



[List of Issues](#)
[Current Issue](#)
[Category: BioOne.2](#)
[Aims & Scope](#)
[Editorial Office](#)
[Editorial Board](#)
[Author Guidelines](#)

Print ISSN: 1095-5674

Online ISSN: 1940-0616

Current: Apr 2016 : Volume , 143 Issue 2

BioOne Member Since: 2007

Frequency: Quarterly

Impact Factor: 0.518

5 Yr. Impact Factor: 0.678

ISI Journal Citation Reports®

Rankings: 172/200 - Plant Sciences

Eigenfactor™: *The Journal of the Torrey Botanical Society*

Title Tools



Most Read Articles

Relative allelopathic potential of invasive plant species in a young disturbed woodland

Plant Phenology And Distribution In Relation To Recent Climate Change

Evolution and origin of the Central Grassland of North America: climate, fire, and mammalian grazers

Recovery of forest floor diversity after removal of the nonnative, invasive plant *Euonymus fortunei*

Seed ferns and the origin of angiosperms

More

Most Cited Articles

Evolution and origin of the Central Grassland of North America: climate, fire, and mammalian grazers

Plant Phenology And Distribution In Relation To Recent Climate Change

Leaf phenology and freeze tolerance of the invasive shrub Amur honeysuckle and potential native competitors

Fire and persistence of montane chaparral in mixed conifer forest landscapes in the northern Sierra Nevada, Lake Tahoe Basin, California, USA

Pteridosperms are the backbone of seed-plant phylogeny

More

Sign up for e-alerts

RSS Feeds

Home / All Titles / The Journal of the Torrey Botanical Society / Oct 2008 / pg(s) 463-474

The Journal of the Torrey Botanical Society

Published by: **Torrey Botanical Society**

« previous article : [next article](#) »

Sélectionner une langue ▼

translator disclaimer

The Journal of the Torrey Botanical Society

135(4):463-474. 2008

doi: <http://dx.doi.org/10.3159/08-RA-020R.1>

Characterization of a Domesticated Tree Lineage (*Spondias purpurea*, Anacardiaceae) Based on Nuclear and Chloroplast Sequence Data¹

Allison J. Miller^{2,3}

Biology Department, Saint Louis University, St. Louis, MO 63103

¹Funding for this study was provided by the National Science Foundation (PD 0105134), Botanical Society of America Karling Graduate Award, Organization for Tropical Studies, Washington University Division of Biology and Biomedical Sciences, and a Mellon Foundation Grant to the Missouri Botanical Garden.

MILLER, A. J. (Department of Biology, Saint Louis University, St. Louis, MO 63103). Characterization of a domesticated tree lineage (*Spondias purpurea*, Anacardiaceae) based on nuclear and chloroplast sequence data. *J. Torrey Bot. Soc.* 135: 463–474. 2008.

²The author thanks four anonymous reviewers for insightful comments on an earlier version of the manuscript. In addition, thank you to R. Aguilar F., A. Anzueto, G. Borjas, G. Carnevali, J. Castilla Canales, L. Chavez V., I. Diaz, A-C. Gomez, A. Herrera, M. Diaz, A. and C. MacVean, M. Merello, A. Molina R., P. Moreño, A. Muehlenbachs, M. Olson, E. O'Mahoney-Cubbison, A. Paschke, E. Pimienta Barrios, B. Ramirez Hernandez, R. Rueda, R. Ruenes, N. Ventura, and B. Wong for assistance in the field.

³E-mail: amille75@slu.edu

Abstract

Domesticated tree species represent an economically and ecologically important group of taxa. Trees differ from other well-studied crop systems (rice, wheat, corn, sunflower) in several basic biological attributes, all of which influence the way in which genetic variation is structured in these organisms. The goals of this study were to delimit a lineage of a Mesoamerican domesticated tree, *Spondias purpurea*, and to investigate the relationship between this lineage and another sympatric congener (*S. mombin*) using nuclear and chloroplast sequence data. The fourth intron of *Pepe* was sequenced for sixty-eight Central American *Spondias* trees including twelve *S. mombin* accessions, 55 *S. purpurea* trees, and one *S. radlkoferi* individual. Data were analyzed using traditional phylogenetic techniques and using a network approach. Nuclear data were compared with previously published sequence data from the chloroplast spacer *trnS-trnG*, revealing that the *Spondias purpurea* lineage includes both cultivated and wild populations, but in localized areas hybridization and incomplete lineage sorting blur the boundaries between the crop species and a sympatric congener. This study provides insight into the nature of a domesticated tree lineage, which, in the case of *Spondias purpurea*, is generally distinct despite some evidence for ongoing gene flow.

Article Views

» **Abstract & References**

[Full Text](#)

PDF (661 KB)

Social Tools

 [Print Friendly](#)

Article Tools

[Email](#)

[Disable search highlighting](#)

[Add to Favorites](#)

[Sign Up for E-alerts](#)

[Download to Citation Manager](#)

Alert me when this article is cited:
[Email](#) | [RSS](#)

[Rights & Permissions](#)

Citing Articles

Received: February 7, 2008; **Revised:** May 20, 2008

Keywords: Anacardiaceae, domestication, gene flow, Mesoamerica, *Spondias*

Literature Cited

- Airy Shaw, H. K. and L. L. Forman. 1967. The genus *Spondias* L. (Anacardiaceae) in tropical Asia. *Kew Bull* 21:1–21.
- Anderson, E. A. 1952. *Plants, Man, and Life*. Reprinted by the Missouri Botanical Garden in 1997. St. Louis, MO. 91–92.
- Aradhya, M. K., D. Potter, and C. J. Simon. 2006. Cladistic biogeography of *Juglans* (Juglandaceae) based on chloroplast DNA intergenic spacer sequences. 143–170. In Motley, T. J., N. Zerega, and H. Cross, editors. *Darwin's Harvest*. Columbia University Press. New York, NY.
- Avitia-García, E. 1997. Estructura floral y anatomía del aborto de ovulos y semillas en ciruela mexicana (*Spondias purpurea* L.). *Horticultura Mexicana* 5:282–288.
- Burnham, R. J. and A. Graham. 1999. The history of Neotropical vegetation: new developments and status. *Ann. Mo. Bot. Gard* 86:546–589. [CrossRef](#)
- Cavers, S., C. Navarro, and A. J. Lowe. 2003. Chloroplast DNA phylogeography reveals colonization history of a Neotropical tree, *Cedrela odorata* L., in Mesoamerica. *Mol. Ecol* 12:1451–1460.
- Clark, A. G. 1990. Inference of haplotypes from PCR-amplified samples of diploid populations. *Mol. Biol. Evol* 7:111–122. [PubMed](#)
- Croat, T. B. 1974a. A case for delayed fruit maturation in *Spondias* (Anacardiaceae). *Biotropica* 6:135–137.
- Croat, T. B. 1974b. A reconsideration of *Spondias mombin* L. (Anacardiaceae). *Ann. Mo. Bot. Gard* 61:483–490.
- Croat, T. B. 1978. *Flora of Barro Colorado Island*. Stanford University Press. Stanford, CA. 238.
- Cuevas, J. A. 1994. Spanish plum, red mombin (*Spondias purpurea*). 111–115. In Hernando Bermejo, J. E. and J. León, editors. *Neglected crops: 1492 from a different perspective*. Plant Production and Protection Series No. 26. FAO. Rome, Italy.
- De Queiroz, K. 1998. The general lineage concept of species, species criteria, and the process of speciation. 57–75. In Howard, D. J. and S. H. Berlocher, editors. *Endless Forms*. Oxford University Press. New York, NY.
- Ding Hou Anacardiaceae. 1978. *Flora Malesiana (Series I)* 8:395–548.
- Ellstrand, N. C., H. C. Prentice, and J. F. Hancock. 1999. Gene flow and introgression from domesticated plants into their wild relatives. *Annu. Rev. Ecol. Syst* 30:539–563. [CrossRef](#)
- Estrada Lugo, E. I. J. 1989. *El Códice Florentino. Su Información Etnobotánica*. Colegio de Postgraduados. Chapingo, Mexico.
- Funk, D. J. and K. E. Omland. 2003. Species-level paraphyly and polyphyly: frequency, causes, and consequences, with insights from animal mitochondrial DNA. *Annu. Rev. Ecol. Syst* 34:397–423. [CrossRef](#)
- Gillies, A. C. M., J. P. Cornelius, A. C. Newton, C. Navarro, M. Hernandez, and J. Wilson. 1997. Genetic variation in Costa Rica populations of the tropical timber species *Cedrela odorata* L., assessed using RAPDs. *Mol. Ecol* 6:1133–1145.
- Hancock, J. F. 2004. *Plant Evolution and the Origin of Crop Species*. CABI Publishing. Wallingford, U.K. 313.

- Juliano, J. B. 1932. The cause of sterility in *Spondias purpurea* L. *Philippine Agriculturist* 21:15–24.
- Kostermans, A. J. G. H. 1991. Kedondong, Ambarella, Amra: The Spondiaceae (Anacardiaceae) in Asia and the Pacific Area. Bina Karya. Bogor.
- Kozioł, M. J. and M. J. Macía. 1998. Chemical composition, nutritional evaluation, and economic prospects of *Spondias purpurea* (Anacardiaceae). *Econ. Bot* 52:373–380.
- Linnaeus, C. 1753. *Species Plantarum*. A Facsimile of the first edition. Volume 1. Ray Society. London, U.K.
- Linnaeus, C. 1762. *Species Plantarum Exhibentes Plantas Rite Cognitas ad Genera Relatas*. Tomus 1, Editio Secunda. Acad. Upsal. Homens. Petropol. Berol. Imperial. London, U.K.
- Lumaret, R. and N. Ouazzani. 2001. Ancient wild olives in Mediterranean forests. *Nature* 413:700.
- Macía, M. J. and A. S. Barfod. 2000. Economic Botany of *Spondias purpurea* (Anacardiaceae) in Ecuador. *Econ. Bot* 54:449–458.
- MacNeish, R. S. 1992. *The Origins of Agriculture and Settled Life*. University of Oklahoma Press. Norman, OK. 433.
- Mandujano, S., S. Gallina, and S. H. Bullock. 1994. Frugivory and dispersal of *Spondias purpurea* (Anacardiaceae) in a tropical deciduous forest in México. *Rev. Biol. Trop* 42:107–114.
- Miller, A. J. and J. H. Knouft. 2006. GIS-based characterization of the wild and cultivated niches of a Mesoamerican fruit tree, *Spondias purpurea* (Anacardiaceae). *Am. J. Bot* 93:1757–1767.
- Miller, A. J. and B. A. Schaal. 2005. Domestication of a Mesoamerican cultivated fruit tree. *Proc. Natl. Acad. Sci* 102:12801–1206. [CrossRef](#)
- Miller, A. J. and B. A. Schaal. 2006. Domestication and the distribution of genetic variation in wild and cultivated populations of the Mesoamerican fruit tree, *Spondias purpurea* L. (Anacardiaceae). *Mol. Ecol* 15:1467–1480. [CrossRef](#)
- Muller, M. H., J. M. Prosperi, S. Santoni, and J. Ronfort. 2003. Inferences from mitochondrial DNA patterns on the domestication history of alfalfa (*Medicago sativa*). *Mol. Ecol* 12:2187–2199. [CrossRef](#), [PubMed](#)
- Nicolesi, E., Z. N. Deng, A. Gentile, S. La Malfa, G. Continella, and E. Tribulato. 2000. *Citrus* phylogeny and genetic origin of important species as investigated by molecular markers. *Theor. Appl. Genet* 100:1155–1166.
- Olsen, K. M. and B. A. Schaal. 1999. Evidence on the origin of cassava: phylogeography of *Manihot esculenta*. *Proc. Natl. Acad. Sci* 96:5586–5591.
- Olsen, K. M. and M. D. Purugganan. 2002. Molecular evidence on the origin and evolution of glutinous rice. *Genetics* 162:941–950.
- Petit, R. J. and A. Hampe. 2006. Some evolutionary consequences of being a tree. *Annu. Rev. Ecol. Syst* 37:187–214.
- Posada, D. and K. A. Crandall. 2001. Intraspecific gene genealogies: trees grafting into networks. *Trends Ecol. Evol* 16:37–45. [CrossRef](#), [PubMed](#)
- Raven, P. H. and D. I. Axelrod. 1974. Angiosperm biogeography and past continental movements. *Ann. Mo. Bot. Gard* 61:539–673. [CrossRef](#)
- Rozas, J. and R. Rozas. 1999. *Comput. Appl. Biosci* 11:621–625.
- Rzedowski, J. 1978. *Vegetación de México*. Limusa Noriega. México, D.F. 432.
- Sang, T. and Y. Zhong. 2000. Testing hybridization hypotheses based on

incongruent gene trees. *Syst. Biol* 49:422–434. [CrossRef](#), [PubMed](#)

Sites Jr, J. W. and J. C. Marshall. 2004. Operational criteria for delimiting species. *Annu. Rev. Ecol. Syst* 35:199–227. [CrossRef](#)

Stacy, E. A., J. L. Hamrick, J. D. Nason, S. P. Hubbell, R. B. Foster, and R. Condit. 1996. Pollen dispersal in low-density populations of three neotropical tree species. *Am. Nat* 148:275–298.

Weeks, A. and B. B. Simpson. 2004. Molecular genetic evidence for interspecific hybridization among endemic Hispaniolan *Bursera* (Burseraeae). *Am. J. Bot* 91:976–984.

Wright, S. I., I. V. Bi, S. G. Schroeder, M. Yamasaki, J. F. Doebley, M. D. McMullen, and B. S. Gaut. 2005. The effects of artificial selection on the maize genome. *Science* 308:1310–1314. [CrossRef](#), [PubMed](#)

Zohary, D. 2004. Unconscious selection and the evolution of domesticated plants. *Econ. Bot* 58:5–10. [BioOne](#)

Zohary, D. and M. Hopf. 2000. *Plant Domestication in the Old World*. Oxford University Press. Oxford, U.K. 334.

Zohary, D. and P. Spiegel-Roy. 1974. Beginnings of fruit growing in the Old World. *Science* 187:319–327.

Cited by

John D. Mitchell, Douglas C. Daly. (2015) A revision of *Spondias* L. (*Anacardiaceae*) in the Neotropics. *PhytoKeys* 55, 1-92.

Online publication date: 5-Aug-2015.

[CrossRef](#)

BioOne is the product of innovative collaboration between scientific societies, libraries, academe and the private sector.

21 Dupont Circle NW, Suite 800, Washington, DC 20036 • Phone 202.296.1605 • Fax 202.872.0884

[TERMS OF USE](#) | [PRIVACY POLICY](#)

Copyright © 2016 BioOne All rights reserved



Texte d'origine

[Proposer une meilleure traduction](#)