Rector of Universitas Gadjah Mada	Ballroom
KEYNOTE SPEECH I Moderated by Ari Aji Cahyono, M.Sc.		
08:30 – 09:00	Dr. Diogo Monteiro Newcastle University, United Kingdom	Ballroom
09:00 – 09:15	DISCUSSION	Ballroom
09:15 – 09:30	COFFEE BREAK	Ballroom
PLENARY SESSION I Moderated by Siti Nurleily Marliana, Ph.D.		
09:30 – 10:00	Dr. Allan Spessa Swansea University, United Kingdom	Ballroom
10:00 – 10:10	DISCUSSION	Ballroom
PLENARY SESSION II Moderated by Ani Widastuti, Ph.D.		
10:10 – 10:35	Prof. Siti Subandiyah Universitas Gadjah Mada, Indonesia	Ballroom
10:35 – 11:00	Prof. Agnesia Endang Tri Hastuti Wahyuni Universitas Gadjah Mada, Indonesia	Ballroom
11:00 – 11:20	DISCUSSION	Ballroom

11:20 – 12:30	LUNCH AND PRAYER	Ballroom lobby
12:30 – 15:00	SYMPOSIA SESSION I	Parallel rooms
15:00 – 15:15	COFFEE BREAK	Front of parallel rooms
15:15 – 16:15	SYMPOSIA SESSION II	Parallel rooms

DAY 1

Innovative and Emerging Agricultural Technology and Management

CARNATION ROOM

Time	Code	Title and Authors
SYMPOSIUM SESSION I		
12:30 – 12:50	A3-024	Performance of a dynamic model for predicting rate of water loss during corn grains drying process using an NARX Neural Networks Galih Kusuma Aji, Wildan Fajar Bachtiar, and Henry Yuliando
12:50 – 13:10	A3-038	Characteristic of protein extraction and hydrolysis profile of jack bean protein (<i>Canavalia ensiformis</i> L. DC) with proteolytic enzyme Bambang Dwi Wijatniko, Agnes Murdiati, and Fumito Tani
13:10 – 13:30	A3-045	Comparison of appearances and color indexes for tempe with different packaging using digital image analysis Zaki Utama, Fidela Devina Agrippina, and Bedri Sekar Nurmadhani
13:30 – 13:50	A3-066	Effect of <i>Sargassum hystrix</i> extracts on weight and blood biochemical profile of Wistar Rats under condition of swimming stress and fasting Laila Sofia Nur'aini, Amir Husni, and Claude Mona Airin
13:50 – 14:10	A3-074	Effect of cooking methods on proximate value, antinutrient content, and antioxidant activity of jack bean (<i>Canavalia ensiformis</i>) tempe Embun Dini Nur Annisa, Amita Tri Rachmawati, Dyah Puspitasari, Fiametta Ayu Purwandari, Widiastuti Setyaningsih, and Andriati Ningrum
14:10 – 14:30	A3-082	Development of “SMART EYE” - smartphone application - to determine image color and texture of a product Rudiati Evi Masithoh, Balza Achmad, and Luthfi Zharif

Time	Code	Title and Authors
14:30 – 14:50	A3-105	Industrialization of soygurt products and its diversification on rural areas of soybean production center for improving local superior products Atris Suyantohadi , Mirwan Ushada, and Dody Kastono
SYMPOSIUM SESSION II		
15:15 – 15:35	A3-125	Color as a predictor of chili content Nafis Khuriyati, M. Affan Fajar Falah, Mirwan Ushada, Bayu Kristiawan, and Nugrahanto Aji W.
15:35 – 15:55	A3-108	Optimization the synthesis condition and characterization of methylcellulose obtained from jack bean seed hull (<i>Canavalia ensiformis</i> L. (DC.)) Theresia Arumsari, Purnama Darmadji, and Agnes Murdiati

DAY 1

Innovative and Emerging Agricultural Technology and Management

MAGNOLIA ROOM

Time	Code	Title and Authors
SYMPOSIUM SESSION I		
12:30 – 12:50	A1-061	Charcoal briquette of young coconut leaves (<i>Cocos nucifera</i> leaf) from Bali Hindu Community's religious rituals waste Dek Krishna Rimba Prabhu and Johanes Pramana Gentur Sutapa
12:50 – 13:10	A1-091	Lateritic characteristic of nickel mining land as a source for ecosystem engineering material Hasbullah Syaf, M.Tufaila, Laode Harjoni Kilowasid, Laode Safiuddin, and Budi Widiawan
13:10 – 13.30	A4-040	Effect of adding the chicken feces meal into the biogas sludge as the bran mixture on the white oyster mushroom (<i>Pleurotus florida</i>) productivity Ambar Pertiwiningrum, Yudi Rahmadian, Ramdhan Dwi N., and Nanung Agus F.
13:30 – 13:50	A4-042	Analysis of the influence of physical and mental workload on worker productivity in Bakery SME Ellena Nurmasari, Mirwan Ushada, and Endy Suwondo
13:50 – 14:10	A4-071	The effect of ethepon treatment on the formation of flowers in Melon (<i>Cucumis melo</i> L.) Budi Setiadi Daryono, Eko Prasetya, Sumarlina, Dian Sartika, and Aprilia Sufi Subiastuti
14:10 – 14:30	A4-084	Development strategies of small and medium enterprises of fishery product processing in Sambas, West Kalimantan Andiyono, Hamdi, Lang Jagat, Musa Hubeis, and Sapta Rahardja

Time	Code	Title and Authors
SYMPOSIUM SESSION II		
15:15 – 15:35	A2-034	<p>Frost hazards assessment on potato agricultural land to achieve climate resilient agriculture in Dieng Volcanic Highland</p> <p>Aditya Pradana, Aida Mardiana, Fathimah Nur Lestari, Futuha Helen Sara, Sani Afifah, and Emilya Nurjani</p>
15:35 – 15:55	A2-107	<p>Cropping calendar scenario based on climate projections against regional climate change in the southern part of Indonesia</p> <p>Bayu Dwi Apri Nugroho, Chusnul Arif, and Rizki Maftukhah</p>

DAY 1

Socio-economic Dimensions in Tropical Agriculture

DAHLIA ROOM

Time	Code	Title and Authors
SYMPOSIUM SESSION I		
12:30 – 12:50	B1-014	Stakeholders-sustainability model for crumb rubber agro-industry: a case study in Pulang Pisau District of Indonesia's Central Kalimantan Province Soleh Rusyadi Maryam, Teuku Yuri M. Zagloel, Francisia SSE Seda, and Chairil Abdini
12:50 – 13:10	B1-037	The effect of technical efficiency of production and revenue on farm household food security in Gunungkidul Hani Perwitasari, Pinjung Nawang Sari, and Liana Fatma Leslie Pratiwi
13:10 – 13:30	B1-044	Organic rice farming characteristics and food consumption in Sleman District Yahya Shafiyuddin Hilmi, Pinjung Nawang Sari, and Any Suryantini
13:30 – 13:50	B1-053	Producer price volatility of red chili pepper and cayenne pepper in several production center provinces and Indonesia Candarisma Dhanes Noor Viana, Slamet Hartono, and Lestari Rahayu Waluyati
13:50 – 14:10	B1-065	Shallot farmer's adaptation toward climate change phenomenon in Larangan Village, Larangan Subdistrict, Brebes District Tri Utami Solichah
14:10 – 14:30	B1-073	Consumer perceptions of snacks with local flour (Mocaf) in Batu and Malang, East Java, Indonesia Riyanti Isaskar, Dwidjono Hadi D., Lestari Rahayu W., and Irham

Time	Code	Title and Authors
14:30 – 14:50	B1-095	Risk and behavior analysis rice farmers in Southern Lampung District Wan Abbas Zakaria, Lidya Sari Mas Indah, and Lina Marlina
SYMPOSIUM SESSION II		
15:15 – 15:35	B1-132	Analysis of consumers' intention to use smartphone-based applications in organic agriculture products purchasing Anggarda Paramita Imawati, Sri Marwanti, and Heru Irianto
15:35 – 15:55	B1-146	The dynamic of food crops farmers in responding to the emergence of new information and communication technologies (ICTS) in rural Yogyakarta Subejo, Dyah Woro Untari, Ratih Ineke Wati, and Gagar Mewasdinta

DAY 1 Sustainable Tropical Animal Production and Health

TULIP ROOM

Time	Code	Title and Authors
SYMPOSIUM SESSION I		
12:30 – 12:50	D2-048	<p>The effect of L-carnitine supplementation in water toward the deposition of abdominal fat in broiler carcass</p> <p>Agustina Dwi Wijayanti, Antasiswa Windraningtyas Rosetyadewi, Syarifuddin Tato, Puspa Wikan Sari, Gagak Donny Satria, and Dwi Cahyo Budi Setiawan</p>
12:50 – 13:10	D2-064	<p>Feed engineering using seaweed as feed to make healthy Broiler meat chicken</p> <p>Rahmatika Choiria and Iman Hernaman</p>
13:10 – 13:30	D2-085	<p>Enhancement of in vitro digestibility of palm kernel cake using cellulolytic microbes from rumen fluid</p> <p>Chusnul Hanim, Lies Mira Yusiaty, and Muhammad Reddy Yustisiawan</p>
13:30 – 13:50	D2-097	<p>The effect of total mixture concentrate based on tofu waste silage as feed on meat quality of thin tail sheep</p> <p>M. Kesumawardana, Zaenal Bachruddin, Edi Sutayanto, and Lies Mira Yusiaty</p>
13:50 – 14:10	D2-101	<p>Effect supplementation of Urea Molasse Multinutrient Block (UMMB) on the weight gain average of heifers Peranakan Ongole breed</p> <p>Yanuartono, Alfarisa Nururrozi, Soedarmanto Indarjulianto, Hary Purnamaningsih, Nurman Haribowo, and Adhit Dwi Oktawan</p>

Time	Code	Title and Authors
14:10 – 14:30	D2-117	Nitrogen balance of Bligon Goat reared by the women farmer group in Ketangi and Banyusoco Village, Gunungkidul, Yogyakarta Special Province Lies Mira Yusiaty, Kustantinah, Chusnul Hanim, Zaenal Bachruddin, and Febry Febryana S.N.
14:30 – 14:50	D2-136	In vitro digestibility of native grass silage supplemented with <i>Leucaena leucocephala</i> Ryan Aryadin Putra, Cuk Tri Noviandi, and Nafiatul Umami
SYMPOSIUM SESSION II		
15:15 – 15:35	D3-022	Estimation of eggs heritability in F1 chicken derived from crossbreeding between pelung chicken and layer Rikha Riski Kurnia, Aditya Rahman Ernanto, and Budi Setiadi Daryono
15:35 – 15:55	D3-059	Profile of progesterone homone on ongole grade cattle does after synchronization of estrus with implant controlled internal drug release (CIDR) on pregnancy rate Anna Farhana, Ismaya, and Nono Ngadiyono
15:55 – 16:15	D3-144	The coconut water (<i>Cocos nucifera</i>) as an alternative standardized medium (DMEM) for cell culture medium of Wistar Rat's hypodermic fibroblast toward mesenchimal stem cell culture Mulya Fitrandi AR, Aprilia Maharani, Gifti Rosalina, Syifa Amalia Syakura, Adam Darsono, and Dicky Moch. Rizal

DAY 1 Sustainable Tropical Animal Production and Health

ORCHID ROOM

Time	Code	Title and Authors
SYMPOSIUM SESSION I		
12:30 – 12:50	D1-013	Detection of <i>Trypanosoma evansi</i> in cattle in Indonesia by using Loop-mediated Isothermal Amplification (LAMP) test Wisnu Nurcahyo, Joko Prastowo, and Dwi Priyowidodo
12:50 – 13:10	D1-070	Fenotyping identification of <i>Klebsiella pneumoniae</i> from subclinical mastitis milk of Ettawah crossbreed goat Clara Ajeng Artdita, Fajar Budi Lestari, Achmad Fauzi, and Erian Pemila Ayu Tanzila
13:10 – 13:30	D4-123	The addition of honey on yoghurt and the investigation on the pH and lactic acid bacteria Ismiarti, Juni Sumarmono, and Triana Setyawardani
13:30 – 13:50	D6-043	The role of sea crustacean <i>Ocypode</i> sp. on the growth performance of catfish <i>Clarias</i> sp. Isna Nurlaily, Murwantoko, and Zuprizal
13:50 – 14:10	D7-089	Correlation between dermatophytes found on cats and in the environment Indarjulianto Soedarmanto, Sitarina Widyarini, Alfarisa Nururrozi, Hary Purnamaningsih, Yanuartono, Slamet Raharjo, and Jeanne Lim Zhi Yen
14:10 – 14:30	D7-152	DNA isolation and pig species detection on sausage with various cooking temperature and time Yuny Erwanto, Ragil Yuliatmo, Nanung Agus Fitriyanto, Muhammad Zainal Abidin, Sugiyono, and Abdul Rohman

Time	Code	Title and Authors
SYMPOSIUM SESSION II		
15:15 – 15:35	E3-046	<p>The dynamic of community forest in the livelihood Tatik Suhartati, Ris Hadi Purwanto, Agus Setyarso, and Sumardi</p>
15:35 – 15:55	E3-075	<p>Smale scale ecology and sociestes: adaptive management to construct ethno-techno-conservation of Papua Nutmeg (<i>Myristica argentea</i> Warb.) Antoni Ungirwalu, San Afri Awang, Ahmad Maryudi, and Priyono Suryanto</p>

DAY 1 Sustainable Tropical Forestry

HELICONIA ROOM

Time	Code	Title and Authors
SYMPOSIUM SESSION I		
12:30 – 12:50	E2-023	Pests of local honey bee (<i>Apis cerana</i>) in Wanagama Education Forest, Gunung Kidul, Yogyakarta Musyafa
12:50 – 13:10	E2-080	Pollen gathering activity of local honey bee (<i>Apis cerana</i>) in green area of Universitas Gadjah Mada campus Musyafa
13:10 – 13:30	E1-036	Variability of canopy interception in the various types of agroforestry system in Java Island, Indonesia Hatma Suryatmojo, Arigasantita, and Heni Puji Astuti
13:30 – 13:50	E1-120	City of philosophy: evaluation of tree philosophy and its architecture in Yogyakarta philosophical axis towards UNESCO world heritage Atus Syahbudin, Serena P. Phenomenon, Alnus Meinata, Angine S. H. Hanindita, and Budi Mulyana
13:50 – 14:10	E1-134	Soil chemical and physical characteristics as a base for achieving sustainable forest land use in RPH Watugudel, KPH Ngawi, Jawa Timur Ambar Kusumandari, Frita Kusumawardhani, Seno Adi Subrata, and K. Fajar Wianti
14:10 – 14:30	E1-138	Carrying capacity of Kalibiru Nature Tourism Area in Kulon Progo Regency Retno Nur Utami, Kurnia Arumsari, and Ambar Kusumandari

Time	Code	Title and Authors
14:30 – 14:50	E2-130	Absconding behavior of local honey bee (<i>Apis cerana</i>) in Wanagama Education Forest, Gunung Kidul, Yogyakarta Musyafa, D. T. Adriyanti, and S. J. Sukmaseta

Conference schedule

Friday, 27 October 2017

Time	Program	Venue
07:30 – 08:00	REGISTRATION	Ballroom lobby
KEYNOTE SPEECH I Moderated by Alan Soffan, Ph.D.		
08:00 – 08:30	Prof. Abdulrahman Aldawood King Saud University, Saudi Arabia	Ballroom
08:30 – 08:45	DISCUSSION	Ballroom
PLENARY SESSION III Moderated by Dr. Mirwan Ushada		
08:45 – 09:10	Takashi Okayasu, Ph.D. Kyushu University, Japan	Ballroom
09:10 – 09:35	Prof. Sri Raharjo Universitas Gadjah Mada, Indonesia	Ballroom
09:35 – 09:55	DISCUSSION	Ballroom
09:55 – 10:10	COFFEE BREAK	Ballroom lobby
PLENARY SESSION IV Moderated by Dr. Widagdo Sri Nugroho		
10:10 – 10:35	Prof. Gede Suparta Budiaستارا Universitas Gadjah Mada, Indonesia	Ballroom
10:35 – 11:00	Dr. Reuben Sharma Universiti Putra Malaysia, Malaysia	Ballroom
11:00 – 11:20	DISCUSSION	Ballroom
11:20 – 13:00	LUNCH AND PRAYER	Ballroom lobby
13:00 – 15:30	SYMPOSIA SESSION II	Parallel rooms

15:30 – 16:00 COFFEE BREAK Ballroom lobby

CLOSING CEREMONY

16:00 – 16:30 **Widodo, Ph.D.**
Head of Badan Penerbit dan Publikasi, UGM Ballroom

PHOTO SESSION Ballroom

DAY 2 Socio-economic Dimensions in Tropical Agriculture

CARNATION ROOM

Time	Code	Title and Authors
SYMPOSIUM SESSION III 13:00 – 15:30		
13:00 – 13:20	B2-087	Association development of fish farmer with arc model for improving competitiveness of aquaculture in Yogyakarta Didik Purwadi and I. Nurlailly
13:20 – 13:40	B3-154	Spatial system dynamic modelling of land availability to cover beef supply and demand Dwi Aulia Puspitaningrum, Masyhuri, Slamet Hartono, and Jamhari
13:40 – 14:00	B1-149	Local food and sustainability of household food sufficiency in Gunung Kidul Regency Sri Peni Wastutiningsih and Fitria Aziz Azizah
14:00 – 14:20	B1-148	The ethics of agricultural information literacy of farmers in coastal sandy land of Yogyakarta Special Region Alia Bihrajihant Raya, Sri Peni Wastutiningsih, Paksi Mei Penggalih, and Sylvatra Puspitasari

DAY 2 Sustainable Tropical Agriculture

MAGNOLIA ROOM

Time	Code	Title and Authors
SYMPOSIUM SESSION III 13:00 – 15:30		
<hr/>		
13:00 – 13:20	C1-016	Utilization of the favorit plants as the base of substance of syar'i herb toothpaste Eli Mas'idah and Sri Artini Dwi Prasetyowati
13:20 – 13:40	C1-026	Biosorption of metals ion on methanol dehydrogenase activity test of <i>Bradyrhizobium japonicum</i> USDA110 Novita Kurniawati, Ambar Pertiwiningrum, Yuny Erwanto, Nanung Agus Fitriyanto, and Mohammad Zainal Abidin
13:40 – 14:00	C1-062	Characterization of extracellular enzymes <i>Bacillus licheniformis</i> from milkfish gut (<i>Chanos chanos</i>) as protoplas isolation agent <i>Chlorella zofingiensis</i> Putri Dwi Mulyani, Setya Handayani, Muh. Nashurrokhman, Syamsul Arif Ardiansyah, and Yekti Asih Purwestri
14:00 – 14:20	C1-069	Phytotoxicity and microbial toxicity of biodegraded indigosol blue 04B batik dye effluents by mycoremediation using fungi isolated in Banyumas Ratna Stia Dewi, Rina Sri Kasiamdari, Erni Martani, and Yekti Asih Purwestri
14:20 – 14:40	C1-140	Characterization of <i>Pseudomonas</i> sp. LS3K as nitrate removal agent at different C/N ratios under aerobic condition Ragil Adi Prasetyo, Ambar Pertiwininggrum, Yuny Erwanto, Lies Mira Yusiatyi, and Nanung Agus Fitriyanto

DAY 2 Sustainable Tropical Agriculture

DAHLIA ROOM

Time	Code	Title and Authors
SYMPOSIUM SESSION III 13:00 – 15:30		
Evaluation of source and sink capacity of five Cowpea Varieties (<i>Vigna unguiculata</i> L. Walp) grown in two different altitudes Heni Purnamawati, Juang Gema Kartika, Feri Vircue Zandroto, and Fachrul Rohimin Iska		
13:00 – 13:20	C2-018	
13:20 – 13:40	C2-032	The effect of BAP (Benzyl Amino Purin) and IAA (Indole Acetic Acid) to Chrysanthemum in vitro multiplication Rani Agustina Wulandari
13:40 – 14:00	C2-057	The effects of priming duration with salicylic acid under salinity stress on growth and leaf anatomy of sweet corn (<i>Zea mays</i> l.) Krisnanda Surya Dharma and Maryani
14:00 – 14:20	C2-068	Phenotypic characters stability of Melon (<i>Cucumis melo</i> L. 'Meloni') Budi Setiadi Daryono, Aestethica El Virdausy, and Eka Wasi' Al-Mughni
14:20 – 14:40	C2-072	Rice growth in a combined submergence and salinity stresses Budiaستuti Kurniasih , Irananta Tarigan, and Erick Firmansyah
14:40 – 15:00	C2-098	Phenotypic characters of hybrid maize as the result of crossing between 'Talenta' and 'Provit A1' maize Erti Hamimi, Muhamad Yasin Hasanul Gaffar, and Budi Setiadi Daryono

Time	Code	Title and Authors
15:00 – 15:20	C2-141	Morphological characters of <i>Cucumis melo</i> L. ‘Tacapa Green Black’, ‘Melona’ and ‘Meloni’ Budi Setiadi Daryono, Emy Setyani, Adhestya Alfiani, and Pungky Ramadhan Rivaldi

DAY 2 Sustainable Tropical Agriculture

TULIP ROOM

Time	Code	Title and Authors
SYMPOSIUM SESSION III 13:00 – 15:30		
Total energy, water, and ash contents five locally cultivars of black rice		
13:00 – 13:20	C3-006	M. Nashrurrokhman, P. R. Sayekti, A. Safitri, W. Ilmi, and R. Pratiwi
13:20 – 13:40	C3-115	Physiological responses of rice (<i>Oryza sativa</i> L. 'Situ Bagendit') to varying water stress and soil type Diah Rachmawati and Fikky Amalia
13:40 – 14:00	C4-067	The model of community participation in the conservation of critical land to sustainable agriculture Maria, Irham, Slamet Hartono, and Lestari Rahayu Waluyati
14:00 – 14:20	C4-126	Effects of copper on plant growth, accumuselation, superoxide dismutase activity and total phenolic compounds of paddy (<i>Oryza sativa</i> L. 'tempo merah') leaves Riska Desi Aryani, Andhika Puspito Nugroho, and Yekti Asih Purwestri
14:20 – 14:40	C5-051	The effect of full moon against flying of <i>Spodoptera exigua</i> moths: implication on monitoring and preventing the pest infestation on onion Fransiscus Xaverius Wagiman, Dian Lestari, Muhammad Syawal Nasution, Edhi Martono, Witjaksono, and Suputa
14:40 – 15:00	C5-083	Environmental factors affecting the severity of Sheath Rot Disease (<i>Sarocladium oryzae</i> and <i>Fusarium</i> spp.) on paddy Syafiqha Pramunadipta, Arif Wibowo, Ani Widiasuti, and Achmadi Priyatmojo

Time	Code	Title and Authors
15:00 – 15:20	C5-094	Current status of emerging disease vascular-streak dieback (VSD) on cacao in Yogyakarta, Indonesia Ani Widiastuti, Arif Wibowo, Ady Bayu Prakoso, and Hendra

DAY 2 Sustainable Tropical Forestry

HELICONIA ROOM

Time	Code	Title and Authors
SYMPOSIUM SESSION III 13:00 – 15:30		
13:00 – 13:20	E3-017	The effects of agroforestry patterns on food crops production in the community forest Silvi Nur Oktalina and Eka Putri Utami
13:20 – 13:40	E3-021	Understanding the impacts of recurrent peat fires in Padang Island, Riau Province, Indonesia Ari Susanti, Oka Karyanto, Agus Affianto, Ismail, Satyawan Pudyatmoko, Trias Aditya, Haerudin, and Hendra Arditya Nainggolan
13:40 – 14:00	E4-143	Effect of breeding technology and trunk axial position on shrinkage and quality of 10 year old teak wood as a furniture's raw material Yustinus Suranto
14:00 – 14:20	E5-063	Effect of nitrogen (N) concentration on the morphology of teak (<i>Tectona grandis</i>) seedlings Puji Lestari, Handojo H. Nurjanto, and Listianti

DAY 2 Sustainable Tropical Forestry

ORCHID ROOM

Time	Code	Title and Authors
SYMPORIUM SESSION III 13:00 – 15:30		
<hr/>		
13:00 – 13:20	E2-119	<p>Litsea grandis: a species that dominates the growth of pole and tree level at Merapi Ungup-Ungup of Ijen Crater Nature Preserve East Java</p> <p>Atus Syahbudin, Asa Yulianto, and Dwi Tyaningsih Adriyanti</p>
13:20 – 13:40	E2-056	<p>Green open spaces in the perspective of ecosystem services: a case study of green open spaces in the urban area of Yogyakarta</p> <p>Giska Parwa Manikasari, Lutfi Muta'ali, and Lies Rahayu Faida</p>
13:40 – 14:00	E2-106	<p>Infiltration capacity and hydraulic conductivity in the different landuse practices at upstream Serayu Watershed</p> <p>Hatma Suryatmojo, Ngadisih, and Prasetyo Nugroho</p>
14:00 – 14:20	E2-076	<p>Abundance and population structure of 'Aren Palm' (<i>Arenga pinnata</i> (Wurmb.) Merr.) on two elevation sites in Kekait, Gunungsari, West Lombok</p> <p>Ahmad Syarif and Retno Peni Sancayaningsih</p>
<hr/>		

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Abdulrahman Aldawood King Saud University, Saudi Arabia Email: aldawood@ksu.edu.sa	08:00	Day 2	Ballroom	KEY2	
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Gede Suparta Budisatria Universitas Gadjah Mada, Indonesia Email: budisatria@ugm.ac.id	10:10	Day 2	Ballroom	PLN6	
Reuben Sharma Universiti Putra Malaysia Email: reuben@upm.edu.my	10:10	Day 2	Ballroom	PLN7	54
Siti Subandiyah Universitas Gadjah Mada, Indonesia Email: sitisubandiyah@ugm.ac.id	10:10	Day 1	Ballroom	PLN2	
Sri Raharjo Universitas Gadjah Mada, Indonesia Email: sraharjo@ugm.ac.id	08:45	Day 2	Ballroom	PLN5	
Takashi Okayasu Kyushu University, Japan Email: okayasu@bpes.kyushu-u.ac.jp	08:45	Day 2	Ballroom	PLN4	

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13:40 Day 2 Orchid E2-106 142					
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12:50 Day 1 Heliconia E2-080 141					
14:30 Day 1 Heliconia E2-130 144					
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Theresia Arumsari Department of Food Technology and Agricultural Product, Faculty of Agriculture Technology, Universitas Gadjah Mada Email: thrsiarumsari@gmail.com	15:35	Day 1	Carnation	A3-108	69
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Yahya Shafiyuddin Hilmi Universitas Gadjah Mada Email: yahya.shafiyuddin.h@mail.ugm.ac.id	13:10	Day 1	Dahlia	B1-044	80
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A close-up photograph of a stack of papers or documents resting on a light-colored wooden surface. Several small, colorful sticky notes are attached to the top edge of the stack. One yellow note is on the left, a pink one is slightly below it, another yellow one is further down, and a green one is on the right. The background is blurred.

ABSTRACTS



SPEAKERS



KEY1

Are private food quality standards contributing to sustainability and trade?

Diogo M. Souza Monteiro

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Since the conclusion of the Uruguay round of General Agreement on Tariffs and Trade in 1994, the creation of the World Trade organization there has been a liberalization of food trade. In fact, in over the past 30 years there has been an increase on trade of agricultural and food products not only between developed and developing nations, but also between the later. While the trade is facilitated by lower tariffs and has generally had a positive impact in both importing and exporting nations, it has brought concerns over its effects in smaller and medium size farmers, food safety , spread of animal diseases and plant pests and on the natural environmental. To mitigate these negative impacts there emerged both private and public voluntary standards prescribing good production and processing practices to potential suppliers. Examples of these are the organic production standards of the EU and USA, Fair Trade or the Rain Forest Alliance. However, there have been concerns over the emergence and justification of these initiatives. Arguably these standards emerged to coordinate food supply chains and both serve the demand for differentiated products in developed nations while improving production and living standards of communities in developing Nations. This talk provides an overview of the debate over the merits and impact of Private voluntary standards in sustainability and trade. The aim is to discuss the opportunities and challenges of using these standards to coordinate global supply chains.

Food quality standards emerged from the need to reduce transaction costs, defining the characteristics of products and processes to facilitate exchanges between buyers and sellers. The FAO codex alimentarius and the International Organization for Standardization (ISO) set up product characteristics and food quality standards that are used by firms and governments. However, these standards are fairly technical and general and in most cases are not visible. Based on these principles and responding to society environmental concerns and consumer preferences for variety, in 1990 other voluntary public standards were developed. Examples are the organic standards. The specification of these standards can be understood from a political economic perspective as the result from a negotiation between the different groups of interest in society (Swinnen and Vandemoortele 2011) and depending on which groups has more influence the resulting standard may or be a barrier to trade.

A series of food safety outbreaks in the UK, European Union and in the US lead to another development of food standards. In the UK the Food Safety act of 1990

passed to the industry the onus of delivering safe food to consumers. More specifically, the final vendor of food to the consumer has the responsibility of assuring the product is safe and has the quality attributes claimed. This created an incentive for supermarket chain and food processing organizations to develop private quality standards and codes of good practice to manage their supply chains. An example is the British Retail Consortium (BRC) stream of Good Agricultural Practices standards. These standards first emerged to reduce the exposure to food safety outbreak risks and therefore were based on the principles of Hazard Analysis of Critical Control Points (HACCP). They soon became the norm and a condition for domestic and international suppliers to access retailers and food processors.

Non-governmental organizations interested in promoting natural environmental protection (like the Rain Forest Alliance) or social justice (like Fair Trade) also developed quality standards voluntary and proposed them to producers and communities in developing countries. There is now a proliferation of food quality standards and labels increasingly recognized by consumers. However, a common feature of most of these standards is that they are created to reduce information asymmetries across the supply chain. Moreover, some of the more recently developed standards are not verifiable by the final consumer, in other words the consumer needs to trust that the product she is purchasing (which if often sold with premium) has indeed the attribute it claims. Thus these standards need to be monitored and certified. They are also exposed to fraud, which in turn can compromise the reputation of these standards.

Voluntary food quality standards have the potential to increase welfare by increasing the variety of products in the marketing, reduce food safety outbreaks and improve living standards and natural environment protection. They may also promote trade and improve global economic development. Moreover these private standards are regularly reviewed and improved with experience and emergence of new scientific developments. But what has been their impact in the developing world? What opportunities do they create for the producers of tropical agricultural products? A number of recent multi-disciplinary studies started to answer these questions. The evidence suggests that not all of these standards are able to both assure the delivery of high quality foods, while preserving natural environment and improving living standards.

In short, voluntary food quality are increasingly used and often are more demanding than public food regulations. They have the potential to link consumers and producers in different part of the world. However, their main purpose is to reduce risk and coordinate supply chains. The impact of these standards in international trade, environmental protection and improving of livelihoods in developing nations is starting to be assessed.

Keywords: food quality standards, supply chain coordination, sustainability, trade

Benchmarking the coupled dynamic vegetation-fire model LPJ-GUESS-SPITFIRE against pantropical EO-based tree biomass and burnt area data leads to improved model performance

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Wildfire is the most important disturbance worldwide in terms of area and variety of biomes affected; a major mechanism by which carbon is transferred from the land to the atmosphere (2-4 Pg per annum, equiv. 20-30% of global fossil fuel emissions over the last decade); and globally a significant source of particulate aerosols and trace greenhouse gases. Fire is potentially important as a feedback in the climate system. If climate change favours more intense fire regimes, this would result in a net transfer of carbon from ecosystems to the atmosphere, as well as higher emissions, and under certain circumstances, increased troposphere ozone production— all contributing to positive climate-land surface feedbacks.

Dynamic vegetation-fire models are needed for forecasting the impacts of climate, fire regimes and land-use on ecosystems and emissions from biomass burning as part of future climate or paleo-climate studies. However, quantitative analysis of fire-vegetation-climate interactions has been held back until only relatively recently by a lack of consistent long-term global data sets on vegetation and fire, and by the underdeveloped state of dynamic vegetation-fire modelling.

LPJ-GUESS is a process-based model of vegetation dynamics designed for regional to global applications. It combines features of the Lund-Potsdam-Jena Dynamic Global Vegetation Model (LPJ-DGVM) with those of the General Ecosystem Simulator (GUESS) in a single, flexible modelling framework. The models have identical representations of eco-physiological and biogeochemical processes, including the hydrological cycle. However, they differ in the detail with which vegetation dynamics and canopy structure are simulated. Simplified, computationally efficient representations are used in the LPJ-DGVM, while LPJ-GUESS employs a gap-model approach, which better captures ecological succession and hence ecosystem changes due to disturbance such as fire. SPITFIRE (SPread and InTensity of FIRe and Emissions) mechanistically simulates the number of fires, area burnt, fire intensity, crown fires, fire-induced plant mortality, and emissions of carbon, trace gases and aerosols from biomass burning. Originally developed as an embedded model within LPJ-DGVM, SPITFIRE has since been coupled to LPJ-GUESS

If we are to have confidence in dynamic vegetation-fire models, then they need to be comprehensively validated or benchmarked. However, neither LPJ-DGVM-SPITFIRE

nor LPJ-GUESS-SPITFIRE has been fully benchmarked using state-of-the-art observational datasets. In fact, this situation generally applies to all coupled vegetation-fire models available around the world. This situation provides the motivation for the Fire Model Inter-comparison Project (FireMIP, <http://www.imk-ifu.kit.edu/firemip.php>), which started two years ago. Here we report on our recent work in benchmarking the LPJ-GUESS-SPITFIRE model.

We benchmarked LPJ-GUESS-SPITFIRE in two complementary ways— in diagnostic mode and in prognostic mode. In diagnostic mode, we bypassed the burnt area module in SPITFIRE and used a combination of MODIS/VIRS TRMM/ATSR-based Global Fire Emissions Database (GFED4) burnt area data (1997–2013) and long-term annual observed fire statistics (1901 to 2000) to inform LPJ-GUESS how much of each grid-cell would be affected by fire per day. Avoiding having to simulate burnt area, enabled us to focus on improving the way LPJ-GUESS-SPITFIRE simulates tree allometry, sapling recruitment, fire-induced mortality and land cover change. We used the 2015 integrated LiDAR and field-based tree biomass dataset of Avitabile et al. for the pan-tropics as the benchmark.

The prognostic simulations built on an improved LPJ-GUESS-SPITFIRE from the diagnostic exercises, but rather than prescribing burnt area, we allowed the model to simulate burnt area based on improved formulations for ignitions and fire spread in SPITFIRE itself. Again we benchmarked simulated tree biomass against the Avitabile et al. dataset. In addition, we evaluated how well LPJ-GUESS-SPITFIRE simulated burnt area against the GFED4 burnt area data.

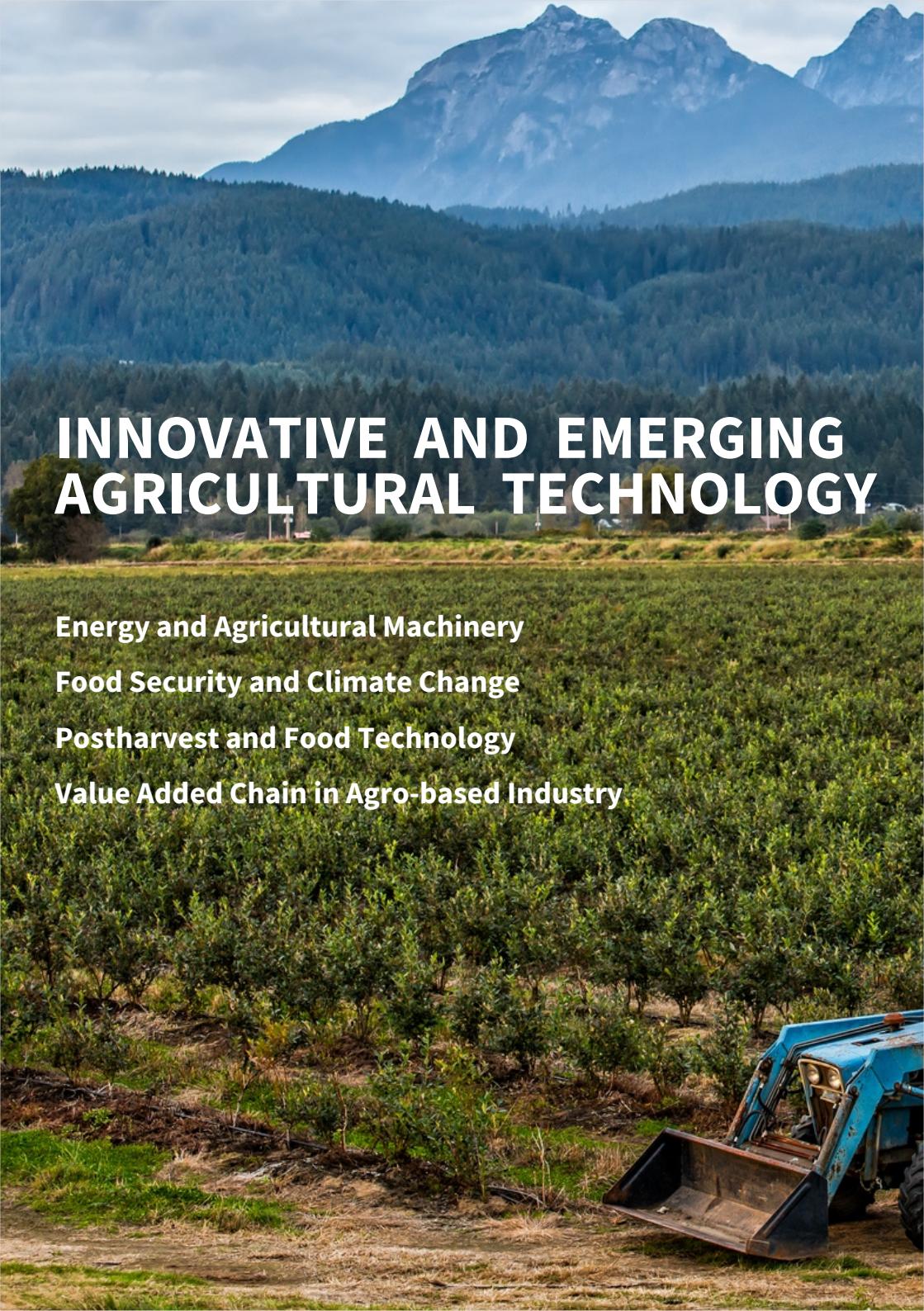
We present how these combined changes to LPJ-GUESS-SPITFIRE result in a much improved simulation of tree carbon across the tropics, including the Americas, Africa, Asia and Australia. We discuss our findings in terms of options for improved forecasting capabilities for fire activity, emissions from biomass burning and fire-climate impacts on tropical ecosystems.

Zoonotic parasitic diseases in Southeast Asia and their global implications

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Domestic animals and wildlife harbour a number of zoonotic pathogens of veterinary and public health concern. Approximately 75% of the emerging human infectious have a sylvatic cycle and wild animals are known to be efficient reservoirs of these infections. In addition, wild animals in the peri urban setting act as efficient sources of infection for domestic animals including livestock. In Southeast Asia, the increasing destruction of natural habitats and the escalating trend in land use change has narrowed the disease transmission interface between humans, domestic animals and wildlife. The complex interaction between the zoonotic pathogens, humans and animals, the arthropod vectors or intermediate hosts, and the environment, pose a serious challenge for the control and prevention of these zoonotic diseases. In many instances, this is confounded by the paucity of sound epidemiological data. In Southeast Asia, wild and domestic animals including livestock are hosts to a myriad of parasites of which a number are zoonotic. These pathogens may be transmitted to humans either through an invertebrate vector or intermediate hosts, or by ingestion of the infective stages. While these parasites are endemic to the region, they pose a serious threat to visitors and may have negative impacts to the tourism industry. Of pivotal concern are two protozoan parasites which cause zoonotic primate malaria (*Plasmodium knowlesi*), and human muscular and enteric sarcocystosis (*Sarcocystis* spp.). The major natural reservoir host for *P. knowlesi* are the Long-tailed Macaques (*Macaca fascicularis*) which is the most common and widespread species of non-human primate in Southeast Asia. This apicomplexan haemoparasite is efficiently transmitted from macaques to humans by *Anopheles* mosquitoes. Zoonotic primate malaria is now considered the most common and most deadly form of human malaria in many parts of Southeast Asia. Sarcocystosis is transmitted by ingestion of the *Sarcocystis* cystic tissue stages present in meat or oocysts in the environment. The life cycle of the parasite involves intermediate and definitive hosts of which humans may assume both roles with varying pathological consequences. While the disease may be self-limiting, muscular infections can cause considerable clinical signs in humans. Both these protozoan parasites have global implications as they are known to infect travellers visiting the region. As such, it is necessary that veterinarians and public health workers be aware of these potentially fatal zoonotic parasites of our local wildlife and domestic animals, in order to facilitate timely and accurate diagnosis, treatment and control measures.



INNOVATIVE AND EMERGING AGRICULTURAL TECHNOLOGY

Energy and Agricultural Machinery

Food Security and Climate Change

Postharvest and Food Technology

Value Added Chain in Agro-based Industry

AND MANAGEMENT



Charcoal briquette of young coconut leaves (*Cocos nucifera* leaf) from Bali Hindu Community's religious rituals waste

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The religious rituals in Bali used ritual materials that made from young coconut leaves, flowers, leaves, incenses, and other materials. The waste from these kinds of biomass have not been widely used. This research aims to utilize and process young coconut leaves from rituals waste to become a renewable energy in the form of charcoal briquette with optimal combination of adhesive amount and clamp pressure. Young coconut leaves were collected in Jagatnatha Shrine, Buleleng Regency. This research use completely randomized design method with two treatments such as clamp pressure (2000, 2500, and 3000 psi) and adhesive amount (4, 6, and 8%). One treatment was conducted in five repetitions. In the process of making the charcoal briquette, 27 g of charcoal was combined with starch adhesive. Starch adhesive contain of heated starch flour and water with ratio 1:16. The charcoal briquette was tested to know its physical characteristics such as moisture content, density, and calorific value, and chemical characteristics such as volatile matter, ash content, and fixed carbon. The result shows that charcoal briquette made from young coconut leaves waste has following quality parametres: moisture content 9.035% – 10.06%; density 0.552 – 0.666; calorific value 6346.38 kJ/g – 7079.45 kcal/g; ash content 15.30% – 19.16%; volatile matter 19.05% – 34.91%; and fixed carbon 55.17% – 37.81%. The best combination is 2000 psi clamp press and 4% adhesive which result moisture content 9.04%; density 0.552; calorific value 7079.45 kcal/g; ash content 18.50%; volatile matter 19.05% and fixed carbon 55.17%.

Keywords: charcoal briquette, chemical characteristics, clamp pressure, coconut leaf, physical characteristics

Lateritic characteristic of nickel mining land as a source for ecosystem engineering material

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Lateritic is a term used for soils on nickel mining areas. These soils posses a unique characteristic worthy of studying for its potential as a provider or as an ecosystem engineering substance. The purpose of the study is to understand soil lateritic characteristics in relation with soil microorganism's roles in ecosystem engineering. Method used is survey on nickel mining sites in the mainland and islands of Southeast (SE) Sulawesi, twice a year for four years during 2011 – 2015. Soil sampling based on mining process which determined condition of the land i.e. undisturbed, disturbed, land under re-grading, and land under revegetation. Soil on revegetated land have been through a ripening process and covered with trees four years old. Soil in regraded land have been prepared for replanting, i.e. hole for planting and treated with organic fertilizer. Soil in an undisturbed land is soil in surrounding mine site which is still in pristine condition. Soil in disturbed land taken from mining front thus consists of a mixture of sub-soil and parent material. Soil analysis conducted at Soil Laboratory, Bogor Soil Research Office and Soil Laboratory of Agro technology department, Faculty of Agriculture, Halu Oleo University. Soil physic parameters analyzed includes permeability, water content, volumetric weight, and total pore. Chemical parameter analyzed includes pH, Organic carbon, N-total, P-total, P-Available, K-Total, K-Available, and Cation Exchange Capacity (CEC). Result shows that physical characteristic of lateritic soil from mining site are low in permeability and water content; high in plasticity, volumetric weight, and total pore. Acid and low content of organic carbon, N-total, P-total, P-available, K-total, K-available, and also low in CEC. The above characteristic provides room for several soil macro fauna which are actively forming and modifying physical and chemical condition on lateritic soil. Besides, soil macro-biological role as ecosystem engineering organism i.e. soil worm, ant, and termite can be tested and established. From this study can also be conducted further study regarding the behavior engineering of lateritic nickel mining site using worm, ant, and termite as an ecosystem engineers.

Keywords: ecosystem engineer, lateritic soil, soil fertility

Frost hazards assessment on potato agricultural land to achieve climate resilient agriculture in Dieng Volcanic Highland

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Dieng Volcanic Highland is one of the most intensive potato agricultural land, as well as frost disaster prone area. Frost indicated by appearance of frozen dew on ground or vegetation surface due to cold temperatures during dry season. Frost causes damage to leaf tissue in potato plants, resulting crop failure and losses of up to tens of millions. Disaster management needs to be assess in order to achieve Disaster Risk Reduction (DRR) on agricultural land. This research aims to analyze level of frost hazard and analyze disaster mitigation plans for potatoes farmland. Research was conducted in Dieng Village, Wonosobo and Dieng Kulon Village, Banjarnegara. Method to assess hazard level was performed by spatial mapping technology using ArcGIS and comprehensive analysis using system thinking diagram through combinations of geomorphology, landuse, and climate aspects. Results shows that frost distribution only appear on alluvial plains than mountain slopes. Air inversion at night near plain's surface causes plains to cool faster than surrounding slopes. Hazards map shows that 110 hectares include frost-prone areas, which are 69 hectares are experience agriculture losses, while 41 hectares are not experience losses. Recommended mitigation plans to reduce frost impacts, among others; A) Shifting into frost resistant commodities, B) Modified cropping system, C) Modified frost formation by installation of furnaces, wind blowers, and sprinkle irrigation, D) Covering farmland with nets or mulch, E) Using a frost-based planting calendar, and F) Implementing climate insurance system. Through this research is expected to create climate-resilient agriculture in Dieng Volcanic Highland.

Keywords: Dieng, frost, hazard, mitigation, potato

Cropping calendar scenario based on climate projections against regional climate change in the southern part of Indonesia

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Although there have been many studies in climate projection and cropping calendar, but a little evidence in relationships with climate change in the southern part of Indonesia, especially in East Nusa Tenggara. East Nusa Tenggara (NTT) Province, a province with consists many islands, typical monsoon climate with low annual rainfall. The aims of this study is to predict potential rainfall that can be used for agriculture, to calculate crop water requirement (especially for rice and corn), and to decide planting schedule for rice and corn during 2016 – 2020 in Kupang, East Nusa Tenggara Province as the southern part of Indonesia. As the results, for climate projection, temperature during period 2015 – 2040 will be increased around 0.4°C, and rainfall will be fluctuated during that period. Data rainfall prediction is used to predict water balance during 2016–2020. Water balance for each beginning of planting season was used as basic to decide planting schedule of rice and corn. The result shows that water potential from rainfall is 838.9 mm/year. The amount of crop water requirement for rice on December and January (2016 – 2020) are 605.73 mm/planting season and 611.56 mm/planting season, respectively. Further, crop water requirement of corn (December and January) are 344.78 mm/planting season and 348.19 mm/planting season, respectively. Planting schedule scenarios during 5 years (2016 – 2020) for rice and corn are dominates in December and January.

Keywords: change, climate projections, climate water balance, crops calendar, rainfall

Performance of a dynamic model for predicting rate of water loss during corn grains drying process using a NARX Neural Networks

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This study investigating modeling and simulation of the corn grains drying process as a dynamic system. The appropriate use of a dynamic model of the rate of water loss to air temperature leads to an effective method for optimizing corn grains drying process. The dynamic characteristic of the water loss of corn grains during dynamics treatment of temperature in the drying process was measured in a continuous manner using a precise load sensor. The development of an artificial neural network (ANN) models based on the nonlinear autoregressive with exogenous input (NARX) model and are applied using the MATLAB® Neural Network Toolbox™ tools. The dynamic responses of the water loss to air temperature were used for model training and validation. A three-layered NARX ANN model (1-10-1 number neurons of each layer with two times delay) was used to identify and make a model such complex system. The developed model showed the accuracy of the rate water loss of corn grains during the drying process, with the MSE value is 1.88892×10^{-4} and R is 0.891594.

Keywords: air temperature, artificial neural network - NARX model, drying process, rate of water loss

Characteristic of protein extraction and hydrolysis profile of jack bean protein (*Canavalia ensiformis* L. DC) with proteolytic enzyme

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Jack bean (*Canavalia ensiformis* L. DC) is legume which is commonly known as high vegetable-based protein, however, jack bean has some demerits such as presence of HCN as anti-nutrition and poor bioavailability of its protein. Hydrolysis of protein serves peptides which are easily to be digested. The objective of this study was to investigate the hydrolysis profile of jack bean protein. HCN in jack bean was eliminated by soaking in water for 24 and 72 hours, followed by fat removal and protein extraction under alkali condition (pH 8 dan 9.5). Protein was subjected to hydrolysis by proteolytic enzyme at time course 60, 120, 180, 240, and 300 minutes. Hydrolysis profile was defined by SDS Page to determine jack protein hydrolysate profile after enzyme treatment. Soaking of jack bean in water for 24 hours enabled to lower HCN content into remained 8.76 ppm in the bean. Protein extraction at pH 8 exhibited promising protein yield and protein profile than pH 9.5. Soaking treatment for 24 hours showed protein yield 88.19% which is much higher than soaking for 72 hours (42.98%). Hydrolysis of jack bean protein with alcalase enzyme was remarkably found to effectively hydrolyze jack bean protein into smaller molecular weight rather than pepsin and trypsin in SDS Page. Degree of hydrolysis increased as the hydrolysis time increased and peaked at 25.73% at fifth hour at 24 h soaking. Thus follow the promising candidate of jack bean protein hydrolysate by alcalase to increase protein bioavailability.

Keywords: alcalase, degree of hydrolysis, jack bean, protease, protein extraction

Comparison of appearances and color indexes for *tempe* with different packaging using digital image analysis

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Appearance and color in tempe are changed during the fermentation, and would be the important factor in the consumer's purchase decision. The purpose of this study was to determine the influence of four packaging types (plastic, banana leaf, teak leaf, and waru leaves) to the appearances and color indexes during tempe fermentation. The digital image analysis was used to compared the tempe surface appearance and color between the samples up to 120 hours fermentation. The results showed that the use of different types of packaging affected the tempe appearance and color. Tempe packed with teak leaf more quickly decreased the value of L^* , increase the value of b^* , and increased the occurrence of black spots on the surface. The plastic gave the most stable color changes throughout tempe fermentation, followed by waru leaf, banana leaf, and teak leaf.

Keywords: appearance, color, digital image analysis, *tempe*, packaging

Effect of *Sargassum hystrix* extracts on weight and blood biochemical profile of Wistar Rats under condition of swimming stress and fasting

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The research aimed to understand the impact of ethanolic extract of *Sargassum hystrix* on the cortisol hormone, glucose, triglycerides and cholesterol parameters as a stress indicator through in vivo assay. In vivo assay were conducted using 3-months old female Wistar rats (weight approximately 110-160 g). The total of 35 rats were divided into 7 groups; normal control, fasting control, negative control and positive control (diazepam 0.81 mg/kg; *S. hystrix* ethanolic extract 150 mg/kg; 300 mg/kg; 450 mg/kg). Groups of negative and positive control were given a stress treatment that is fasting (ad libitum drink and no food were given) and 5-minutes swimming. Stressor was given every day in 10 days. Weight measurement were performed every day. Blood sample were collected on day-0 (baseline), day-5 and day-10 for the analysis of glucose, triglycerides, cholesterol and cortisol hormone. The result showed that the ethanolic extract of *S. hystrix* (150, 300 and 450 mg/kg) could reduce the stress caused by the reduction of glucose, triglycerides and cholesterol level. 150 mg/kg dose of ethanolic extract of *S. hystrix* has similar ability as diazepam to reduce the level of cortisol hormone, whereas the dose of 300 and 450 mg/kg can reduce the level of cortisol hormone faster (in day-5 of in vivo treatment).

Keywords: *Sargassum hystrix*, cortisol, in vivo, oxidative stress, swim stress

Effect of cooking methods on proximate value, antinutrient content, and antioxidant activity of jack bean (*Canavalia ensiformis*) tempe

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Indonesia has a very abundant biodiversity; one of its kinds is Jack Bean (*Canavalia ensiformis*). It has a high potential as protein source seen from the content, the affordability, and the productivity. Today, Jack Bean Tempe become less popular thus requires efforts to improve the utilization through various ways such as exploration of antioxidative value and implementation of the best cooking methods. This study was conducted as a preliminary study of product development which aims to determine the effect of various cooking processes on the chemical changes of Jack Bean tempe. Jack Bean tempe was boiled, steamed, fried, and baked prior to freeze dried. Control (raw tempe) and cooked tempe were analyzed the antioxidant properties, anti-nutrients content, and proximate value. The experiments were conducted based on Completely Randomized Design with repetition. The results showed that the protein content of Jack Bean tempe was 37% (db). Steaming process could further maintain the protein content, the minerals content, and the antioxidant activity of Jack Bean tempe. Boiling process significantly decreased the phytic acid content as anti-nutrients. Roasting and frying process increased the fat content and decreased the protein content of Jack Bean tempe.

Keywords: antioxidant activity, cooking methods, jack bean *tempe*, proximate value

Development of “SMART EYE” —smartphone application— to determine image color and texture of a product

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The value and color space are used to describe and visualize colors in two or three dimensions. Usually color measurement is utilized colorimeters, such as Minolta chroma meters, Hunter Lab colorimeter, and Dr. Lange colorimeters. However, those methods are only able to measure an area of about 2 cm², therefore they fail to describe the overall color of the product surface (León, *et al.*, 2006). The development of digital cameras and computer technology, integrated with image processing techniques in a computer vision system, can be used to analyze and quantify colors more comprehensively than conventional color measuring instruments (Yam and Papadakis, 2004). With rapid development of smart-phone, supported by a reliable operating system, a method to detect the quality parameters of fruits can be done quickly. In this research, an image processing program namely Smart EYE was developed. This is an Android-based application to measure image color parameters of L, a, b and image texture of energy, entropy, homogeneity, and contrast. The resulting color and texture values can be used for further analysis to assess the quality of the product.

Keywords: application, smart eye, smartphone

Industrialization of soygurt products and its diversification on rural areas of soybean production center for improving local superior products

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Soybean as vegetables protein sources has an important role for improving the nutrition of the community. Nowadays, soybean demand increased related the development of food industry. The post-harvest of soybean farmers most beneficial influenced on the merchants or speculator who have an impact on the soybean farmars haven't the bargaining power against crop yields achieved. The development of industrialization in the production area centers of soybean farmers for producing post harvest to commersial products has needed by the community. Yogurt products from soy (sogyurt) contain high nutrients and vitamins and are a functional food product with low prices for the community. Sogurt product necessary to be produced and disseminated to the community because limited only the products of tofu and tempeh for processing from soybean. The development of the industrialization of soygurt products and its diversification in the production area centers of soybean farmers involving community and the government provide solutions to increase the economic value of soybean and make the production centers become more developed. The methodology of development of soygurt industrialization has been done through preparing the need factors attributed to the laboratory scale, soygurt product desain including formulation related to the industry standard based on the community's preferences and production cost, product quality test analysis on physical, organoleptic and laboratory test, packaging design, SPIRT licensing, concept testing of soygurt to consumers and product dissemination to market level. The result activities in building rural community agroindustry to soygurt products can increase the economic value of soybean and industrial development in the region based on products of local wisdom.

Keywords: industrialization, local soybeans, product development, soygurt

Optimization the synthesis condition and characterization of methylcellulose obtained from jack bean seed hull (*Canavalia ensiformis* L. (DC.))

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Cellulose isolated from jack been seed hull is used as material for methylcellulose synthesis. Optimization of methylcellulose synthesis condition obtained by Response Surface Methodology (RSM) central composite design at NaOH concentration 27,59; 31; 36; 41, and 44.41% (w/v), volume of dimethyl sulfate 3.32; 4, 5, 6, and 6.68 mL, and time of methylation 4.32; 5; 6; 7; and 7.68 hours with remethylation in same condition, based on degree of substitution (DS). The increasing of NaOH concentration, volume of dimethyl sulfate, and time of methylation increase the DS until the certain point then decrease gradually with the further increase of them. The optimum synthesis condition is at NaOH 35.49%; 5.18 mL dimethyl sulfate, and 6.05 hours with remethylation in same condition. Methylcellulose obtained from that condition has DS value 1.74 ± 0.02 , methylcellulose yield $104.77 \pm 0.78\%$, solubility $72.31 \pm 1.78\%$, WHC 15.06 ± 0.11 g water/g dry sample, OHC 4.22 ± 0.08 g oil/g dry sample, viscosity of 2% solution 356.57 ± 11.54 cPs, moisture content $9.45 \pm 0.18\%$ (db), ash content $2.91 \pm 0.21\%$ (db), lightness 88.52 ± 0.13 , pH 1% solution 7.28 ± 0.13 , loss of drying $8.04 \pm 0.11\%$, cristallinity index 61.02%, and has ability to form thermoreversible gel at 60°C.

Keywords: cellulose, jack bean seed hull, methylcellulose, methylation, Response Surface Method (RSM)

Color as a predictor of chili content

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Chili sortation is based on physical appearance such as color, size, shape, and defect. Using sensory analysis, it is easy to classify the chili quality based on physical appearance. Color is an important quality attribute for many commodities, include chili. Color is considered to reflect the freshness and maturity of the chili. The feasibility of predicting capsaicin, vitamin C, and total carotene in fresh red chili based on color measurement was investigated. Chili samples at various growing stages were obtained from the farmer. Samples were measured for color (La^*b^*) using chromameter and chili contents. Regression analysis was used to develop prediction models for chili content based on color. The overall results demonstrate that color can be used as a predictor of chili contents.

Keywords: chili content, color, prediction

Effect of adding the chicken feces meal into the biogas sludge as the bran mixture on the white oyster mushroom (*Pleurotus florida*) productivity

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The aim of this research was to determine the effect of adding the chicken feces meal into the biogas sludge as the bran mixture on the white oyster mushroom productivity. The biogas sludge was dried under the sunlight for 3 days. The sludge was divided into K without chicken feces meal, V₁ with the addition of the chicken feces meal (15%), and V₂ with the addition of the chicken feces meal (45%). V₁ and V₂ were mixed on media ingredients with oyster media control (10% bran with sludge 40 gram) with 3 replications. Parameters observed were harvesting period, fresh weight per champignon, number of umbrella per cluster, stalk length, and diameter of umbrella. The data were analyzed using completely randomized design of variance pattern and differences between mean were tested using Duncan's Multiple Range Test (DMRT). The result showed that the best treatment was mushroom media on V₂ with the addition of the chicken feces meal (45%). The white oyster mushroom productivity was increased on the fresh weight per champignon of 35.92% and diameter umbrella of 24.46%, number of umbrella per cluster of 63.53%, and stalk length of umbrella of 24.15%.

Keywords: beef cattle sludge, chicken feces meal, white oyster mushroom

Analysis of the influence of physical and mental workload on worker productivity in Bakery SME

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Worker is one of the important factors in Small Medium-sized Enterprise (SME) because of manual production. Workload and daily production target influence worker productivity. The research objectives are: 1)To measure worker physical and mental workload in Bakery SMEs; 2)To analyze the relationship between physical, mental workload and productivity. The case study of research is in SME an anonymous bakery SME in Sleman. Physical workload indicator was based on heart rate. Heart rate was measured using wrist pulsemeter. Cardiovascular load percentage was calculated using measured heart rate work and leisure time. Mental workload indicator was measured NASA-TLX questionnaire. It had six indicators as mental, physical, temporal demand, performance, effort and frustration level. Productivity was identified by the dough output. The relationship between physical, mental workload and productivity was analyzed using polynomial quadratic regression. The result concluded the worker productivity in bakery SME was influenced by physical and mental workload as much as 80.8% and 19.2% influenced by other factors. The result of 80.8% was significant compared to the other one in SMEs. This result provided the linear model opportunity to be used easily instead of non-linear to define the worker and production system interaction in SMEs.

Keywords: heart rate, polynomial quadratic regression, questionnaire of NASA-TLX

The effect of ethepon treatment on the formation of flower in melon (*Cucumis melo* L.)

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Melon is a potential horticultural crop which the production is increased significantly each year in Indonesia. However, melon plant that has been widely developed in Indonesia faced a problem due to the high tropical temperature affected the fall of flower causing failure production of fruit. In addition, the variation of sex expression in melon flower is important for genetic analysis and breeding programs. Ethepon is one of plant chemical growth regulator known to change the sex expression of plant by increasing the number of female flower in monoecious plant especially Cucurbitaceae. This research aimed to analyze the effect of ethepon treatment on the sex determination of melon flower. This study was conducted by 3 stages treatment of ethepon during March – July 2014, namely when 2, 5, and 7 weeks after planting. The research was designed using Split-plot completely randomized design by cultivating melon cultivar Melodi Gama 1, Melodi Gama 3, Bartek, and PI 371795. The data were analyzed by F test and Duncan Multiple Range Test (DMRT) with accuracy level of 5% using software SAS 9.3. The result showed that ethepon treatment affected the formation of melon flower by increasing the number of female or hermaphrodite flower and decreasing the number of male flowers, especially in concentration of 75 ppm and 100 ppm but with different responses in different cultivar.

Keywords: ethepon, flower formation, melon, plant breeding, sex expression

Development strategies of small and medium enterprises of fishery processed product in Sambas, West Kalimantan

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Potential of fishery sector in Sambas Regency, covering potential of cultivation fish marine resources, and fish processing and marketing of fishery products. The potential of the fishery sector from year to year is always an increase in productivity. However, the real condition of the economy for most people in this sector such as fishermen is still very alarming. The development of processing industry, diversification and distribution of fishery products conducted by Small and Medium Enterprises (SMEs) is considered to be a solution for the problem. But again, this business is still experiencing constraints due to the lack of business centers for processing of fishery products, plus yet the absence of identification and scientific study of the processing industry of the region's superior fishery products in Sambas Regency. The aim of this research is to identify, determine and map the prospective small and medium enterprises / industries, then formulate the development policy strategy and policy priorities resulting from the formulation of strategic policies concerning the development of SMEs for the processing of fishery products using Strengths, Weaknesses, Opportunities, Threats (SWOT) And Quantitative Strategic Planning Matrix (QSPM).

Keywords: fishery product processing, LQ, QSPM, SME, SWOT

SOCIO-ECONOMIC DIMENSIONS IN TROPICAL

Agricultural Socio-economics

Fishery Socio-economics

Livestock Socio-economics



A close-up photograph of a man from the chest up. He is wearing a light-colored t-shirt and a dark baseball cap. He has a serious expression and is looking directly at the camera. His hands are dirty and are holding a bunch of palm oil fruits (palm kernels). The background is a dense green forest.

AGRICULTURE

Stakeholders-sustainability model for crumb rubber agro-industry: a case study in Pulang Pisau District of Indonesia's Central Kalimantan Province

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A considerable number of studies on Indonesia's crumb rubber agro-industry have been conducted over the last decade but none has explicitly integrated stakeholder and sustainability as background concepts. This study is designed to analyze significance of stakeholders' role in shaping sustainability potential of crumb rubber agro-industry. "Stakeholders" refers to Government, community, and business holders, while "Sustainability" is fragmented into economy aspect, environmental aspect and social aspect. Serving as exogenous variables are "Role of Government", and "Role of Community", while serving as endogenous variables are "Role of Business Holders" and "Sustainability". The Partial Least Square-Structural Equation Model is employed to analyze significance of "Role of Government" and "Role of Community" towards "Role of Business Holders", respectively, which further gives effect to "Sustainability". The analysis is performed according to business segment i.e. rubber farming, raw rubber trading, raw rubber processing and the combination of the three, as well as on the basis of sustainability aspects. In the case of Pulang Pisau District, Central Kalimantan Province, the study reveals that at combined-business-segment level, both "Role of Government" and "Role of Community" significantly affect "Role of Business Holders" but "Role of Business Holders" does not give significant effect to "Sustainability". Different outcomes are resulted from similar analysis at business segment level (rubber farming, rubber trading, and rubber processing) as well as in respect to each and combined aspect of sustainability (economy, environment and social). The result of this study suggests areas to be improved by stakeholders in order to establish crumb rubber agro-industry sustainability.

Keywords: crumb rubber, stakeholders, sustainability

The effect of technical efficiency of production and revenue on farm household food security in Gunungkidul

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This study aims to: (1) know factors affecting rice production; (2) assess the level of technical efficiency on rice farming; (3) determine factors affecting the income of rice farming; and (4) analyze factors affecting food security level of rice farmers' household. The basic method used in this research was analytical descriptive. Two sub-districts in Gunungkidul Regency, Wonosari and Giritirto, were chosen by purposive sampling as study area. The sample was taken randomly, i.e. 30 respondents for each sub-district. Factors influencing rice production and the level of technical efficiency on rice farming were calculated using Stochastic Frontier Production Function; factors influencing rice farm income were measured using unit output of price profit function; factors influencing the household food security level was calculated using share of household food expenditure; all objectives were analyzed using two-stage least square (2SLS) regression. Results showed: (1) Factors affecting rice production were labor allocation and amount of seed, NPK, TSP, and ZA fertilizers; (2) Technical efficiency of rice farming had yet efficient in input use; (3) Rice farming income was influenced by the price of Urea and ZA fertilizers, price of Fastac and Samak pesticides, land area, production quantity, and technical efficiency; (4) household food security was affected by the price of rice, chicken eggs, tofu, and chicken meat, as well as income of rice farming.

Keywords: food security, income, Gunungkidul Top of Form, rice production, technical efficiency

Organic rice farming characteristics and food consumption in Sleman District

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Rice is the important staple food for Indonesian people. However, the rice cultivation is faced to some issues, for example using a huge amount of synthetic materials which might reduce the quality of environment. In contrary, some studies revealed that the usage of low-cost-natural planting system might increase farmer's income as well as the sustainability of environment. Aim of this study was to examine the farming characteristic, i.e. production cost; revenue; income, and the nature of household organic farmer expenditure in Sleman District. The study was done by taking 30 samples of organic rice farm household using proportional random sampling method. The samples taken were certified as organic farmers. Farming characteristic and household food consumption was examined by doing interview on farmers to know the (1) total cost for organic rice cultivation, (2) revenue, (3) income, and (4) household expenditure per year. The results showed that organic rice farming income per hectare in Sleman District was Rp 14,912,202, while the cost per hectare was Rp 8,743,365. Furthermore, proportion of food expenditure in household of organic farmer was 55.68 %, and was categorized as low. Factors that positively affect the share of household organic rice farming expenditure in Sleman District is egg prices; price of cooking oil; sugar prices; instant noodle prices and tempe prices, while organic rice farming income is a factor that negatively affect the share of food expenditure.

Keywords: cost, organic rice farming, revenues, the proportion of food expenditures

Producer price volatility of red chili pepper and cayenne pepper in several production center provinces and Indonesia

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This study aimed to determine the producer price behavior and volatility of red chili pepper and cayenne pepper in several production centers and Indonesia. The data used in this study was secondary data from Central Bureau of Statistics which was statistical data of producer prices of red chili pepper and cayenne pepper in 2008 to 2015 presented by month. The analysis method to determine price behavior was ARIMA, and to determine price volatility was ARCH/GARCH. Based on the analysis, the result of producer price behaviors of red chili pepper was: 1) North Sumatera followed ARIMA model (2,1,2); 2) West Sumatera followed ARIMA model (1,0,0) and 3) West Java, Central Java, East Java and Indonesia followed ARIMA model (1,0,1). The result of analysis of the producer price behaviors of cayenne pepper was 1) Aceh, Central Java, and Indonesia followed ARIMA model (1,0,1); 2) West Java followed ARIMA model (3,0,2); 3) East Java followed ARIMA model (1,0,0) and 4) West Nusa tenggara followed ARIMA model (1,0,2). Based on the analysis, the producer price volatility of red chili pepper in North Sumatera, West Java, East Java, and Indonesia could be categorized as high, while the price volatility of red chili pepper producers in West Sumatera and Central Java was categorized as low. The producer price volatility of cayenne pepper in Aceh, Central Java, East Java, West Nusa Tenggara and Indonesia was categorized as high, while the producer price volatility of cayenne pepper in West Java was categorized as low.

Keywords: ARIMA, cayenne pepper, producer price, red chili pepper, volatility

Shallot farmer's adaptation toward climate change phenomenon in Larangan Village, Larangan Subdistrict, Brebes District

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This research examined the issue related to farmer's adaptation toward climate change phenomenon, specifically for farmers whose main commodity is shallot, in Larangan Village, Larangan Sub District, Brebes District. The purposes of this research are to understand the adaptation strategies, which are done by the shallot farmers in their planting field, toward climate change phenomenon. The study used a combined method (qualitative and quantitative method) by using non participative observation and performing interview to respondents and several informants. The result of this research shows that the adaptation strategies of shallot farmers toward climate change in Larangan Village on direct case consist of several aspects; cultivation aspect (changing the planting pattern, using the pump, changing the land management, and increasing the utilization of pesticide), agricultural financing aspect (storing shallot in para-para), and cultural diversification aspect (horizontal diversification/planting other commodities and seasonal transmigration).

Keywords: adaptation, climate change, shallot farmer

Consumer perceptions of snacks with local flour (mocaf) in Batu and Malang, East Java, Indonesia

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One of the impacts of the globalization era is the changing lifestyle of society which also has implications for the changing of society consumption pattern today. Various types of food products offered are also very varied, and mostly made from imported raw materials such as wheat flour. This study aims to determine consumer perceptions of food such as snacks made from local flour (mocaf - modified cassava flour). The research was conducted in Malang and Batu, East Java. Samples were obtained using non probability sampling with convinience sampling technique. While the analytical method used qualitative descriptive analysis. The results obtained that consumer perceptions of the seven dimensions of the quality of snack products (crispy mushrooms) are in the range of scale above 3 (Good). There are five attributes that have a better perception value than the 13 other attributes. These attributes are health benefits, expiration, local products, packaging materials and affordable prices.

Keywords: consumer, perception, snacks, local, mocaf

Risk and behavior analysis rice farmers in Southern Lampung District

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One of the agricultural commodities that have an important role in food self-sufficiency is rice. Rice farming is highly dependent on environmental factors that pose a threat to the welfare of farmers. Risks that faced by rice farmers include price risks, production risks, and income risks. This study aims to: (1) analyze the risk of production, price, and income of wetland rice farming on technical irrigation and rainfed land in South Lampung regency, 2) to analyze farmer behavior on rice farming risk on technical irrigation and rainfed land. The research was conducted in August - September 2016 in Kecamatan Palas, rice production center in South Lampung. The farmers sample consist of 23 paddy field farmers technical irrigation, and 37 rained farmers, that is taken proportionally in random sampling. Data were analyzed quantitatively including analysis of coefficient of variation, Bernoulli Theory and Neuman Morgenstern. The results show: (1) the risk of production, price, and income faced by rice farmers on technical irrigation land is lower than from rainfed; (2) most rice farmers behave neutrally to the risk that is on technical irrigation land of 78.26% and rice farmers in rain-fed land is 81.08%. No farmers were found to be brave at risk either on technical irrigation lands or on rainfed land.

Keywords: farmer behavior, rice paddy, risk

Analysis of consumers' intention to use smartphone-based applications in organic agriculture products purchasing

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Recently, there have been many emerging smart phone applications that are used in marketing activities including agricultural products. However little is published about what drives people to engage in online purchasing of agriculture products. This study aims to reveal the factors that influence the intention to use smart phone-based application in purchasing organic agriculture products. The smart phone-based application used in this study namely *Kecipir*. Samples were taken by non probabilistic method of consumers who intend to use *Kecipir* application to buy organic agriculture products, with the sample of 150 respondents in Jabodetabek area. Data analysis using Structural Equation Modeling (SEM), while technique research conducted by survey with the online questionnaire as a tool of data collection. The result showed that all variables used in this study, namely compatibility, altruism, perceived risk, perceived ease of use, and perceived usefulness were significant determinant factors of behavioral intention to use *Kecipir*, whether it directly influenced intention or indirectly influence intention through attitude toward using the application. This study has some limitations. First, the data were drawn using online questionnaire which oftentimes does not reflect the real condition of a certain respondent. Second, the samples may not fully represent the entire population. Lastly, the subjects of this study were those who had known *Kecipir* application, but the level of understanding of each respondent might be different which makes it possible to influence the result of study.

Keywords: intention, organic agriculture, smartphone application usage, structural equation modeling, Technology Acceptance Model (TAM)

The dynamic of food crops farmers in responding to the emergence of new information and communication technologies (ICTs) in rural Yogyakarta

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From the beginning of modernization of agricultural and rural development in rural Indonesia started in early 1970s, the dissemination of information, technology and innovation to farmers has been conventionally undertaken by Training and Visit (T&V) system. In principle, implementation of T&V system, new extension materials on technology and innovation of agriculture were delivered by using face to face communication, group meetings and farmers training. In line with modernization process, the use of mass media (printed and electronic) for information delivery related to agricultural development has been gradually increasing. Information and Communication Technologies (ICTs) is commonly referred as electronic media or cyber media as one type of mass media has been widely acknowledged play important role in the agricultural and rural development process. This paper discusses how does traditional food crops farmers di Yogyakarta access and utilize ICTs for supporting daily life activities including agricultural activities. Characteristic of farming and socio-economic characteristics of farmers in rural Yogyakarta have been considered as important factors in determining the use of ICTs either for daily live activities or farming related activities. Research method of the study was descriptive method. In general, food farmers have been using electronic media such as television, radio, and hand phone with function for entertaining, education and getting new information. Information gathered from ICTs include social, cultural, economic, health and environmental issues. The use of conventional electronic media particularly television and radio for accessing agricultural information is still considerably important, while the use of new media namely internet via hand phone and smart phone is still limited among food crop farmers. Information on agriculture which accessed by farmers through ICTs was still dominated by technological innovation of production aspects.

Keywords: communication, farming, food, new media

The ethics of agricultural information literacy of farmers in the coastal sandy land of Yogyakarta Special Region

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Agricultural information literacy of farmers is a prominent aspect for the growth of farmers. It can improve the human capital of farmers, promote efficiency of agriculture, and help in reaching better life conditions. However, the ability of farmer literacy is apparently lacking when compared to the wide availability of information. This study aims at exploring the extent of chili farming information literacy of farmers in the coastal sandy land of Yogyakarta Special Region and strengthening the farmers' information ethics literacy. The research was conducted by using a semi structured questionnaire based survey of 50 farmers working in two villages of the coastal sandy land area. The result shows that farmers needed information of chili farming for various purposes. Meanwhile, farmers mostly concerned about the information of chili seed qualities and the price and marketing information of chili product. The fluctuation of price of chili has become a critical issue for farmers in every harvesting period. Other than agricultural information, information about economics, health, and culture were also prominent issues for them. Farmers relied on farmer group members in seeking the information while television is the most attractive media for them. Many farmers were well aware of modern techniques of agriculture on coastal sandy land because it is beneficial for chili farming. This paper strengthens the moral education of information literacy by paying attention to the code of ethics. In implementing of ethics of information literacy, farmers should have conducted the confirmation of new information, respected to the right of privacy, implemented social responsibility and considered self respect and had an initiative to seek, confirm and implement information.

Keywords: agricultural information, coastal sandy land, farmers, information literacy

Local food and sustainability of household food sufficiency in Gunung Kidul Regency

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Local food is one of environment's potentials which can be used to support human life. Some of its uses like increasing community income, accelerating food diversification, and reaching food sufficiency make it needed to be developed. This research is aimed: 1) to identify the existing of local food and 2) to know the role of local food on household food sufficiency sustainability. Qualitative method is used to analyze numerous kinds of respondents' respond, which are gathered by interview and FGDs. The result showed that many local food from agricultural products, such as rice, fruits, vegetable, cassava, corn, soy beans, etc. The farmer process those product and make a business of its. The local food business has been started from few years ago either individually or cooperatively. They usually sell the local food as a processing food, except rice. A huge of local food processing product is fried snack and only limited food is sold in another type of food processing. The local food play some roles, such as (1) staple food, especially for rice, (2) contribute in household income, and (3) medium of business learning and cooperative networking.

Keywords: food processing, local food, role of local food

Association development of fish farmer with arc model for improving competitiveness of aquaculture in Yogyakarta

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The problem of small-scale fisheries agroindustry is complex because of fluctuating production. Access to capital is lacking, post-harvest handling is not perfect, technology is simple, scattered location and below education level of farmers. So consequently, the quality of final product and price are shallow. With this situation, the strengthening of freshwater fisheries agro industry is intended to strengthen the position of fish farmers in the fishery industry, so that farmers are able to absorb the profit optimally from the fishing industry activities to improve the livelihood of farmers. The purpose of this research is making model planning, development, and institutional strengthening of fishery agroindustry. Joining farmers in the institutional fish farmer group will strengthen the institution as an institution that plays an important role to strengthen the bargaining position of farmers in marketing their fishery products, which ultimately affect the income.

Keywords: association group, system of fishery industry

Spatial system dynamic modelling of land availability to cover beef supply and demand

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System Dinamic Model (SDM) is an effective approach model in solving problem of complex system. Although there have been development in expanding System Dynamic to include spatial system model, most application have been restricted to simulate many chances and get the wise argumentated policy. This study is conducted to answer increasing demands of beef in Daerah Istimewa Yogyakarta (DIY), Indonesia by looking into the availability of land to be used as feedlot. The background of the study is initiated after looking a gap between rising demand of beef and its supply. Demands of beef in Indonesia rise rapidly by 4 %/yr but the production growth by only in 2.38 %/yr (Indonesia Statistical Data Beaurea, 2016). In DIY the condition is similar. There is a gap between rising demands of beef and its supply too. This research focus in to what extend the availability of land can cover dinamic change condition. We used Spatial System Dynamic to close the objective of the study. We incorporate a partial dynamic System Approach especially a Causal Loop Model (CLD) to achieve the goal of the research. This study is result generally suggests that DIY Area, there is suffice to meet the increasing beef demands. A number of policy might be taken to solve the problem. Among them is to properly address land usage. In future time, we might to keep land wise and also we must handle of agriculture land to other purpose seriously.

Keywords: availability, beef, land, spatial, system dynamic

SUSTAINABLE TROPICAL AGRICULTURE

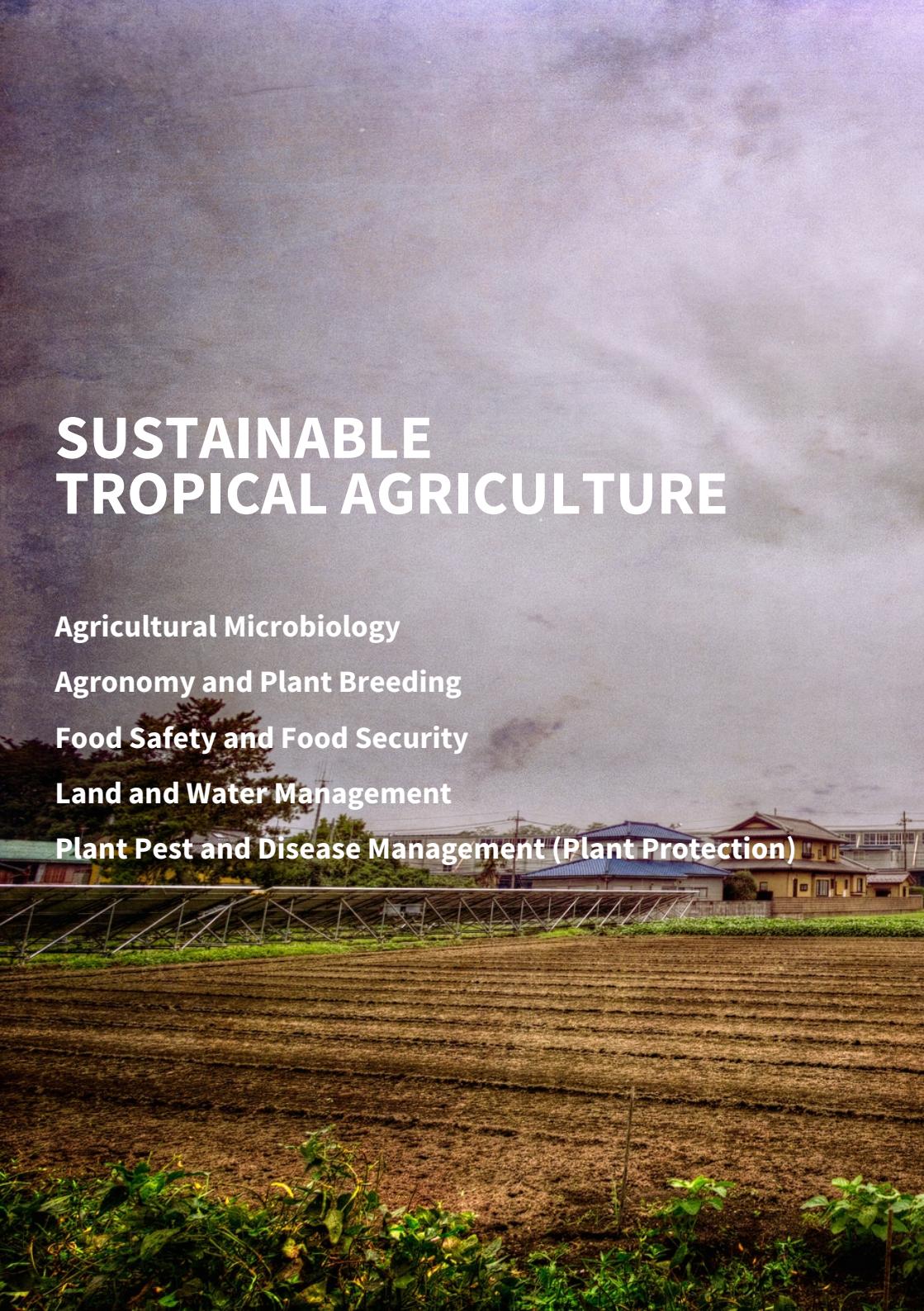
Agricultural Microbiology

Agronomy and Plant Breeding

Food Safety and Food Security

Land and Water Management

Plant Pest and Disease Management (Plant Protection)





Utilization of the favorit plants as the base of substance of syar'i herb toothpaste

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Citizen of Indonesia that majority as the muslims, while every individual needs toothpaste that uses as the cleaner teeth but also could guaranteed of the halal. And the second, in Indonesia has many herb plants like betel leaf, siwak (toothbrush that from roots of the herb plant), gambier, areca nut, and mint leaf that has so many good benefit as the medicine plants. Also, according to the research the herb of plants could impede the growth of microbe and fungi. The research of utilization of the five herb plants as the base of substance of toothpaste that have more a practical shape and appropriate with the halal for of all the muslims that never did before. So, as the research of the five herb plants that need to do with extraction of every substance with soxletation. Then, do the testing of microbiology as the every extraction results. Next, to search the right formulation with formulated of it. And then, do the testing of microbiology again until resulted of the formulation of paste that has capable to obstacle the biggest bacteria and fungi that could scrape the plate and prevent of bleeding, evaporate of teeth, and fresh the mouth out. From the results of the research of the five herb plants, four from it are proved to capable to obstacle bacteria and fungi with the first is betel leaf, gambier, siwak, and areca nut that could obstacle the growth of the *Diplococcus* bacteria sp 47.5 mm for betel leaf, and 27.0 mm for gambier, 11.0 mm for siwak, and 7.1 mm for areca nut. But while on, the *Straphylococcus aureus* is 13.0 mm for betel leaf, 11.0 mm for gambier, 10.0 mm for siwak, and 8.9 mm for areca nut. And for the *Streptococcus* of mutan is 36.1 mm for betel leaf, 14.1 mm for gambier, 11.8 for siwak, and 7.8 for areca nut. The last is the *Candida albicans* is 41.0 mm for betel leaf, 10.4 for gambier, 14.0 mm for siwak and 7.5 mm for the areca nut. The next is the results of the extraction of herb plants that proved has benefits, will formulated to get the composition of paste, and the best of capable to obstacle zone is the composition that from the areca nut with 0.4 g and gambier, siwak, betel leaf and mint leaf is 0.2 g for every composition. And then this composition of formulas that made from herb substance. This composition formulas don't need any adding substance, so it's pure from herb only and that makes it be halal. And from the results of this research could be concluded that the extract of betel leaf has the biggest capable to impede is 47.5 mm. while the composition of formula that has the biggest of impede is formulation 4, that the

substance with 0.4 g of betel leaf and 0.2 g for every another like gambier, siwak, areca nut, and mint leaf. Although the mint leaf has not impede energy but mint leaf has menthol composition that carry the fresh and aroma effect. So from this five plants are proper to be the base of substance of syar'i herb toothpaste. The results of this research that hoped to be the base of scientific to usage of the composition's formula of toothpaste that from the five favorit syar'i herb plants.

Keywords: areca nut, betel leaf, gambier, mint, siwak, toothpaste

Biosorption of metals ion on methanol dehydrogenase activity test of *Bradyrhizobium japonicum* USDA110

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This research aims to know effect of absorption metals ion (bisorption) which have different group elements on methanol dehydrogenase (MDH) activity test of nitrogen fixation bacteria *Bradyrhizobium japonicum* USDA 110. Ten of metals ion 30 μM concentration were tested to grow *Bradyrhizobium japonicum* USDA 110 in diluted one per ten of nutrient medium. The results of MDH activity test shown bacterial grown without added metal ion has similar MDH activity with bacterial added calcium ion/ Ca^{2+} . Highest enzymatic activity shown on bacterial grown with added magnesium/ Mg^{2+} was 0.08 (U/mg). MDH require to grow on anaerobic condition specially symbiotic *Bradyrhizobium japonicum* USDA 110 bacteria. Addition metal ion of magnesium/ Mg^{2+} accelerate bacterial growth 2.6 times and MDH activity 1.28 times than without added metal ion. This research has deduce during anaerobic condition on soil and symbiotic process, metal ions specially calcium and magnesium require to add on plant growth medium to accelerate growth *Bradyrhizobium japonicum* bacteria which well known as bacterial symbiotic on soy bean roots.

Keywords: *Bradyrhizobium japonicum* USDA110, biosorption, metal ion, methanol dehydrogenase, nutrient medium

Characterization of extracellular enzymes *Bacillus licheniformis* from milkfish gut (*Chanos chanos*) as protoplas isolation agent *Chlorella zofingiensis*

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The bacterial isolates from the milkfish gut (*Chanos chanos*) have been known as *Bacillus licheniformis* that have cellulolytic capability and expected to be used as insulating protoplast agents from *Chlorella* to produce Single Cell Proteins. However the ability and characteristics of extracellular enzymes from *Bacillus licheniformis* is still unknown. Detection of extracellular enzyme capability from *Bacillus licheniformis* was done qualitatively and quantitatively. The formation of clear zones around the colonies after incubation for 24 hours on medium containing inducers of CMC, xylan, skim milk, and starch showed that these bacteria were able to produce cellulase, hemicellulase, protease, and amylase. The bacterial isolates were grown on inducer-enriched liquid medium in order to determine their growth profile by measuring cell density using spectrophotometer (OD600) everyday for 3 days. Optimum incubation time for producing cellulase and hemicellulase was also determined. Measurement of cellulase and hemicellulase activity was done by Bernfeld method. Optimum pH and temperature of cellulase and hemicellulase activity were also determined. *Chlorella* cell wall degradation test was performed by enzyme on *Chlorella* cells using safranin gram under the inverter microscope. Based on the results, best incubation time for *Bacillus licheniformis* in producing cellulase and hemicellulase were 2 days and 3 days, respectively with enzyme activity of 6.016 U/ml and 2.482 U/ml. The optimum pH for cellulase and hemicellulase activity was pH 7 and pH 6, and the optimum temperature was 29°C and 37°C. Cellulase and hemiselulase from bacterial isolate *Bacillus licheniformis* proved able to degrade *Chlorella* cell wall to produce protoplas.

Keywords: *Bacillus licheniformis*, *Chlorella*, extracellular enzyme, milkfish, SCP

Phytotoxicity and microbial toxicity of biodegraded indigosol blue 04B batik dye effluents by mycoremediation using fungi isolated in Banyumas

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Fungi are capable for treating various synthetic dye effluents. Seven strains of fungi isolated in Banyumas-Central Java were screened for their ability to decolorize Indigosol blue 04B batik dye effluents. Besides, the study was carried out to investigate the biodegraded its effluent was used for detoxification, phytotoxicity and microbial toxicity. The decolorized effluents were tested for its toxic effect on the agriculturally and environmentally important soil bacterial flora according to *Bacillus cereus* and *Azotobacter* sp., and also *Staphylococcus aureus* and *Escherichia coli*. Phytotoxicity assay was to assess the toxicity of fungus-decolorized broth using Green bean seeds (*Vigna radiata*) and corn seeds (*Zea mays*). Decolorization study showed that fungus were able to decolorize (21.04–99.89 %) Indigosol Blue 04B batik dye effluents, at room temperature after 3 days of incubation. The assay of phytotoxicity showed high response detoxification to the biodegradation of the effluents samples. There is no inhibition zone was found around the effluents samples treated with fungi after incubating *B. cereus* and *Azotobacter* sp., and also *S. aureus* and *E. coli* for 48 h. Superior isolates showed efficiency for degradations and could be used for batik waste mycoremediation.

Keywords: batik dye effluents, decolorization, indigosol blue 04B, microbial toxicity, phytotoxicity

Characterization of *Pseudomonas* sp. LS3K as nitrate removal agent at different C/N ratios under aerobic condition

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This study aimed to determine the characteristics of growth kinetics and the nitrate removal ability by *Pseudomonas* sp. LS3K on synthetic medium at different C/N ratios. This research was conducted by growing *Pseudomonas* sp. LS3K in denitrification medium under aerobic condition. Nitrogen source on the medium was sodium nitrate and carbon source was trisodium-citrate-dihydrate. The C/N ratios in the medium were adjusted to 5, 10, 15 and 20. The bacterial growth characteristic was observed based on the increases of the optical density value. Characteristics of nitrate removal by *Pseudomonas* sp. LS3K was observed based on the nitrate removal (NO_3^-) and nitrite (NO_2^-) production during the observation. The results showed that *Pseudomonas* sp. LS3K had the ability to grow in the medium with different C/N ratios and perform aerobic denitrification by reducing nitrate to nitrite. The best potential of nitrate removal ability *Pseudomonas* sp. LS3K base on the treatment C/N ratio 10 that resulting nitrate removal of (299 ± 16.43) ppm with the removal rate of (6.208 ± 0.34) ppm/h, removal efficiency of $(98.350 \pm 0.40)\%$ from the initial nitrate concentration and gave minimal nitrite production.

Keywords: *Pseudomonas* sp., aerobic condition, C/N ratio, growth kinetics, LS3K, nitrate removal

Evaluation of source and sink capacity of five Cowpea Varieties (*Vigna unguiculata* L. Walp) grown in two different altitudes

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Cowpea (*Vigna unguiculata* L. Walp) has the potential as soybean substitution for tempeh. The utilization of cowpeas is still low due to the limited knowledge and ability of the community in processing it. This resulted on the low interest in producing it even though it can be harvested in 70–80 DAP. This study aims to study the morphology and physiology characteristics of cowpea affecting the production of pods and seeds and the influence of altitude on the characters of cowpea. This research was conducted in two different altitudes (Dramaga site/210 m asl and Ciomas site/527 m asl), in Bogor, West Java. Five varieties of cowpea were used in the study. The results showed that interaction between varieties and locations influenced the character of leaf area and weight of dry-seed per plant. The dry-seed weight per plant was positively correlated ($r = 0.87$) with the number of pods per plant, while the number of pods per plant was negatively correlated with the leaf area ($r = -0.56$). The activity of the source increases two times at higher altitude. Plants grown in lower altitude produced wider leaves than in higher altitude. The seed yield in high altitude was higher than low altitude. Two varieties of cowpea (KT 1 and KT 6) produced seed >60 % at higher altitude.

Keywords: morphology-physiology characteristics, seed yield

The effect of BAP (Benzyl Amino Purin) and IAA (Indole Acetic Acid) to *Chrysanthemum* in vitro multiplication

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Adequate availability of *Chrysanthemum* seedlings, both in quality and quantity, poses a major problem for farmers. Developing new mutant varieties of chrysanthemum can overcome the problem in seedling quality, while in vitro propagation technique can be used for the solution to the quantity problem. Indonesian Ornamental Crops Research Institute has produced and released several mutated varieties, namely Yulimar, Awanis, Kineta, Marimar, and Merharyani. This research aims to study the response of five mutant varieties to the combination of plant growth regulator BAP and IAA. MS medium was enriched with BAP 0.5; 1; 1.5; and 2 mg/L, combined with IAA 0.1 mg/L. Research result showed that each variety has different morphological and growth type. Both Merharyani and Kineta have short habitus and broad leaves. On the contrary, Yulimar, Awanis, and Marimar have tall habitus and narrow leaves. Agar solidified MS medium containing 1.5 mg/L BAP and 0.1 mg/L IAA is the best medium for multiplication, as can be seen from plant's number of shoots, number of leaves, and number of shoot leaves produced. MS medium containing 0.5 mg/L BAP with 0.1 mg/L IAA or 1 mg/L BAP with 0.1 mg/L IAA is able to produce the highest number of roots in five mutant varieties used in this research.

Keywords: *Chrysanthemum*, benzyl amino purin, indole acetic acid

The effects of priming duration with salicylic acid under salinity stress on growth and leaf anatomy of sweet corn (*Zea mays* L.)

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Salinity stress is known for adverse effect on plants. Priming with salicylic acid was believed to be able to improve plant performance under salinity stress. This study were aimed to determine the effect of priming duration with salicylic acid on growth, leaf anatomy and to determine optimal priming duration for sweet corn seedlings (*Zea mays* L.) under salinity stress. The experiment was based on Completely Randomized Design with two factors and five replications. The first factor was priming duration with salicylic acid (2 mM) for four different durations (0, 12, 18 and 24 h). The second factor was the level of salinity (0 % and 3 %). Parameters observed were germination capacity, plant height, root length, fresh weight, dry weight, shoot-root ratio, chlorophyll content, proline content, leaf anatomy and stomatal density. Data were analyzed with t-test, ANOVA and followed by Duncan's test at 95 % confidence level. The results showed that 18 h priming duration resulted in the highest germination capacity. Priming for 24 h showed phytotoxic effect for sweet corn on the germination phase. Priming with salicylic acid for all durations improved root and stem growth; increased fresh weight, dry weight, shoot-root ratio, chlorophyll content, proline content and stomatal density, as well as could maintaining the leaf anatomical structure of sweet corn seedlings from the negative effects of salinity. The optimal priming duration with salicylic acid for sweet corn seedlings under salinity stress was 18 h.

Keywords: priming duration, salicylic acid, salinity stress, sweet corn

Phenotypic characters stability of Melon (*Cucumis melo* L. 'Meloni')

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FAO's data shows that melon production in the world on 2005 about 70 % of 28 million tons was grown in Asia. Melon is one of the agricultural commodities that effected Indonesia's economic rate, hence melon breeding is important to develop specifically for assemble the local cultivar to be superior. Meloni is one of local cultivars which was result of crossing between female melon SL-3 and male melon PI 371795. This study aims to discover superior character, determine the stability of phenotypic characters melon Meloni 4th and 5th generation. In this study, observed phenotype characters were analyzed using SPSS software quantitatively. The result had shown that unique character of Meloni's fruit was elliptical shape, cream skin fruit, the size was about 550 to 780 g (small to intermediate), the sweetness was 8.6–10.6 (brix), and has fragrance. The analysis had shown that phenotypic character between melon Meloni F4GH and F4LH was unstable, whereas between F4LH and F5LH mostly stable, except fruit thickness and sweetness level (brix). Environmental differences can affect the stability of phenotypic characters and increase variation.

Keywords: *Cucumis melo* L., Meloni, offspring, phenotypic characters, stability

Rice growth in a combined submergence and salinity stresses

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The occurrence of submergence in agricultural land is increased by the climate change. The level of tolerance in crops depends on many factors including plant stages, duration of submergence, etc. Level of submergence tolerance is likely to decrease when other adverse factors such as salinity exist. Two experiments have been conducted to study the effect of a combined submergence and salinity on rice growth. First experiment studied the salt tolerance at early seedling stage while submerged. Split plot design was used with oxygen concentrations (with and without aeration) as the main plot and salinity levels (0.2, 50, 100 dan 150 mM NaCl) as the sub plot. Second experiment evaluated the length of submergence (one and two weeks) and salinity levels (0.2 and 50 mM NaCl) at older stages rice plants. The results showed that at early stages of seedlings, almost all growth variables have been decreased by salinity. The oxygen deficit reduced salt tolerance in rice seedlings. At older stages of rice, one-week submergence did not reduce rice growth. However, during two weeks submergence, rice submerged in saline water showed better growth compared to those submerged in non-saline water.

Keywords: aeration, rice (*Oryza sativa* L.), salinity, stresses, submergence

Phenotypic characters of hybrid maize as the result of crossing between 'Talenta' and 'Provit A1' maize

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Maize or corn (*Zea mays* L.) is an important annual cereal crop of the world belonging to family Poaceae [1]. It is the most widely cultivated cereals in the world [2]. Maize, also called corn, is believed to have originated in Central Mexico 7000 years ago from a wild grass, and Native Americans transformed maize into a better source of food, inincluding starch, sweeteners, oil, and beverages [3]. Maize contains about 72 % starch, 10 % protein, and 4 % fat, supplying an energy density of 365 Kcal/100 g [3]. Because maize is rich of nutrition, therefore it has potential tobe a functional food. According to International Food Information Council (IFIC) the functional foods are dietary components with a health benefit beyond basic nutrition [4]. Low production costs, along with the high consumption of maize flour and cornmeal, especially where micronutrient deficiencies are common public health problems, make this food staple an ideal food vehicle for fortification[3]. In other hand, the prevalence of Vitamin A Deficiency (VAD) has been recognized as a public-health issue in developing countries [5]. Maize was known also lacks some nutrients, such as vitamin, calcium, folate, and iron [3]. However, there is one of maize cultivar that has higher betacarotene total about 0.081 ppm namely 'Provit A1' [6]. 'Provit A1' maize has orange color. Pigmented corn contains several bioactive phytochemical, such as carotenoids, for use as a source of pro-vitamin A compounds [7]. Maize is processed and consumed varies from country to country, with maize flour and meal being two of the most popular products [8]. Various industrial processes, including whole kernel, dry milling fractionation, and nixtamalization can cause vitamin and mineral losses during processing[8]. Therefore it is better to consume fresh corn.

Keywords: crop, functional food, hybrid maize, phenotypic characters, plant breeding

Morphological characters of *Cucumis melo* L. ‘Tacapa Green Black’, ‘Melona’, and ‘Meloni’

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Melon is cultivated because the demand is high. However, most of Indonesian farmers used melon imported seeds. It makes the price of melon is getting expensive. Hence, Indonesia should produce high quality melon seeds. This research used three melon cultivars (*Cucumis melo* L.) ‘Tacapa Green Black’, ‘Melona’ and ‘Meloni’ which are the result of breeding in Laboratory of Genetic and Breeding, Faculty of Biology, Universitas Gadjah Mada. The purpose of this study is to describe morphological characters of three melon cultivar. ‘Tacapa Green Black’ is breeding result of Testcross ♀ Act3 434 × F1 PI 371795, ‘Melona’ is Luna’s segregation and ‘Meloni’ is breeding result of ♀ ‘SL-3’ × ♂ ‘PI 371795’. Research has been conducted since February until May 2017. These cultivars were cultivated in Blitar and analyzed its morphological structures in Laboratory of Genetics and Breeding, Faculty of Biology, Gadjah Mada University. Seed of ‘Tacapa Green Black’, ‘Melona’ and ‘Meloni’ were planted. During the growing season, these melons was measured, observed, and documented to obtain the quantity and quality characters. Data were analyzed and compared each other. The results showed ‘Tacapa Green Black’ has weight average of 3.2 kg, brix of 7–9, fruit shape’s is oval, clear net, fruit colour is yellow green, and rind colour is dark green. ‘Melona’ has weight average of 0.8 kg, brix of 7–15, fruit colour is orange, having lobus, and sweet. ‘Meloni’ has oval shape, fruit colour is pale yellow, weight of 1.1 kg, brix of 8–16 and fragrant.

Keywords: cultivate, Melon, Melona, Meloni, Tacapa green black

Total energy, water, and ash contents five locally cultivars of black rice

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Black rice has a high nutrient content of many locally cultivars in certain regions of Indonesia. Black rice has the potential to be developed as a functional food because it has a high nutritional content. In general, the processing of rice by milling stage intact to produce a brighter and cleaner refined rice and by products that is, rice bran. This study was conducted to find the total energy, moisture content and the ash content of the black rice locally 'Wajolaka', 'Toraja', 'Cempo Ireng' Seyegan, 'Melik' Bantul, and 'Wedomartani' in component whole rice, refined rice, and rice bran. Measurement of total energy derived from the measured levels of carbohydrates, proteins and fats using proximate analysis using by different methods, micro Kjeldahl, and Soxhletation. The water content was measured using the oven method while the ash by burning method. Measurements were made with two replications and analyzed using two-way ANOVA. The results showed that a total energy of 'Wajolaka', 'Toraja', 'Cempo Ireng' Seyegan, 'Melik' Bantul, and 'Wedomartani' sequentially 308.59; 301.65; 308.30; 293.86; 290.90 Cal/100 g, while the water content 12.26; 13.36; 12.21; 13.73; 13.80 % and ash content 0.28; 0.29; 0.22; 0.35; 0.37 %. Based on research has been done, it can be concluded that the water content, ash, and total energy varies between five cultivars of black rice. Total ash content and the highest energy contained in the bran while the highest water levels in rice bran.

Keywords: ash content, black rice, functional food, total energy, water content

Physiological responses of rice (*Oryza sativa* L. 'Situ Bagendit') to varying water stress and soil type

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Drought causes decreased growth and induced physiological responses. The objective of this research was to analyze the physiological responses of rice (*Oryza sativa* L. 'Situ Bagendit' to varying water stress and soil texture type. This research used a complete randomized design with two factors: (1) drought stress treatment of 100 %, 50 % and 25 % of field capacity; (2) soil texture type: clay, clay loam and sandy clay loam. The variables observed were plant heights, number of leaves, relative water content (RWC), plant biomass, chlorophyll and proline levels. Data were analyzed using ANOVA, followed with DMRT analysis (with $\alpha = 0.05$). This research showed that drought decreased RWC, plant heights, and plant biomass. Drought caused accumulation of proline levels as compatible solute that regulates osmotic balance. On soil media with sandy clay loam texture showed optimal growth. The interaction between drought and soil type showed significant differences in relative water content, chlorophyll and proline levels.

Keywords: drought, proline, rice, RWC, soil type

The model of community participation in the conservation of critical land to sustainable agriculture

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The Central Statistics Center of 2013 shows an increase in critical land area ranging from 1 to 1.5 percent per year. Utilization of land that is not in accordance with its capabilities and not accompanied by the effort of soil and air conservation. The existence of critical land on some community land greatly affects the socio-economic sustainability. It can happen because most of the community is very dependent on rice fields and fields as the main income. Critical land conservation is a method of adaptive use and capability. This study aims to: 1) to determine the effect of ability, opportunity, and perception of the motivation of farmers in conservation; 2) to determine the effect of ability, opportunity and perceptions of farmers participation in conservation activities, and 3) to determine the effect of motivation on farmers participation in conservation. Techniques of analysis in this research is Structural Equation Modeling (SEM) used to test hypothesis of relationship of exogenous variables influence on endogenous variables. The test result using Amos 18 software shows the variables that influence farmer participation in critical land conservation activity that is opportunity obtained by farmers and motivation owned by farmers. It means that if the farmers have a good opportunity of support from the government and non-government organizations and the easier to market the production, the participation of farmers in land conservation activities will increase. Similarly, if the farmers' income in conservation activities is higher, the recognition of the ability to manage the critical land is higher, and the farmers' desire to preserve agricultural land is higher then farmers' participation in conservation activities will increase.

Keywords: conservation, critical land, farmer participation, SEM

Effects of copper on plant growth, accumuselation, superoxide dismutase activity and total phenolic compounds of paddy (*Oryza sativa* L. 'Cempo merah') leaves

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Copper is one of the essential micronutrients for growth of paddy plant. High concentration of copper in the soils could cause oxidative stress to paddy plant. In order to overcome from this oxidative stress, plants have several anti-oxidative responses. This research aims to study the effects of Cu treated water on plant growth, accumulation, superoxide dismutase (SOD) activity and total phenolic compounds concentration of paddy (*Oryza sativa* L. 'Cempo Merah'). Copper with concentrations of 0 ppm, 100 ppm, and 300 ppm was added to the plants 28 days post-cultivated. Then, the samples of soils and leaves were collected four times, i.e. 0, 4, 72, and 168 hours post-Cu treated. The accumulation of Cu in the soils and paddy leaves was analyzed by using flame-AAS. The superoxide dismutase (SOD) activity was analyzed by using Giannopolitis & Ries (1977) method and total phenolic compounds were analyzed by using *Folin-Ciocalteau* method. The variables being observed were the plants' growth parameters, the number of copper concentration in the soil and the paddy leaves post-treated, the SOD activity, and the total phenolic compounds concentration of paddy. The result showed that adding the number of Cu²⁺ concentration in the water could inhibit the plant growth yet it could increase the number of copper concentration in the soil and the paddy leaves, and could also increase the SOD activity and the total phenolic compounds concentration of 'Cempo Merah' leaves. The highest SOD activity in the 'Cempo Merah' leaves was at the 300 ppm Cu²⁺ treatment, i.e. 7.83 unit/g of paddy leaves. The total phenolic compounds concentration of 'Cempo Merah' leaves was also found at the 300 ppm Cu²⁺ treatment, i.e. 223.52 mg GAE/g of extracts.

Keywords: Cempo merah, copper, paddy, superoxide dismutase (SOD), total phenolic compounds

The effect of full moon against flying of *Spodoptera exigua* moths: implication on monitoring and preventing the pest infestation on onion

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The larvae of *Spodoptera exigua* Hubner (Lepidoptera: Noctuidae) is the noxious pest on onion. Studies revealed that flying of the *S. exigua* moths was significantly affected by the natural illumination. Number of captured male moths using yellow sticky trap with sex pheromone during night (3.83 moths/10 traps) was significantly more than during the day (0.30 moths/10 traps), and at full moon (5.80 moths/10 traps) was significantly more than before and after full moon i.e. 2.94 and 2.77 moths/ 10 traps, respectively. Suitable number of traps to monitor infestation of the *S. exigua* moths was 3 traps/2.000 m². Meanwhile, netting with 20 mesh of screen was very effective to prevent the female moths to lay their eggs on onion leaves, and there were no eggs, larvae, and damaged plants observed in the treated plots. Etiolation was observed on netting treatment, however the onion yield on treated plots (3.9 kg/m²) was significantly higher than on untreated plots (2.3 kg/m²).

Keywords: *Spodoptera exigua*, full moon, onion, sex pheromone, yellow sticky trap

Environmental factors affecting the severity of sheath rot disease (*Sarocladium oryzae* and *Fusarium* spp.) on paddy

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One of the obstacles in increasing rice production is the presence of sheath rot pathogen infection which causes change color on the rice sheath to brown or reddish brown, sometimes does not produce rice grain. The pathogens that cause sheath rot disease are *Sarocladium oryzae* and *Fusarium* spp. The loss of rice yields reaches 85%. Environment is one of important factor in disease development, therefore environmental factors affecting the disease severity of sheath rot on paddy were analyzed using path analysis. Path analysis is multiregression analysis by using path diagram to know the direct or indirect influence of the variables that suspected as the effect of treatment to the main variable. The research was conducted in Imogiri, Jetis, Sanden, Sewon, and Pundong Sub Districts of Bantul City with the variables used were rainfall, rice varieties, altitude, plant spacing, fungicide use, history of planting, disease incidence and disease intensity. The main variables in this study are disease intensity and disease incidence. The results show that, indirect variable which have significant effect to disease intensity and disease incidence of sheath rot disease were height of place, rainfall, varieties, and history of planting with variable of fungicide usage. The direct variables that significantly influence the disease intensity and the disease incidence of sheath rot disease in the field were the use of fungicide and rainfall. Path analysis is needed to determine the variables that directly or indirectly affect the intensity and incidence of sheath rot disease to determine the proper control.

Keywords: disease incidence, disease intensity, path analysis, path diagram, sheath rot disease

Current status of emerging disease vascular-streak dieback (VSD) on cacao in Yogyakarta, Indonesia

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A devastating disease named vascular-streak dieback (VSD) caused by basidiomycete *Oncobasidium theobromae* was firstly found in Papua New Guinea (PNG) in the 1960s then now causes losses among cacao seedlings and kills branches in mature cacao trees throughout Southeast Asia and parts of Melanesia. In Indonesia, this disease was recently reported as an important emerging disease that destroyed cacao plantation in Sumatera, Sulawesi and East Java. Yogyakarta is one of cacao plantation center in Indonesia but current report of this disease status has not been found. Therefore, survey of VSD cacao disease was undertaken in this research which were conducted in Gunung Kidul and Kulon Progo Regency, the central of cacao plants in Yogyakarta Special Province. The result showed that generally Cacao VSD was found more severe in Gunung Kidul than in Kulon Progo. Disease incidence of cacao VSD in Gunung Kidul varied from 30 % - 100 %; with disease intensity varied from 7.5 % - 60 %. In Kulon Progo, disease incidence varied from 0 % - 70 % with disease intensity varied from 0 % - 25 %. Cacao plantation with routine pruning showed lower disease intensity of VSD disease. This survey indicated that current status of Cacao VSD is critical as one of emerging plant diseases in Indonesia.

Keywords: cacao, emerging disease, Indonesia, vascular streak dieback, VSD



SUSTAINABLE TROPICAL ANIMAL PRODUCTION AND HEALTH

Animal Diseases That Impact Food Security

Animal Feed and Nutrition

Animal Genetic and Reproduction

Animal Product Technology

Aquaculture

Food Safety and Veterinary Public Health



**Detection of *Trypanosoma evansi* in cattle in Indonesia
by using Loop-mediated Isothermal Amplification (LAMP) test**

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Trypanosomiasis (Surra) is a protozoa disease in animals caused by *Trypanosoma evansi* that is infected mechanically by biting flies. Surra caused economic disadvantages in livestock, particularly horses, cattles, and buffalos in Indonesia. In addition, Surra is immunosupresive and potential to be zoonotic disease. This study was conducted to detect *Trypanosoma evansi* molecularly using Loop-mediated Isothermal Amplification (LAMP) Test. The method was sensitive and specific diagnostic assay capable of detecting *T. evansi*. There were three isolate DNA samples of *T. evansi* in Indonesia (Brebes, Lampung and Bengkulu). Amplification was possible when a water bath was used to maintain the temperature at isothermal conditions (60–65 °C), and results could be read by visual observation of colour change. The LAMP test was efficient and robust, and results were obtained within 1 hour. These findings have increased the prospects for developing a simple molecular test that can be used with limited equipment at point of care in endemic rural areas.

Keywords: *Trypanosoma evansi*, detection, LAMP, protozoa, Surra

Fenotyping identification of *Klebsiella pneumoniae* from subclinical mastitis milk of Ettawah crossbreed goat

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Klebsiella spp. is a common bacteria causing mastitis. *Klebsiella pneumonia* and *Klebsiella varicola* is the most infected *Klebsiella* spp. in the dairy farm. The occurrence of *Klebsiella mastitis* also found in a Ettawah crossbreed goat. This study used 16 milk samples from eight lactation goats. Samples were tested by California Mastitis Test (CMT) reagent to determine the mastitis status, inoculated on Blood Agar (BA) and Mac Conkey Agar (MCA). The colonies from BA and MCA were stained by Gram staining to determine cell morphology. The colonies from MCA were identified by biochemical tests such as sugar fermentation tests (glucose, lactose, maltose, and saccharose), arginine, ornithine decarboxylase, indole, citrate, urea hydrolysis (Christensen's method), lysis and malonate. The result of mastitis test showed five goats were positive result and three samples were negative. Bacterial staining showed two samples were Gram-negative, rods and the others were Gram-positive, coccus. The samples with rods shapes were continued by biochemical tests. The characterization result of biochemical test indicated that the rods shapes bacteria were *Klebsiella pneumonia*.

Keywords: *Klebsiella pneumonia*, Ettawah crossbreed goat, fenotyping, subclinical mastitis

The effect of L-carnitine supplementation in water toward the deposition of abdominal fat in broiler carcass

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L-carnitine as supplement in farm animals has been widely used to encourage the quality of broiler carcass. Production of broiler chicken with the excessive of body fat seems to be a problem since the consumers request are desired to the less fat of carcass. The addition of carnitine in diet supposed to increase the metabolism of energy and fatty acid oxidation. This amino acid derivative compound also expected lowered the lipid metabolism that hopefully reduced the triglyceride and cholesterol of serum. The study of supplement with L-carnitine in drinking water has deducted to evaluate the body weight gain and abdominal fat deposit in broiler during rearing period. The broiler ($n=80$) had divided into 4 groups ; group 1 as control with no supplement; group 2, 3 and 4 treated with L-carnitine with dose of 10, 20, and 30 mg $\cdot L^{-1}$ of water during 24 days. The body weight gain were evaluated every week. At day-35 broilers sacrificed and the abdominal fat collected and weighted. The results indicated during rearing period L-carnitine did not improve the weight gain. The abdominal fat weight were significantly different between control group (34.84 ± 5.24 g) and group 3 (32.13 ± 8.44 g) with $P < 0.05$. It is concluded that supplemented L-carnitine in drinking water may reduced the formation of abdominal fat in broiler.

Keywords: abdominal fat, broiler, L-carnitine

Feed engineering using seaweed as feed to make healthy Broiler meat chicken

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Based on the survey from WHO, countries who have population like Indonesia every year thereare one million people who develop heart disease, 40 % died, 60 % of them helped and saved 10 % of which will also be died. One possible cause is a buildup of cholesterol in the wall coronary arteries. High cholesterol in the body is because consumption broiler chicken meat contains a lot of saturated fat. To create healthy broiler chicken meat, feed engineering is required. It is required for eliminate adverse effects on consumers. Feed engineering can done in the form of addition of seaweed in broiler feed. Approximately 4.92 million tons of seaweed Indonesian untapped much is wasted into the waste often causes pollution environment. Seaweed is rich in dietary fiber that dissolves in water and can bind fat in the digestive tract to reduce fat in the body. This study aims to determine the effect of seaweed in lowering body fat broiler chickens. Research carried out experimentally by maintenance broiler chicken divided by two group, one group with usuall feed and one group with adding seaweed in the feed. Ration treatment consists of four kinds of treatment. Maintenance performed with broiler provision of commercial starter ration for 14 days and the separation to four treatment group with 2.5 % seaweed, 5 % seaweed, 7.5 % of seaweed, and pure ransum without seaweed maintenance for 2 weeks. Measurement cholesterol levels, use Liberman Burchad method. The results of this study would be useful for seaweed product diversification for animal feed in order to function optimally. As well as reducing the risk of patient coronary heart disease through healthy chicken meat consumption in order to improve public health.

Keywords: broiler, cholesterol, seaweed

Enhancement of in vitro digestibility of palm kernel cake using cellulolytic microbes from rumen fluid

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This research was conducted to evaluate the effect of addition of cellulolytic microbes from rumen fluid of Ongole crossbred (OC) and Frisian Holstein crossbred (FHC) on in vitro digestibility of fermented palm kernel cake (FPKC). This study was consisted of four level addition of cellulolytic microbes by 0, 5, 10, and 15 % based on dry matter (DM), each treatment was done in three replications. The fermentation was done at room temperature anaerobically. Physical quality, lactic acid value, chemical composition including dry matter (DM), organic matter (OM), crude protein (CP), ether extract (EE), crude fiber (CF), nitrogen free extract (NFE), as well as in vitro digestibility consisted of CFD, DMD, and OMD.were observed after 21 days of incubation. Data were analysed variance using factorial design (2x4), and the differences between mean values were analyzed Duncan's new multiple range test (DMRT). The cellulolytic microbes activity from rumen fluid of OC higher than that the FHC, those were 0.608 U/mg vs 0.370 U/mg. The FPKC using cellulolytic microbes from rumen fluid induced the odor became more sour, the texture became softer than FPKC without cellulolytic microbes from rumen fluid, however the colour PKC wasn't changed. The fermentation using cellulolytic microbes decreased DM, OM, and CF content ($P<0.05$), but increased EE content ($P<0.05$), as well as CFD, DMD, and OMD ($P<0.01$). It could be concluded that cellulolytic activity of microbes from OC was higher than FHC, which could enhanced nutrient digestibility of FPKC.

Keywords: cellulolytic microbes, in vitro digestibility, palm kernel cake

The effect of total mixture concentrate based on tofu waste silage as feed on meat quality of thin tail sheep

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This study aimed to obtain influence of tofu waste based-concentrate to meat quality on thin tail sheep. Twelve sheep (1 year old) thin tail sheep were divided into 2 groups: 6 sheep given feed straw and concentrate without the addition of tofu waste based-concentrate silage and 6 sheep given feed straw and tofu waste based-concentrate silage. Feeding experiment was carried out for 3 months. Data retrieval meat color, water holding capacity, pH, cooking loss, and tenderness carried out on sheep meat after the slaughtered. The data were analyzed using Independent-Sample T test. Statistical analysis showed that the addition of tofu waste based-concentrate silage provide significantly improved ($P<0.05$) on meat quality as indicated by decrease of cooking loss and tenderness value of meat. Based on the study, it is concluded that addition of feed silage concrete base tofu waste can improve meat quality on thin tail sheep.

Keywords: carcass and meat quality, silage, sheep, tofu waste

Effect supplementation of Urea Molasse Multinutrient Block (UMMB) on the weight gain average of heifers *Peranakan Ongole* breed

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An experiment was conducted to evaluate the effects supplementation of urea-molasse multinutrient block (UMMB) on the weight gain of heifers peranakan ongole beef cattle based diets with rice straw. Urea molasse multinutrient block were made with different formulations (A and B). A total of 15 heifers Peranakan Ongole beef cattle were divided into 3 groups. Control group animals were daily fed rice straw as a basal diet without UMMB, group A were daily fed rice straw as a basal diet with UMMB (A), group B were daily fed rice straw as a basal diet with UMMB (B) respectively. Weight gain were measured with Lambourne method weekly. Data on the feeding trial were collected during four weeks, and were subjected to the Paired T-test analysis of variance (ANOVA). The results of this experiment showed that the UMMB supplementation had no significantly influenced of weight gain average ($P>0.05$). With regard to the weight gain average of heifers, the group A showed a highest (9.52 kg), group B (9.38 kg) and control group (6.98 kg), respectively. Based on statistical analyses, it can be concluded that supplementation of UMMB had no effects on average weight gain in this study.

Keywords: supplementation, urea molasse multinutrient block, weight gain

Nitrogen balance of Bligon Goats reared by the women farmer group in Ketangi and Banyusoco Village, Gunungkidul, Yogyakarta Special Province

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Total of 16 female goats reared by woman farmer groups were used in this experiment to evaluate the protein metabolism efficiency. The goats were grown in the two different areas Ketangi and Banyusoco, Gunungkidul district, Yogyakarta Special Province. Randomly the goats with ± 25 kg body weight, 2.5 y.o. were divided into two groups and put in the individual cages. The goats were fed by local feedstuff, based on the practice of the farmers. The study was run for couple months of adaptation period and followed by one-week sampels collection period. Samples of feed, refusal feed as well as feces were taken out every day for dry matter and nitrogen analysis. Sampel of daily urine collection was done for nitrogen analysis. The amount of daily feces and urine excreted were recorded. The data obtained were used to calculate N intake, fecal and urinary N excretion as well as the N retained. All of the data were analyzed using *Independent sample t-test*. Consumption, urinary and fecal N excretion of Bligon goat reared by Ketangi farmers did not significantly differ compared with goat reared by Banyusoco farmers although the feedstuff offered to the goat were really different. Nitrogen balance of the both group of Bligon goats were 11.16 ± 1.030 g/d (0.88 ± 0.163 g/W $^{0.75}$ /d) in Ketangi and 11.35 ± 1.056 g/d (0.88 ± 0.118 g/W $^{0.75}$ /d) in Banyusoco. It could be concluded that Bligon goat in the both villages get the ration that was able to fulfill the requirement for maintenance.

Keywords: balance nitrogen, bligon goat, different villages

In vitro digestibility of native grass silage supplemented with *Leucaena leucocephala*

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Research has been conducted to determine the best level of *Leucaena leucocephala* supplementation to digestibility and fermentability in vitro. The study was designed using completely randomized design with 3 levels supplementation of *Leucaena* (10, 20, and 30 %) and each treatment was done in 6 replications. All of the silage treatments was inoculated with 2 % *Lactobacillus plantarum*, and stored in mini-silos for 21 days. The results showed that supplementing native grass with 20 % *Leucaena* resulted in the greatest ($P<0.05$) dry matter and organic matter digestibilities. The highest fiber crude digestibility was obtained at 30 % supplementation. However, the greatest digestibility of crude protein obtained at 10 % *Leucaena* supplementation and that digestibility decreased linearly with the increasing levels of supplementation ($P<0.05$). These data indicate that supplementing native grass with 20 % *Leucaena* is the best treatment in terms of nutrient digestibility.

Keywords: *Lactobacillus plantarum*, *Leucaena leucocephala*, digestibility, native grass, silage, supplementation

Estimation of eggs heritability in F₁ chicken derived from crossbreeding between pelung chicken and layer

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Local chicken is one of favorite protein sources in Indonesia, but local chicken consumption is lower than broilers. Pelung chicken is one of local chicken that has the biggest body size and weight but has a lower egg production. Improvement of egg quality and quantity local chicken can be done by selective breeding between Pelung chicken and Layer. The aim of this study was to determine the proportion of eggs phenotype in F₁ that inherited from both parents by heritability value. This research was conducted in April–September 2016 in Agro Technology Innovation Center (PIAT) Research Facility of Universitas Gadjah Mada, Yogyakarta. The method of this research was measurement morphometry of eggs (length, width, and weight) for 4 months production of chicken F₁, Pelung and Layer. The result of this study for 4 months obtained the egg production for F₁, Pelung and Layer were 730; 130; and 1250 eggs. The value of H² according to length, width and weight of eggs between F₁ and Layer were 0.047; 0.183 and 0.244. The value of H² according to length, width and weight of eggs between F₁ and Pelung were 0.122; 0.064 and 0.470. The value of H² calculations concluded that heritability eggs of F₁ compared both parentals was low to moderate.

Keywords: chicken, crossbreeding, eggs, heritability, morphometry

Profile of progesterone hormone on ongole grade cattle does after synchronization of estrus with implant controlled internal drug release (CIDR) on pregnancy rate

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This study was aimed to determine the level of progesterone on Ongole Grade (OG) cattle that is synchronized by using *Controlled Internal Drug Release (CIDR)* on *pregnancy rate*. The material of this study consisted of 20 OG cattles with BCS between 2.5–3 divided into four groups of five each. All does received intravaginal CIDR for 13 days. Each does received injection GnRH (*Gonadotropin Releasing Hormone*) after CIDR removal and in scheduled *timed artificial insemination (TAI)*. Blood samples taken four times on day 0, day 5, day 17 and day 21 after the implementation of TAI 3 ml/tails through jugular vein. Then blood samples in centrifuge for 10 min at a speed of 3000 rpm to obtain blood serum to be analyzed hormone progesterone using *Enzyme Linked Immuno-Sorbent Assay (ELISA)*. The results showed a 80–100 % oestrus after CIDR removal. The progesterone hormone profile of 20 cattles was obtained by nine pregnants, namely 3, 4, 6, 7, 9, 11, 13, 14 and 16 with progesterone on the day 21 after each TAI was 19.46 ± 9.45 ng/ml, 10.07 ± 1.14 ng/ml, 16.45 ± 7.61 ng/ml, 6.81 ± 6.31 ng/ml, 5.25 ± 7.36 ng/ml, 12.57 ± 6.33 ng/ml, 10.48 ± 10.91 ng/ml, 10.44 ± 11.46 ng/ml and 5.09 ± 6.59 ng/ml. The other 11 were suspected of not pregnant because of the progesterone levels produced <3 ng/ml on day 21. It was concluded that the use of CIDR implants and GnRH injections was effective for cattle synchronization in all groups of OG cattles on *pregnancy rate*.

Keywords: CIDR, ongole grade, progesterone, synchronization of oestrus

The coconut water (*Cocos nucifera*) as an alternative standardized medium (DMEM) for cell culture medium of Wistar Rat's hypodermic fibroblast toward mesenchimal stem cell culture

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Stem cell issues to be a sophisticated medical solutions in the treatment of degenerative diseases include diabetes mellitus, heart failure, and stroke were higher in Indonesia. The primary cell culture is first step to do the stem cell culture. Medium is very important for cell culture, including DMEM. However, the application of stem cell culture still get a big challenge one of them using the latest standardized medium was obtained at a high cost. Indonesia as tropical archipelago country has a high abundance coconut. The water and its contents were isotonic that resembling the body's physiological fluids. The aim of this study is to evaluate the ability of coconut water (*Cocos nucifera L.*) as alternative standardized medium (DMEM) for stem cell culture. Coconut water were prepared aseptically and were examined organoleptic. The primary culture of fibroblasts were obtained from the backs hypodermic of mice tissue backs and were cultured in 96-well microplates plates. Fibroblasts were intervened using juvenile coconut water, mature coconut water and DMEM were equipped with penstrep, Fungizone and FBS, and then were incubated for a period of 3, 6, 12 and 24 h. The viability of the cell test was examined by using trypan blue staining and the cytotoxic coconut water was observed by the formation of formazan in the wells in MTT-assay that interpreted using ELISA microplate reader with 595 nm wavelength. Based on test viability of fibroblasts cultured in juvenile and mature coconut water respectively shown optimum results 116.25 % and 115.11 % of the standard medium (DMEM) at 3 h of incubation while minimum cell viability was 84.25 % and 70.85 % at 6 h of incubation. However juvenile coconut water was better than mature although the statistical shown there no significantly different ($p > 0.05$) both coconut water media by two way-ANOVA. Percentage living cell numbers were still high at 12 h of incubation (84.21 %) in the cytotoxic MTT test, proved that coconut water safely be used as cell culture medium. Coconut water can replace standard culture medium (DMEM) in the incubation period of 3–6 h.

Keywords: cell culture, coconut water, Dulbecco's Modified Eagle medium, stem cell

The addition of honey on yoghurt and the investigation on the pH and lactic acid bacteria

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Purpose of the research was to study effects of different levels of honey on pH and total of Lactic Acid Bacteria (LAB) of low fat stirred yoghurt. The research was conducted from November 26th until December 22th, 2015 at Animal Product Technology Laboratory of Jenderal Soedirman University, Purwokerto. The aim of research was to study the effects of adding honey at different levels on pH and total of lactic acid bacteria of low fat stirred yoghurt. A total of 15.75 L low fat cow's milk and 3.75 g freezed dried yoghurt starter containing *Lactobacillus bulgaricus*, *Streptococcus thermophylus*, and *Lactobacillus acidophilus* were used. A Completely Randomized Design (CRD) with six replications and five treatments were employed. Treatments included: P0 (yoghurt without honey), P1 (yoghurt with 3 % of honey), P2 (yoghurt with 4.5 % of honey), P3 (yoghurt with 6 % of honey), and P4 (yoghurt with 7.5 % of honey). Data were analyzed by analysis of variance and continued with orthogonal polynomial and Honestly Significance Difference (HSD). The results showed that adding honey to low fat stirred yoghurt has no significant effect on pH ($P > 0.05$), but has significant effect on total of lactic acid bacteria ($P < 0.05$). The average pH of low fat stirred yoghurt was 3.96. The total counts of lactic acid bacteria for low fat stirred yoghurt without and with 3, 4.5, 6, and 7.5 % honey were 8.30 ± 0.410 log cfu/mL, 9.98 ± 1.003 log cfu/mL, 9.23 ± 0.928 log cfu/mL, 9.67 ± 1.014 log cfu/mL, and 9.11 ± 0.645 log cfu/mL, respectively. In conclusion, characteristic of low fat stirred yogurt stored seven days at 6 °C, pH was unaffected by adding honey up to 7.5 %, but total of lactic acid bacteria was affected by adding honey up to 7.5 %. Adding 3 % honey causes the highest count of lactic acid bacteria.

Keywords: lactic acid bacteria, low fat stirred yoghurt, pH

The role of sea crustacean *Ocypode* sp. on the growth performance of catfish *Clarias* sp.

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The aim of experiment was to evaluate growth performance *Ocypode* sp. meal in diets african catfish (*Clarias* sp.). Four experiment diets were formulated contain different ratio of fish meal replacement 0, 10, 20, 30 %. Diets contained crude protein level of 36 % at gross energy 2900 kcal/kg. Completely randomized design with four treatments and three replicates was used. Catfish with average body weight of ± 12.27 g were kept in net size $2 \times 1 \times 1$ m placed in plastic terpal ponds $10 \times 6 \times 1.2$ m, with density 100 fish each net. Fish was fed at satitation fo 60 days of culture period. The result showed that regardless of fish meal content in the diet, fish fed on diet contained 0 and 10 % fish meal replacement with ocypode meal had higher fat retention ($P < 0.05$). However, it doesn't significantly different on survival rate, feed intake, daily growth rate, feed efficiency and protein retention ($P > 0.05$). The data showed that the use 0 and 30 % fish meal replacement had same resulted on growth performance of catfish. It was indicated that 30 % *Ocypode* sp. meal might be used on catfish feed.

Keywords: *Ocypode* sp., catfish, feed, growth

Correlation between dermatophytes found on cats and in the environment

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This research is carried out to investigate the zoonotic dermatophytes found in the environment and those found on cats. Forty skins scrapes were obtained from the lesion of cats suffering from dermatitis and 40 environment samples were taken by swabbing the places frequented by the sick cats i.e. cage or bed sheets. These samples were cultured in Sabouraud's Dextrose Agar, incubated at 28 °C for 21 days, and then observed macroscopically and microscopically. Results showed that one case (2.5 %) was found dermatophytes in both cat and environment; 18 cases (45 %) showed positive result in cats but negative in environment; dermatophytes was found in environment but not cat in one case (2.5 %); while 20 cases (50 %) indicate absence of dermatophytes in both cats and environment. Based on these results, it's concluded that dermatophytes are found both in the environment and diseased cats which probably had a correlation.

Keywords: cats, dermatophytes, environment, zoonotic

DNA isolation and pig species detection on sausage with various cooking temperature and time

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DNA degraded during cooking cause some fragmentation and cleaved DNA into small fragment, consequently the difficulty to isolate DNA and determine the species in the food matrix. The objectives of the research was to isolate DNA, polymerization of DNA fragment and detection of the pig species of commercial sausages after various cooking time and temperature. The commercial sausages made from pork was purchased from local market then were cooked at 70, 100, 120, 150, and 200 °C for 15, 30, 60, 120, 240 min. DNA was isolated using FavorGen DNA isolation kit and polymerized using species specific primer of three different basepair (200, 300 and 400 bp). The DNA concentration was analyzed using ImageJ application test. The results showed that DNA could be isolated from the commercial pork sausage in all samples including for the high temperature cooking (200 °C) for long time (240 min). Pig species could be detected using species specific primer for three different lengths of DNA targets even though in high temperature (200 °C) and long cooking time (240 min) showed that DNA amplicon target was slight band compare to other samples. Cooking time and temperature affected to DNA quality based on the band intensity and DNA concentrations. The ImageJ test could show the quantity of the amplicon after polymerized using specific primer. In conclusion, the pig species in cooked sausage still could be detected after long time and high temperature cooking.

Keywords: cooking time and temperature, DNA isolation, pig determination, pork sausage



SUSTAINABLE TROPICAL FORESTRY

Forest Conservation

Forest Ecosystem and Biodiversity

Forest Management and Policy

Forest Product

Forest Silviculture



Variability of canopy interception in the various types of agroforestry system in Java Island, Indonesia

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Hydrologic cycle in the tropical rainforest have a unique system and interdependent between its component. In the forested area, movement of water between the atmosphere and the soil plays a diversified role in the storage capacity. Hydrologic processes in the forested area start from rainfall interception in the forest vegetation structure. A portion of precipitation is inevitably intercepted by the canopy (canopy interception), flow along the stem to the ground surface (stemflow), drips from the foliage and branches or passes through canopy openings to the ground (throughfall), or is further intercepted by forest floor (litter interception). Improved knowledge of canopy processes is allowing better estimation of the influence of forests in hydrology on forest function. The aim of this study was to measure the hydrological processes of canopy interception in the various types agroforestry area mixed with coffee plantation and compared to natural forest. Canopy interception was investigated using 15 units of throughfall and 8 units of stemflow. Data analysis suggests that the throughfall was the function of 0.4689 of rainfall, while the stemflow was 0.0006 of rainfall. The result found that canopy interception as a function of throughfall and stemflow in agroforestry-coffee plantation area was 55.2% of rainfall, while in the natural forest was 30.44% of rainfall. Vegetation structure in the agroforestry system has a significant impact to increase the canopy interception.

Keywords: agroforest, canopy interception, coffee plantation, hydrologic process

City of philosophy: evaluation of tree philosophy and its architecture in Yogyakarta philosophical axis towards UNESCO world heritage

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Yogyakarta has a special urban design considering the philosophical axis extending from south to north (from Panggung Krapyak to Tugu). The axis has a philosophical meaning about the journey of human life which reflected within an architecture of the building, floorplan, and tree species that contains historical-cultural heritage. In *Serat Salokapatra* it was mentioned that tree species along imaginary axis symbolized human journey. A combination between tree philosophy and urban design are Yogyakarta's special symbol and meaningful design. Nowadays, Yogyakarta has been the center of civilization and its people should preserve this identity. Law No. 13 2012 concerned about people should be involved in preserving culture. This research intends to evaluate the suitability of tree species and pattern according to the existing conditions with the *pakem* keraton (palace guidance) and review people's knowledge about the philosophical axis. The method used was direct inventory and identification of tree species and architecture, and using interviews guided by questionnaires. Based on direct inventory, there was a discrepancy of tree patterns between *pakem* keraton and realization. The philosophical axis has eight plants species based on *pakem* keraton and 359 plants within 24 species. The tree architecture model are Aubreville, Rauh, Troll, and Scarrone. Total of 71 % respondents who were elderly people over 65 yr were unaware of the existence of the philosophical axis. Only 29 % respondents understand the philosophical axis and 6 % know about submission of Yogyakarta in UNESCO World Heritage. The results of this research may be taken as consideration for government and society for the restoration of tree species in philosophical axis to support the realization of Yogyakarta City of philosophy at the UNESCO world heritage. Based on interviews with Environment Agency of Yogyakarta City and KPH Yudahadiningrat, the suitability of tree planting pattern along the philosophical axis will help to make it happen.

Keywords: Pakem , philosophical axis, tree architecture model, tree philosophy, Yogyakarta

Soil chemical and physical characteristics as a base for achieving sustainable forest land use in RPH Watugudel, KPH Ngawi, Jawa Timur

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This study was done in an area that was covered by teak forest. However, because of the human influences, the land use was changed to rice field, shrubs, dry field, settlement and remaining teak forest. The aim of this research is to study the soil chemical and physical characteristics as a base in improving its quality. The soil samples were taken from the field at five lands use types with four repetitions. Then, the soil samples were analyzed in the laboratory. This research resulted that at all areas has the soil acidity of more than 8. The soil acidity at the rice field is the highest (8.25) and the forest area has the lowest (8.025). The highest soil organic content was in shrubs area (3.69 %) and rice field has the lowest (2.72 %). The Nitrogen content of the shrubs area is the highest (0.29 %), whereas at the rice field was the lowest (0.20). Furthermore, the Phosphorus content of the rice field is the highest (21.07 ppm), whereas at the forest area was the lowest (4.61 ppm). The available potassium at the settlement was the highest (1.99 me/100 g), and at the rice field was the lowest (0.78 me/100 g). The soil physical characteristics of the study area showed that the bulk density varies around 1 g/cm³ and the particle density varies from 2.13 cm³ (at the shrubs area) to 2.27 cm³ (at the rice field area). The porosity also varies from 46.30 % (at settlement area) to 60.80 % (at the rice field area), whereas the soil permeability also varies from widely from 1.4 cm/hr (at the teak forest area) to 25.9 cm/hr (at the shrubs area). In general, it can be concluded that the study area has the high soil acidity, relatively high soil organic matter content, low nitrogen, phosphorus and potassium, good porosity and relatively bad permeability. To achieve sustainable forest land use, the use of fertilizer is recommended, also the soil tillage to improve the soil physical characteristics.

Keywords: characteristics, forest, land use, soil, sustainable

Carrying capacity of Kalibiru Nature Tourism Area in Kulon Progo Regency

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Nature Tourism Business in forest area, especially with protection status, will eventually degrade its resources if not being executed carefully. On the other hand, the forest area and its resources are the main asset of the business. One of the indicators of the carefulness lays on the availability of the carrying capacity information, which is the maximum limit of the visitors number present in the tourism area without causing the area's disturbance and decreasing the visitors' satisfaction. By knowing the carrying capacity, it will make the manager be able to arrange the level of visitation that it is safe for both on-site and off-site environment. The mentioned environment includes the biophysical, social, economical, and cultural components. Based on those reasons, a research about the carrying capacity of a nature tourism area is needed. The aim of this research was to know the physical carrying capacity, the real carrying capacity, and the effective carrying capacity of Kalibiru Nature Tourism Area, Kulon Progo Regency, which laid on Protection Forest Territory, governed by the Association of Forest Management of Yogyakarta, from which the results would be used to develope the strategies on the visitors management. The calculation of the carrying capacity was approached by using the modified Cifuentes's method (1992). Data collection was done through field survey, literature study, survey by questionnaire to 120 respondents which were selected randomly, and interview with the manager of Kalibiru Nature Tourism Area. The results of the research showed that the physical carrying capacity was 12,504 visitors/day; the real carrying capacity was 1,929 visitors/day; and the effective carrying capacity was 578 visitors/day.

Keywords: carrying capacity, Kalibiru Nature Tourism Area

Pests of local honey bee (*Apis cerana*) in Wanagama Education Forest, Gunung Kidul Yogyakarta

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Local honey bee (*A. cerana*) was kept in Wanagama Education Forest to produce honey. *A. cerana* is known to be more resistant to the bee parasite Varroa mite compared to European honey bee, *Apis mellifera*. Nevertheless, observation on the pests of *A. cerana* is necessary due to the fact that the pests may harmful to *A. cerana* colony. The objectives of the study was to know the potential pests of local honey bee. The observation was done in Wanagama Forest in June 2017 on 10 hives of *A. cerana*. The pests attacking *A. cerana* colony was recorded and identified. The results showed that ants and wax moth was found in bee hives. Ants was found in all the hives. However, the bee colony was not affected by the ants. Wax moth (*Galleria mellonella*) was found in 10 % of the hives. Wax moth did not attack directly to the bees but it caused significant damage to the comb. The larvae of *G. mellonella* fed on the honeycomb. Wax moth (*G. mellonella*) seems to be potential pest of *A. cerana* in Wanagama Education Forest.

Keywords: *Apis cerana*, local honey bee, pests, Wanagama

Green open spaces in the perspective of ecosystem services: a case study of green open spaces in the urban area of Yogyakarta

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Green Open Spaces (GOS) have a variety of ecosystem services of which can be utilized by society. This study aims are to identify GOS criteria for determining ecosystem services, to study the conditions and distributions of ecosystem service potentials of GOS in Urban Area of Yogyakarta (UAY), and optimize GOS in the perspective of ecosystem services. The research locations included GOS of UAY consisting of urban forests, city parks, riverbanks, and greenbelts, comprising of twelve research locations. The identification of the criteria for GOS was done using the expert judgement and pairwise comparison methods resulting in weight values. The data from the field and the assessment by experts were analyzed by means of scoring analysis to find out the level of ecosystem services in each research location and they were further descriptively and deductively analyzed by taking account of the area allotment and the available regulations to attain the conditions of GOS with optimal ecosystem services. The results of the study show that of the sixteen criteria under study, each plays a role in ecosystem services. The values of ecosystem services of GOS in UAY show different values for each type of GOS. In general, the types of urban forests have ecosystem services in the high category for the eleven ecosystem services, while city parks and riverbanks on the average have ecosystem service values in the moderate category, and greenbelts have ecosystem service values in the low category. Based on the results, optimalize GOS in UAY in the perspective of ecosystem services can be done by optimizing each criteria with the highest weight value adjusted to the allotment of each type of GOS.

Keywords: city park, ecosystem services, greenbelt, green open spaces, riverbank, urban forest

Abundance and population structure of 'Aren Palm'
(*Arenga pinnata* (Wurmb.) Merr.) on two elevation sites in
Kekait, Gunungsari, West Lombok

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Mutiuse of Aren palm (*Arenga pinnata*), especially for brown sugar, for household economic income are popular in Java, Sumatra, and Sulawesi islands where most distribution of this palm are located. Environmental conditions and genetic resource determine the production of flowers. This research was carried out to study Aren palm abundance, population structure, and its fecundity in different elevation in Kekait, Gunungsari, West Lombok. Point Centered Quarter Method (PCQM) was applied to analyse vegetation abundance of two study sites, 0–250 m asl and 250–500 m asl. On each study sites there were 10 stations that were gradually lied with 20 m elevation difference each. In each station was created 30 m transect line with each 3 subtransects and 3 sampling points of 4 quadrants each. Therefore, there were 30 sampling points with 120 quadrants in each study sites. This research was conducted from July 2015 to March 2016. The results showed that there were 10 species of 9 families in site 1 and 11 species of 10 families grown in site 2 with composition of seedlings, saplings, and trees were 57.5 %, 16.7 %, and 20.8 % for site 1; and 39.2 %, 0 %, and 6.7 % for site 2 respectively. Fecundity values in blok I was 0.14 % and in blok II was 0.10 %. With natural regeneration of 0.10 %, the palm population showed that at the higher elevation of 250–500 m asl is more sustain, with 20.8 % of tree density still had higher number of flower bundle.

Keywords: fecundity, flower's bundle, PCQM

Pollen gathering activity of local honey bee (*Apis cerana*) in green area of Universitas Gadjah Mada Campus

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Pollen is an important food of local honey bee (*A. cerana*). The worker bee of *A. cerana* gather the pollen from the flower to carry back to the hive. The pollen is stored in the cell of honeycomb where it is used for developing brood. Activity of *A. cerana* in gathering pollen may be affected by environmental factors such as temperature and humidity. The objective of the research was to know daily activity of *A. cerana* in gathering the pollen. The study was done in green area of Universitas Gadjah Mada Campus by counting the worker bee which entered the hive three times a day (07.00–08.00; 12.00–13.00; and 16.00–17.00). The temperature and humidity was determined. The results showed *A. cerana* was the most active in the morning (07.00–08.00) in which the number of worker bee gathered the pollen and carried to the hive was 25.9 individuals/ minute. The number of worker bee was very low at 12.00–13.00 (7.2 individuals/minute) and at 16.00–17.00 (5.3 individuals/minute). The most intensive bee activity was observed at 26.3 °C and 74 % humidity. Temperature and humidity seemed to affect the activity of *A. cerana* in gathering the pollen.

Keywords: *Apis cerana*, local honey bee, green area pollen, Universitas Gadjah Mada Campus

Infiltration capacity and hydraulic conductivity in the different landuse practices at upstream Serayu Watershed

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Soil hydrological properties like infiltration capacity and hydraulic conductivity have important consequences for hydrological properties of soils in river catchments and for flood risk prevention. They are dynamic properties due to varying land use management practices. The objective of this study was to characterize the variation of infiltration capacity and hydraulic conductivity at upstream catchment of Serayu Watershed regarding the effects of forest transformation upon soil hydrological properties. Soil hydraulic properties measured on two micro-catchment of agroforestry and intensive agriculture. The fundamental activities associated with different plant preferences and soil treatments reduced soil hydraulic properties, including infiltration characteristics, soil compaction, and hydraulic conductivity within the near-surface soil profile. Field observations of soil hydraulic properties conducted on 18 plots at agroforestry (Tamansari site) and intensive agriculture (Penanggungan site) in the micro-catchment level. In each plot, the infiltrometer test performed with three repetitions based on differences in topography. Saturated hydraulic conductivity estimated from infiltration measurements taken in each plot, using the falling-head method. Along the field observation, a high intensity of soil treatment for the intensive agriculture activities has accelerated the soil organic layer lost. Agroforestry system with a low rate of soil treatment activities could reduce the soil organic layer lost. Infiltration capacity in the agroforestry site categorized in the medium level, while in the intensive agriculture categorized in the high level. The results indicate clearly that soils play a crucial role for water retention and therefore, in overland flow prevention. There is a need to have more awareness on the intimate link between the land use and soil properties and their possible effects on flooding.

Keywords: agroforestry, infiltration, intensive agriculture, soil hydraulic conductivity

Litsea grandis: a species that dominates the growth of pole and tree level at Merapi Ungup-Ungup of Ijen Crater Nature Preserve East Java

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Merapi Ungup-Ungup of Ijen Crater Nature Preserve has a high diversity of flora. Obstacles that faced by the manager was the lack of information related to the type of forest stands and its vegetation constituent. The aims of this research were to identify species composition on pole and tree level and its conservation status, and to identify the structure of forest stand. This research was conducted in the Merapi Ungup-Ungup of Ijen Crater Nature Preserve and Tree breeding Laboratory, Sub-Laboratory of Dendrology at Faculty of Forestry, Universitas Gadjah Mada. Data was collected using systematic sampling with an intensity of 3 %. The plot was placed at an altitude of 1,500 m asl to 1,850 m asl inside the transect line which was replicated within every 50 m asl of height increase. Transect line with a length of 100 m was made by the right side of the main road to Ijen Crater. The first plot was placed 25 m from the edge of the road, and distanced 50 m in between each plot. The total plot that was made was 16 plots, with a plot size of 20 m x 20 m and 10 m x 10 m for tree and pole observation respectively. Results showed diversity index of Shannon-Wiener (H) was 2.69 and 2.08 for pole and tree level in row which means moderate level of diversity. There were 21 species from 16 families found in pole level, and 25 species from 20 families found in tree level. *Litsea grandis* dominates with INP 114.45 in tree and 69.41 in the pole. The conservation status of plant species pole and tree level based on IUCN Red List consists of LC (Least Concerns) on *Magnolia condelei* and *Podocarpus imbricatus* and UV (Vulnerable) status on *Saurauia bracteosa*. Stand structure on pole level consists of B and C stratum, while tree level consist of A, B, and C stratum.

Keywords: conservation status, Ijen Crater, nature preserve, species composition, stand structure

Absconding behavior of local honey bee (*Apis cerana*) in Wanagama Education Forest, Gunung Kidul, Yogyakarta

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Local honey bee (*Apis cerana*) is traditionally kept to produce honey in Wanagama Forest. *A. cerana* do not store large amount of honey. Therefore *A. cerana* produce less honey than European honey bee (*Apis mellifera*). Absconding of *A. cerana* colony is an obstacle in producing honey in Wanagama. The objective of the research was to know the absconding phenomena of *A. cerana* and to find its causes. The colony of *A. cerana* were prepared and kept in Wanagama Forest in August 2016 and June 2017. The colonies of honey bees were observed to determine the absconding behavior of *A. cerana* monthly. The results showed that 13 % to 30 % colonies of *A. cerana* absconded. Before absconding, the number of brood in the hive reduced sharply. The wax moth was found in the absconded colony. The absconding of *A. cerana* seemed not caused by the shortage of pollen and nectar in Wanagama. Wax moth that destroy the honeycomb may be responsible for the absconding of *A. cerana*.

Keywords: *A. cerana*, absconding, local honey bee, Wanagama

The effects of agroforestry patterns on food crops productions in community forest

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The development of community forest in Gunungkidul is followed by the changes in management orientation from the purpose of conservation to be an economic purpose. The changes in orientation lead to the changes in land use patterns from traditional agroforestry to intermediate and even an advanced agroforestry. It could worriedly threaten the food security in Gunungkidul for once the trees are grown on the forest's land then the production of food crops is reduced and even unproductive. Local farmers are generally engaged with the local wisdom in managing the forests in which to combine agricultural crops with forestry trees, therefore it is necessary to examine how much food crops production in the community forest on some agroforestry patterns. The purpose of this study is to calculate the food crops production from the community forest based on some agroforestry patterns. The method used is survey to the respondents who own the community forest combining agricultural crops and forestry trees. The number of respondents are 120 people. The results show that the dominant agroforestry pattern is the Random Mixture with the main composition of teak. The dominant food crops production on the *trees along border* pattern is rice which is 733.5 kg/ha, the *alley cropping* pattern is corn which is 1,000 kg/ha, the *alternate rows* pattern is cassava which is 1562.5 kg/ha and the *random mixture* pattern is corn which is 249.4 kg/ha. The amount of production on each pattern reflects the suitability of the agroforestry pattern with the type of food crops.

Keywords: agroforestry, community forest, food crops, production

Understanding the impacts of recurrent peat fires in Padang Island, Riau Province, Indonesia

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Padang Island in Riau province of Indonesia has been severely impacted by recurrent fires in 2014 and 2015, leading to severe peat ecosystem degradation and people's livelihood. Therefore, analyzing the peat fires should not be isolated from socio-economic and local political context. Much has been written about peat fires especially the magnitude of the fires, however the linkages between ecological and livelihood system of peatland ecosystem gained only scant attention. This paper analyzes how the drivers of peat fires are causing a steady decline in Padang Island and aims to provide more holistic understanding on how the drivers interplay and continue to feed the process of peatland degradation with its associated peat ecosystem degradation and the impact on local economic development and people's livelihood. Multidisciplinary approach was applied in this study. This includes remote sensing data analysis, analysis on related documents such as historical, and documents and regulations. Intensive fieldwork was conducted in the island in which series of FGDs and interviews were executed. We found that the global demands for agricultural commodities have led to massive peat drainage for monoculture farming on peat lands. The high dependency on global commodity market and monoculture farming has created livelihood vulnerability, especially because of the price fluctuation of agricultural products at global market. Moreover, the monoculture farming tends to be unsustainable since it demands peat drainage, provides less options for sources of income and tends to marginalize indigenous knowledge about farming on peatland which have been practiced for centuries in the island.

Keywords: impacts, Indonesia, Padang Island, peat fires, peatland ecosystem

The dynamic of community forest in the livelihood

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The community forests at Java Island was not initially designed scientifically. The Community traditionally treated the forest as trees grown surronding the community land to meet the need of timber both as fuel wood and construction wood for their own subsistence living. However, for more than the last two decades the community forest at Java has become phenomenal. It is impressive in terms of the magnitude of timber production that reached almost 3 million cubic meter/year and also in terms of generating local and even regional economies by more than IDR 5 Billion/year, engaging more than 15,000 wood processing SMEs and creating more than 200,000 job opportunities . It may also be noted that the additional carbon stock in the community forest at Java may exceed 4 tons/year/ha, reflecting main contribution in reducing carbon emission level at regional jusrisdiction. The shift from traditional community forest into forestry driven by capitalistic economy market is urgent to be studied in systemic way. A wide range of variations of community oforest setting and specific situation of household were found almost unexpectedly. It is becoming important to learn on how community forest developed dynamically in coupled systems withthe corresponding livelihood system and then to bring the lessons learned onto other areas. It is believed that when these elements of dynamics are well understood, significant roles of community forests in changing the quality of life as well as the shift of community culture can be used as appropriate considerations for policy development. There are four element in coupling operation sub system as drivers component : motivation, forced situatuin, increase timber economic value, and decrease food crop, young generation employment which can make community forest and livelihood sub system dynamically couple.

Keywords: community forest, culture, dynamic livelihood, quality of life

Small scale ecology and societies:
adaptive management to construct ethno-techno-conservation of
Papua Nutmeg (*Myristica argentea* Warb.)

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Identities and entities can be found in the cultural and ecological environment of the community when they interact. The Papua nutmeg (*Myristica argentea* Warb.) has been utilized by ethnic Baham-Matta in the Western part of Papua for centuries as traditionally ecological knowledge of non-timber forest product (NTFP). In contrast, this phenomenon has not been constructed scientifically as part of social forestry science. Therefore, this research was intended to figure out qualitatively the construction of adaptive management of Papua nutmeg utilization by ethnic Baham-Matta by means of ethnoscience approach. This study found that the adaptive resource management Papua nutmeg is called Henggi in Iha language and endemic to the tropical forest of the Western part of Papua. The utilization of Papua nutmeg consists of three processes of pre-harvest, harvest as well as post-harvest. The Papua nutmeg utilization is traditionally managed and local conservation has been implemented using a traditional method known as Sasi system.

Keywords: adaptive management, Baham-Matta, ethno-techno-conservation, Nutmeg, Papua

Effect of breeding technology and trunk axial position on shrinkage and quality of 10 year old teak wood as a furniture's raw material

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Shortage on teak wood availability as material for furniture industry has been solved by developing tree breeding technology and decreasing on cut rotations. Three types of teak forest breeding technology being developed is called APB, KBK and JPP-PHT-1. Breeding technology was developed as an effort to get productive and hight quality of teak stands. Decreasing on cutting rotation encourages to increase young wood utilization. This study was aimed to determine the effect of breeding technology and axial stem position on teak wood shrinkages and wood quality of 10 y.o. Nine 10 y.o. teak trees were harvested on forest areas of Nganjuk Forest District, East Java Province. These trees consisted of seedling grown by APB, KBK, and JPP-PHT-1 breeding technology of which consisted of three trees on each kind of breeding technology. Three disks were taken from each trunk, namely from the butt, middle and upper parts. Wood shrinkages on tangential and radial and its ratio were measured based on British Standard method. Data were analyzed by using variance analysis arranged in blocked factorial and further testing were performed by using HSD Duncan. Wood quality was determined by using Suranto method (2014). Results showed that interaction of twoo factors did not affect on tangential and radial shrikages and also tangential-radial ratio. Tree breeding technology very significantly affects on tangensial shrinkage and significantly effect on radial shrinkage. APB breeding technology produces the greatest tangential shrinkage (8.46), followed by KBK (6.62) and JPP-PHT-1 (6.59 %). APB breeding technology produces the greatest radial shrinkage (5.51), followed by KBK (5.08) and JPP-PHT-1 (4.42 %). The axial tree trunk position affect only on tangential and radial ratio. The stem base has a largest T/R ratio (1.84), followed by middle part (1.45) and upper part (1.26). In term of wood shrinkage, Breeding technology affects the wood quality. APB breeding technology produces the lowest timber quality (3.30), followed by JPP-PHT-1 (2.85), and KBK (2.78).

Keywords: axial position, teak breeding technology, wood quality, wood shrinkage

Effect of nitrogen (N) concentration on the morphology of teak (*Tectona grandis*) seedlings

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Teak (*Tectona grandis*) is a timber tree species which is commonly grown by farmers due to its high quality and commercial value. One of nutrient that affects the physiological processes of teak plants is nitrogen (N). This study aims to determine the morphological symptoms of teak seedlings affected by several concentration levels of N and to determine the optimal concentration of N for the best teak seedling growth. This study was conducted using Completely Randomized Design (CRD), which consisted of five treatments, namely minus N nutrient solution (N0), half strength N nutrient solution (N1), full strength N nutrient solution (N2), 1.5 full strength N nutrient solution, 2 full strength N nutrient solution (N4), and aquadest as control (C). Each treatment was replicated 3 times. This research was conducted at the Laboratory of Intensive Silviculture Klebangan from June to November 2016. Parameter observed included height, diameter, nodal distance, and morphological symptoms of leaf. The results showed that variation of N concentration affected teak growth (height, diameter, and nodal distance). They also affected color and morphology of the leaves. Symptoms of N deficiency were the yellowing and drying of leaf tips and the presence of yellow spots in the inter veins. N concentration of 995 ppm resulted the best growth, but it caused drying in the interval area, probably due to deficiency in Magnesium (Mg). Without N (N0 and Control) caused the lowest seedling growth. The greatest N concentration of 1335 ppm did not give the best growth.

Keywords: morphology, nitrogen, teak

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Field of Interest

- Agricultural pest management
- Insect surveys and their identification.
- Forest pest management
- Feeding behavior
- Studying the seasonal distribution and life cycles of agricultural and forest insects and manage their numbers within an IPM approach concept.
- Insect biotechnology studies of insect pests for the purpose of identifying them and managing them.
- Large-scale discovery of new taxa and the analysis of diversity and distribution patterns of ants in poorly known areas of Africa and Madagascar.
- Species-level taxonomic revisions.

Education

- 1987 Bachelor degree, Plant Protection, Plant Protection Department,
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- 1993 Master degree, Economic Entomology, Department of Entomology,
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Research Projects

- Aldawood, A. S., Tufail, M. Sharaf, M. R. and Rasool, K. G. 2012. Use of DNA Barcoding in the Taxonomy of Fire Ant Species in Riyadh Region, Kingdom of Saudi Arabia.
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Field of Interest

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- Environmental Analysis
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Education

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- 2000 Doctoral degree, Conservation Biology & Applied Statistics,
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Professional Activities

- March 2017 - present Assistant Director/Senior Data Scientist (EL1),
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- 2016 – 2017 (contract) Consultant, Commonwealth Dept. of the Environment and
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- 2013 – 2017 (contract) Adjunct Research Investment and Teaching Fellow,
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- 2011 – 2013 (contract) Senior Research Scientist, Joint position at BIK-F
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- 2008 – 2010 (contract) NCAS-Climate, U. Reading, UK
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Field of Interest

- Economist of Food Quality and Information
- Food Marketing
- Supply Chain Coordination
- Consumer Research on Nutrition and Diet Choices
- Food Policy
- Choice Experiments
- Applied Econometrics

Education

- 1993 Bachelor degree, Animal Science, University of Évora, Portugal
- 1994 Post-graduate course, Agro-food Marketing, Agronomic Mediterranean Institute of Saragosa, International Centre for Advanced Mediterranean Agronomic Studies (IAMZ-CIHEAM), Spain
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- 2004 Master degree, Resource Economics, University of Massachusetts, Amherst, USA
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Publications

- Souza Monteiro, D. M. Economics of food chain coordination and food safety standards: Insights from Agency Theory. Chapter to appear at Tanya Roberts (Editor): The Economics of Food Safety, Springer. Forthcoming
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Field of Interest

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Education

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Professional Activities

- Advisor to the World Health Organization (WHO) on zoonotic primate malaria
- Director on the Executive Board of the World Association for the Advancement of Veterinary Parasitology (WAAVP)
- Affiliate Researcher at the University of Glasgow, UK
- President of the Malaysian Society of Parasitology and Tropical Medicine (MSPTM)
- Executive Council member of the Veterinary Association Malaysian (VAM)

Publication

- El-Sayed, N. M. et al. (2005). The genome sequence of *Trypanosoma cruzi*, etiologic agent of Chagas disease. *Science*. 309(5733):409-415.
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Field of Interest

- Plant Pathology

Education

- Bachelor degree, Dept of Phytopathology, Fac. of Agriculture UGM, Indonesia
- Master degree, Dept. of Microbiology, Fac. of Agriculture, University of Queensland, Australia
- Doctoral degree, United Graduate School of Agricultural Science, Gifu University, Japan



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Field of Interest

- Antioxidant: Its effect on food quality and health

Education

- 1985 Bachelor degree, Faculty of Agricultural Technology, Universitas Gadjah Mada
- 1988 Master degree, Department of Food Science and Human Nutrition, Colorado State University, USA
- 1992 Doctoral degree, Department of Food Science and Human Nutrition, Colorado State University, USA
- 1993 Post-doctoral research, Department of Animal Sciences, Colorado State University, USA

Awards

- 2011 Linnaeus-Palme grant for staff exchange, Chalmers University of Technology, Sweden
- 2009 Linnaeus-Palme grant for staff exchange, University of Boras, Sweden
- 2005 Innovative research grant, Gadjah Mada University, Yogyakarta
- 2004 Research Grant from International Foundation of Sciences, Sweden
- 2003 Research Grant from Indonesia Toray Science Foundation, Jakarta

Publication

- 2017 Changes in Sensory, Physicochemical and Microbiological Properties of *Ronto* during Fermentation
- 2017 Adsorption of β -Carotene in Isopropyl Alcohol with Decolorized Activated Carbon as Model for β -Carotene Adsorption in Crude Palm Oil
- 2017 Aktivitas Antioksidan Kulit Biji Kakao dari Hasil Penyangraian Biji Kakao Kering pada Derajat Ringan, Sedang dan Berat
- 2016 Effects of Cocoa Bean (*Theobroma cacao L.*) Fermentation on Phenolic Content, Antioxidant Activity and Functional Group of Cocoa Bean Shell
- 2016 The potential of palm kernel shell activated carbon as an adsorbent for β -carotene recovery from crude palm oil



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Field of Interest

- Smart agriculture using affordable microcomputers, sensors, and devices
- Agricultural machineries mainly focusing on field machineries
- Computational mechanics based on unconventional elastoplastic theory and its application to Biosystems engineering

Education

1999 Doctoral degree, Graduate School of Agriculture, Kyushu University, Japan.

Awards

2004 Young research award in the Japanese Society of Agricultural Machinery

2014 Incentive award in the Japanese Society of Agricultural Informatics

Professional Activities

2001 - present Associate Professor, Faculty of Agriculture, Kyushu University

2012 Visiting researcher in University of the Hohenheim, Germany

2009 Visiting professor in University of California, Davis, USA

2001 Researcher, Faculty of Agriculture, Kyushu University

1999 - 2001 Lecturer, Venture Business Laboratory, Kyushu University

Publication

- Friction theory based on the subloading surface concept.
- Development of fem program as a soil-water coupled finite deformation introducing the extended subloading surface model.
- Image processing on-line measurement for soil displacement.
- Consideration of shear band formation by elastoplastic constitutive equation of soils with tangential stress rate effect.
- Evaluation of conventional and unconventional plasticity for prediction of softening behavior.
- Effects of Partially Shallow Tilling and Sowing Method on the Growth and the Yield of Soybean (*Glicine max L.*) in Upland Filed Converted from Paddy Field.

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Each parallel symposia session will have a moderator, with one or more committee members in attendance. Presenters are allocated 15 minutes to deliver their presentation, with an additional 5 minutes for a Q&A. Based on the allocated presentation time, the presentation file should ideally contain approximately 10–12 PowerPoint slides. You are responsible for the content of your presentation.

The following will be at your disposal, for use during your presentation:

- Laptop
- Projector and screen
- Microphone
- Laser pointer

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All presenters are required to submit their presentation file during registration on the first or second day of the conference, at the submissions desk in front of the Ballroom. It is not possible to use your own computer for your presentation.

- Your presentation file should be in a format compatible with Microsoft PowerPoint 2007 (or earlier).
- Bring your presentation on a USB memory stick. Facilities will not be provided for other submission methods.
- We highly recommend that you keep a backup of your presentation file on a second USB stick.
- Please do not embed videos in your presentation.

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