Department of Plant Sciences Center for Population Biology Genome Center University of California Davis

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Education

PhD Genetics, University of Georgia 2006 MS Botany, University of California Riverside 2000 BA Botany, University of California Riverside 1998

Academic Employment

Professor, Dept. Plant Sciences, University of California Davis 2016-present Associate Professor, Dept. Plant Sciences, University of California Davis 2012-2016 Assistant Professor, Dept. Plant Sciences, University of California Davis 2009-2012 Postdoctoral Researcher (with BS Gaut), University of California Irvine 2006-2008 Profesor de Asignatura, Universidad Nacional Autónoma de México 2001

Selected Fellowships and Awards

Corn Pun Trophy, Genetics Society of America 2017
Mid-Career Excellence in Maize Genetics Award 2016
Faculty Development Award in recognition of university service 2015
DuPont Young Professor Award 2012
Presidential Early Career Award for Scientists and Engineers 2009
Dean's Award for Postdoctoral Excellence, UC Irvine 2008

Instruction and Advising

Current (total) advisees: 5 (16) postdoc, 5 (6) graduate, 4 (27) undergraduate

Current thesis committees: 23 PhD, ? MS

Instructor, Frontiers and Techniques in Plant Science, CSHL, July 2015

Genetics (UC Davis, BIS 101, undergraduate), 2013-present

Ecological Genomics (UC Davis, ECS243, graduate), 2014-present

Faculty advisor, Pioneer Hi-Bred/CAES graduate student symposium in plant breeding, 2012-present

Faculty advisor, US-Mexico graduate student exchange program, 2011-2015

Population and Quantitative Genetics (GGG 201D, graduate), 2010-2013

Plant Genetics (PLS 152, undergraduate), 2010-2011

Biología de Plantas I (undergraduate), UNAM, 2001

Service: selected from last 2 years

University

UC Davis Disciplinary Peer Review Committee on sexual violence and sexual harassment, 2017-present Task Force on Bioinformatics at UC Davis, 2017

College representative, UC Davis High Performance Computing Advisory Committee, 2016-present Section Chair for Agricultural Plant Biology, 2014-present

Plant Sciences executive committee, 2014-present

Search committees: Dept. Chair of Plant Sciences (Chair, 2016), Climate Adaptation (2017)

Dept. of Plant Sciences academic planning committee, 2010-2016

Professional

K-12 Outreach: Korematsu Elementary School, CA (2017); Shelburne Middle School, VA. (2017)

Maize Genetics Awards Committee, 2017

Advisory Board, PeerJ Preprints, 2016-present

Editorial Boards: Genes, Genomes, and Genetics (Associate Editor 2014-2016, Senior Editor 2017-present), PLoS Genetics (2018-Present), PeerJ (2013-present), Axios Reviews (2013-2017), eLife (Guest Editor, 2016)

External search committee member, Dept. Plant Biology, Swedish University of Agricultural Sciences (2016)

Journal peer review: Nature (4), Nature Genetics, eLife, Nature Plant, Cell, Nature Communications, PLoS Genetics, The Plant Cell, eLife, Current Biology, Genome Research (3), Trends in Plant Science (2), New Phytologist, Genome Biology & Evolution, Molecular Ecology (3), G3 (many), BMC Genomics (2), Plant Journal, Scientific Reports, Agriculture, Ecosystems and Environment,

Proposal review: NSF (2016,2017 (2)), Swiss National Science Foundation (2016), GWIS (2016), Israeli Science Foundation (2016)

Current Funding

NSF Plant Genome Research Program: "The genetics of highland adaptation in maize" (PI), 2016-2021 NSF Plant Genome Research Program: "Biology of Rare Alleles" (Co-PI), 2013-2018

Invited Seminars: last 12 months

Plenary Speaker, Maize Genetics Conference, Saint-Malo, France, Mar 2018

University of California, Davis, CA, Feb 2018

Plant And Animal Genome Conferecne (two workshops), San Diego, Jan 2018

U. Nebraska, Lincoln, Nov 2017

U. Colorado, Boulder, Oct 2017

SMBE structural variation symposium, San Antonio, July 2017

Harris Moran Breeding, Davis, CA, Feb 2017

Publications (lab members in bold, *equal contribution, †cover article, ‡undergraduate, §corresponding)

Preprints

Mei W, Stetter MG, Gates DJ, Stitzer MC, Ross-Ibarra J[§] Adaptation in plant genomes: bigger is different

Bilinski P[§], Albert P, Berg JJ, Birchler JA, Grote M, Lorant A, Quezada J[‡], Swarts, K, Yang J, Ross-Ibarra J[§] Parallel altitudinal clines reveal adaptive evolution of genome size in *Zea mays*

O'Brien A§, Sawers R, **Ross-Ibarra J**, Straus SY§. Evolutionary responses to conditionality in species interactions across environmental gradients

Bukowski R, Guo X, Lu Y, Zou C, He B, Rong Z, Wang B, Xu D, Yang B, Xie C, Fan L, Gao S, Xu X, Zhang G, Li Y, Jiao Y, Doebley K, **Ross-Ibarra J**, **Buffalo V**, Buckler ES, Xu Y, Lai J, Ware D, Sun Q. Construction of the third generation *Zea mays* haplotype map

In press or in print

H-Index 32 (5039 citations as of Thu Nov 30 00:08:47 2017)

- 70. Wang L, **Beissinger TM**, **Lorant A**, **Ross-Ibarra C**, **Ross-Ibarra J**§, Hufford MB§ (2017) The interplay of demography and selection during maize domestication and diffusion Genome Biology 18:215
- 69. Yang J*\$, Mezmouk S*, Baumgarten A, Buckler ES, Guill KE, McMullen MD, Mumm RH, Ross-Ibarra J\$ (2017) Incomplete dominance of deleterious alleles contribute substantially to trait variation and heterosis in maize PLoS Genetics 13:e1007019.
- 68. **Lorant A**, Pedersen S, Holst I, Hufford MB, Winter K, Piperno D, **Ross-Ibarra J**§ (2017) The potential role of genetic assimilation during maize domestication PLoS ONE 12:e0184202
- 67. Aguilar-Rangel MR, ChÃavez Montes RA, Gonzalez-Segovia E, Ross-Ibarra J, Simpson JK, Sawers RJH (2017) Allele specific expression analysis identifies regulatory variation associated with stress-related genes in the Mexican highland maize landrace Palomero Toluqueño Peer J 5:e3737.
- 66. **Stetter MG**, **Gates DJ**, **Mei W**, **Ross-Ibarra J**§ (2017) How to make a domesticate Current Biology 27:R896âĂŞR900
- 65. Swarts K, Gutaker RM, Schuenemann V, Benz B, Blake M, Bukowski R, Holland J, Kruse-Peeples M, Lepak N, Matson RG, Prim L, Romay C, Ross-Ibarra J, Sanchez J, Schmidt C, Sofro E, Krause J, Weigel D, Buckler ES, Burbano HA (2017) Genomic estimation of complex traits reveals ancient maize adaptation to temperate North America Science 357:512-515.
- 64. **Bilinski P**[§], Han Y, **Hufford MB**, **Lorant A**, Zhang P, Jiang J, **Ross-Ibarra J**[§] (2017) Diverse origins of high copy tandem repeats in grass genomes PLoS ONE 12:e0177896.
- 63. Jiao Y, Peluso P, Shi J, Liang T, **Stitzer MC**, Wang B, Campbell M, Stein JC, Wei X, Chin C-S, Guill K, Regulski M, Kumari S, Olson A, Gent J, Schneider KL, Wolfgruber TK, May MR, Springer N, Antoniou E, McCombie R, Presting GG, McMullen M, **Ross-Ibarra J**, Dawe RK, Hastie A, Rank DR, Ware D (2017) Improved maize reference genome with single-molecule technologies Nature 546:524âÂŞ527
- 62. **Renny-Byfield S** \S , Rodgers-Melnick E, **Ross-Ibarra J** \S (2017) Gene fractionation and function in the ancient subgenomes of maize MBE 34:1825-1832
- 61. **Velasco D**, Aradhya M, and and **Ross-Ibarra J**§ (2016) Evolutionary genomics of peach and almond domestication. G3 6:3985-3993 Citations: 9

60. Ramos-Madrigal J, Smith BD, Moreno-Mayar JV, Gopalakrishnan S, **Ross-Ibarra J**, Gilbert MTP, Wales N (2016) Genome sequence of a 5310-year-old maize cob provides insights into the early stages of maize domestication Current Biology 26:3195-3201 Citations: 9

- 59. **Durvasula A**^{‡*}, Hoffman PJ*, **Kent TV**[‡], Liu C, Kono TJY, Morrell PL[§], **Ross-Ibarra J**[§] (2016) ANGSD-wrapper Molecular Ecology Resources 16:1449-1454 Citations: 0
- 58. **Beissinger TM**§, Wang L, **Crosby K**, **Durvasula A**‡, Hufford MB, **Ross-Ibarra J**§ (2016) Recent demography drives changes in linked selection across the maize genome Nature Plants 2:16084 Citations: 20
- 57. Wolfgruber TK, Nakashima MM, Schneider KL, Sharma A, Xie Z, Albert PS, Xu R, **Bilinski P**, Dawe RK, **Ross-Ibarra J**, Birchler JA, Presting G (2016) High quality maize centromere 10 sequence reveals evidence of frequent recombination events. Frontiers In Plant Science 7 Citations: 9
- 56. Orozco-Ramìrez Q, Santacruz-Varela A, **Ross-Ibarra J**, Brush B (2016) Maize diversity associated with social origin and environmental variation in southern Mexico. HereDITY 116:477-484. Citations: 10
- 55. Gerke JP[§], Edwards JW, Guill KE, **Ross-Ibarra J**[§], McMullen MD. The genomic impacts of drift and selection for hybrid performance in maize (2015) GENETICS 201: 1201âÅŞ1211 Citations: 14
- 54. Sosso D, Luo D, Li Q-B, Sassse J, Yang J, Gendrot G, Suzuki M, Koch KE, McCarty DR, Chourey PS, Rogoswky PM, Ross-Ibarra J, Yang B, Frommer WB (2015) Seed filling in domesticated maize and rice depends on SWEET-mediated hexose transport. Nature Genetics 47:1489-1493 Citations: 36
- 53. **Takuno S**, Ralph P, Swarts K, Elshire RJ, Glaubitz JC, Buckler ES, **Hufford MB**, **Ross-Ibarra J**[§] (2015) Independent molecular basis of convergent highland adaptation in maize. Genetics 200:1297-1312 Citations: 24
- 52. **Vann LE, Kono T, Pyhäjärvi T, Hufford MB**§, **Ross-Ibarra J**§ (2015) Natural variation in teosinte at the domestication locus teosinte branched1 (tb1). PEERJ 3:e900 Citations: 4
- 51. Hake S, **Ross-Ibarra J** (2015) Genetic, evolutionary and plant breeding insights from the domestication of maize. ELIFE 2015;4:e05861 Citations: o
- 50. Fonseca RR, Smith B, Wales N, Cappellini E, Skoglund P, Fumagalli M, Samaniego JA, Caroe C, Avila-Arcos MC, Hufnagel D, Korneliussen TS, Vieira FG, Jakobsson M, Arriaza B, Willerslev E, Nielsen R, Hufford MB, Albrechtsen A, **Ross-Ibarra J**, Gilbert MT (2015) The origin and evolution of maize in the American Southwest. Nature Plants 1:14003 Citations: 0
- 49. Dyer GA, López-Feldman A, Yúnez-Naude A, Taylor JE, **Ross-Ibarra J** (2015) Reply to Brush *et al.*: A wake up call for crop conservation science. PNAS 112 (1), E2-E2 (letter).

Citations: 3

48. Makarevitch I, Waters M, West P, **Stitzer M**, **Ross-Ibarra**, J, Springer NM (2015) Mobile elements contribute to activation of genes in response to abiotic stress. PLoS GENETICS 11 (1): e1004915. Citations: 90

- 47. Tiffin P, Ross-Ibarra J (2014) Advances and limits of using population genetics to understand local adaptation. Trends in Ecology and Evolution 29:673-680 Citations: o
- 46. **Bilinski P, Distor KD, Gutierez-Lopez J, Mendoza Mendoza G,** Shi J, Dawe K, **Ross-Ibarra J**[§] (2014) Diversity and evolution of centromere repeats in the maize genome. Сняомозома 0009-5915 Citations: 11
- 45. **Mezmouk S, Ross-Ibarra J** § (2014) The pattern and distribution of deleterious mutations in maize. (2014) G3 4:163-171 Citations: 24
- 44. Waters AJ, **Bilinski P**, Eichten SR, Vaughn MW, **Ross-Ibarra J**, Gehring M, Springer NM (2013) Comprehensive analysis of imprinted genes in maize reveals allelic variation for imprinting and limited conservation with other species. PNAS 110:19639-19644 Citations: 43
- 43. **Pyhäjärvi T**, **Hufford MB**, **Mezmouk S**, **Ross-Ibarra J**[§] (2013) Complex patterns of local adaptation in teosinte. Genome Biology and Evolution 5: 1594-1609.[†] Citations: 62
- 42. Wills DM, Whipple C, **Takuno S**, Kursel LE, Shannon LM, **Ross-Ibarra J**, Doebley JF (2013) From many, one: genetic control of prolificacy during maize domestication. PLoS GENETICS 9(6): e1003604. Citations: 39
- 41. McCouch S, Baute GJ, Bradeen J, Bramel P, Bretting PK, Buckler E, Burke JM, Charest D, Cloutier S, Cole G, Dempewolf H, Dingkuhn M, Feuillet C, Gepts, P, Grattapaglia D, Guarino L, Jackson S, Knapp S, Langridge P, Lawton-Rauh A, Lijua Q, Lusty C, Michael T, Myles S, Naito K, Nelson RL, Pontarollo R, Richards CM, Rieseberg L, Ross-Ibarra J, Rounsley S, Hamilton RS, Schurr U, Stein N, Tomooka N, van der Knaap E, van Tassel D, Toll J, Valls J, Varshney RK, Ward J, Waugh R, Wenzl P, Zamir. (2013) Agriculture: Feeding the future. Nature 499:23-24 Citations: 190
- 40. **Hufford MB**, Lubinsky P, **Pyhäjärvi T**, **Devengenzo MT**[‡], Ellstrand NC, **Ross-Ibarra J**[§] (2013) The genomic signature of crop-wild introgression in maize. PLoS Genetics 9(5): e1003477. Citations: 113
- 39. **Provance MC**[§], Garcia Ruiz I, **Thommes C**[‡], **Ross-Ibarra J** (2013) Population genetics and ethnobotany of cultivated *Diospyros riojae* Gómez Pompa (Ebenaceae), an endangered fruit crop from Mexico. Genetic Resources and Crop Evolution 60: 2171-2182. Citations: 2
- 38. Melters DP*, Bradnam KR*, Young HA, Telis N, May MR, Ruby JG, Sebra R, Peluso P, Eid J, Rank D, Fernando Garcia J, DeRisi J, Smith T, Tobias C, **Ross-Ibarra J**§, Korf IF§, Chan SW-L. (2013) Patterns of centromere tandem repeat evolution in 282 animal and plant genomes. Genome Biology 14:R10

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37. Kanizay LB, **Pyhäjärvi T**, Lowry E, **Hufford MB**, Peterson DG, **Ross-Ibarra J**, Dawe RK (2013) Diversity and abundance of the Abnormal chromosome 10 meiotic drive complex in *Zea mays*. HEREDITY 110: 570-577.

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36. **Hufford MB**, **Bilinski P**, **Pyhäjärvi T**, **Ross-Ibarra J**[§] (2012) Teosinte as a model system for population and ecological genomics. Trends in Genetics 12:606-615[†] Citations: 28

35. Muñoz Diez C, Vitte C, **Ross-Ibarra J**, Gaut BS, Tenaillon MI (2012) Using nextgen sequencing to investigate genome size variation and transposable element content. *In* Grandbastien M-A, Casacuberta JM, editors. Topics in Current Genetics v24: Plant Transposable Elements - Impact on Genome Structure & Function. pp. 41-58

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34. van Heerwaarden J^\S , Hufford MB, Ross-Ibarra J^\S (2012) Historical genomics of North American maize. PNAS 109: 12420-12425

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- 33. Swanson-Wagner R, Briskine R, Schaefer R, **Hufford MB**, **Ross-Ibarra J**, Myers CL, Tiffin P, Springer NM. Reshaping of the maize transcriptome by domestication. (2012) PNAS 109: 11878-11883 Citations: 66
- 32. **Hufford MB***, Xun X*, **van Heerwaarden J***, **Pyhäjärvi T***, Chia J-M, Cartwright RA, Elshire RJ, Glaubitz JC, Guill KE, Kaeppler S, Lai J, Morrell PL, Shannon LM, Song C, Spinger NM, Swanson-Wagner RA, Tiffin P, Wang J, Zhang G, Doebley J, McMullen MD, Ware D, Buckler ES[§], Yang S[§], **Ross-Ibarra J**[§] (2012) Comparative population genomics of maize domestication and improvement. Nature Genetics 44:808-811[†] Citations: 376
- 31. Chia J-M*, Song C*, Bradbury P, Costich D, de Leon N, Doebley JC, Elshire RJ, Gaut BS, Geller L, Glaubitz JC, Gore M, Guill KE, Holland J, **Hufford MB**, Lai J, Li M, Liu X, Lu Y, McCombie R, Nelson R, Poland J, Prasanna BM, **Pyhäjärvi T**, Rong T, Sekhon RS, Sun Q, Tenaillon M, Tian F, Wang J, Xu X, Zhang Z, Kaeppler S, **Ross-Ibarra J**, McMullen M, Buckler ES, Zhang G, Xu Y, Ware, D (2012) Maize HapMap2 identifies extant variation from a genome in flux. Nature Genetics 44:803-807[†] Citations: 345
- 30. Fang Z, **Pyhäjärvi T**, Weber AL, Dawe RK, Glaubitz JC, Sánchez González J, **Ross-Ibarra C**, Doebley J, Morrell PL[§], **Ross-Ibarra J**[§] (2012) Megabase-scale inversion polymorphism in the wild ancestor of maize. Genetics 191:883-894 Citations: 39
- 29. Cook JP, McMullen MD, Holland JB, Tian F, Bradbury P, **Ross-Ibarra J**, Buckler ES, Flint-Garcia SA (2012) Genetic architecture of maize kernel composition in the Nested Association Mapping and Inbred Association panels. Plant Physiology 158: 824-834 Citations: 0
- 28. Morrell PL, Buckler ES, Ross-Ibarra J^{S} (2012) Crop genomics: advances and applications. Nature Reviews Genetics 13:85-96[†]

Citations: 268

27. Studer A, Zhao Q, **Ross-Ibarra** J, Doebley J (2011) Identification of a functional transposon insertion in the maize domestication gene *tb*1. NATURE GENETICS 43:1160-1163.

Citations: 247

26. van Heerwaarden J^\S , Doebley J, Briggs WH, Glaubitz JC, Goodman MM, Sánchez González JJ, Ross-Ibarra J^\S (2011) Genetic signals of origin, spread and introgression in a large sample of maize landraces. PNAS 108: 1088-1092

Citations: o

25. **Hufford MB**[§], Gepts P, **Ross-Ibarra J** (2011) Influence of cryptic population structure on observed mating patterns in the wild progenitor of maize (*Zea mays* ssp. *parviglumis*). Molecular Ecology 20: 46-55

Citations: 10

24. Tenaillon MI, **Hufford MB**, Gaut BS, **Ross-Ibarra J**§ (2011) Genome size and TE content as determined by high-throughput sequencing in maize and *Zea luxurians*. Genome Biology and Evolution 3: 219-229

Citations: 113

23. Eckert AJ, van Heerwaarden J, Wegrzyn JL, Nelson CD, Ross-Ibarra J, González-Martínez SC, and Neale DB (2010) Patterns of population structure and environmental associations to aridity across the range of loblolly pine (*Pinus taeda* L, Pinaceae). Genetics 185: 969-982 Citations: 250

- 22. Fuchs EJ, **Ross-Ibarra J**§, Barrantes G (2010) Reproductive biology of *Macleania rupestris*: a pollen-limited Neotropical cloud-forest species in Costa Rica. JOURNAL OF TROPICAL ECOLOGY 26: 351-354 Citations: 5
- 21. Whitney KD, Baack EJ, Hamrick JL, Godt MJW, Barringer BC, Bennett MD, Eckert CG, Goodwillie C, Kalisz S, Leitch I, Ross-Ibarra J (2010) A role for nonadaptive processes in plant genome size evolution? Evolution 64: 2097-2109

 Citations: 59
- 20. **van Heerwaarden J**, **Ross-Ibarra J**[§], Doebley J, Glaubitz JC, Sánchez González J, Gaut BS, Eguiarte LE (2010) Fine scale genetic structure in the wild ancestor of maize (*Zea mays* ssp. *parviglumis*). Molecular Ecology 19: 1162-1173

Citations: 31

19. Shi J, Wolf S, Burke J, Presting G, **Ross-Ibarra J**, Dawe RK (2010) High frequency gene conversion in centromere cores. PLoS Biology 8: e1000327 Citations: 73

18. Hollister JD, **Ross-Ibarra J**, Gaut BS (2010) Indel-associated mutation rate varies with mating system in flowering plants. Molecular Biology and Evolution 27: 409-416. Citations: 0

17. **van Heerwaarden J**, van Eeuwijk FA, **Ross-Ibarra J** (2010) Genetic diversity in a crop metapopulation. Heredity 104: 28-39

Citations: 31

16. Gore MA*, Chia JM*, Elshire RJ, Sun Q, Ersoz ES, Hurwitz BL, Peiffer JA, McMullen MD, Grills GS, Ross-Ibarra J, Ware DH, Buckler ES (2009) A first-generation haplotype map of maize. Science 326: 1115-1117.

Citations: 540

15. **May MR**[‡], **Provance MC**, Sanders AC, Ellstrand NC, **Ross-Ibarra J**[§] (2009) A pleistocene clone of Palmer's Oak persisting in Southern California. PLoS ONE 4: e8346.

Citations: 21

- 14. Zhang LB, Zhu Q, Wu ZQ, **Ross-Ibarra J**, Gaut BS, Ge S, Sang T (2009) Selection on grain shattering genes and rates of rice domestication. New Phytologist 184: 708-720. Citations: 97
- 13. **Ross-Ibarra J**, Tenaillon M, Gaut BS (2009) Historical divergence and gene flow in the genus Zea. Genetics 181: 1399-1413. Citations: 109

12. **Ross-Ibarra J***, Wright SI*, Foxe JP, Kawabe A, DeRose-Wilson L, Gos G, Charlesworth D, Gaut BS (2008) Patterns of polymorphism and demographic history in natural populations of *Arabidopsis lyrata*. PLoS ONE 3: e2411.

Citations: 137

- 11. Lockton S, **Ross-Ibarra J**, Gaut BS (2008) Demography and weak selection drive patterns of transposable element diversity in natural populations of *Arabidopsis lyrata*. PNAS 105: 13965-13970. Citations: 59
- 10. Ross-Ibarra J^{\S} , Gaut BS (2008) Multiple domestications do not appear monophyletic. PNAS 105: E105 (letter).

Citations: 18

9. Gaut BS, Ross-Ibarra J (2008) Selection on major components of angiosperm genomes. Science 320: 484-486.

Citations: 64

8. **Ross-Ibarra J**, Morrell PL, Gaut BS (2007) Plant domestication, a unique opportunity to identify the genetic basis of adaptation. PNAS 104 Suppl 1: 8641-8648.

Citations: 242

7. Ross-Ibarra J^{\S} (2007) Genome size and recombination in angiosperms: a second look. Journal of Evolutionary Biology 20: 800-806.

Citations: 27

6. Wares JP, Barber PH, **Ross-Ibarra J**, Sotka EE, Toonen RJ (2006) Mitochondrial DNA and population size. Science 314: 1388-90 (letter).

Citations: 29

5. Ross-Ibarra J^\S (2005) QTL and the study of plant domestication. Genetica 123: 197-204. Citations: 28

4. **Ross-Ibarra J** § (2004) The evolution of recombination under domestication: a test of two hypotheses. American Naturalist 163: 105-112. Citations: 65

3. Ross-Ibarra J (2003) Origin and domestication of chaya (Cnidoscolus aconitifolius Mill I. M. Johnst):

Mayan spinach. MEXICAN STUDIES 19: 287-302. Citations: 0

2. **Ross-Ibarra J**§, Molina-Cruz A (2002) The ethnobotany of Chaya (*Cnidoscolus aconitifolius* ssp. *aconitifolius* Breckon): A nutritious Maya vegetable. Economic Botany 56: 350-365. Citations: 54

1. Neel MC, **Ross-Ibarra J**, Ellstrand NC (2001) Implications of mating patterns for conservation of the endangered plant *Eriogonum ovalifolium* var. *vineum*. American Journal of Botany 88: 1214-1222. Citations: 31