

## RESEARCH CURRICULUM VITAE: ROBERT JOEL DUFF

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### EDUCATION

1995. Ph.D. – Molecular systematics and evolution. University of Tennessee, Knoxville, Department of Botany.  
Dissertation: Restriction site variation and structural analysis of the chloroplast DNA of *Isoetes* in North America. Advisor: Dr. Edward E. Schilling.

1991. M.S. - Botany. University of Tennessee, Knoxville, Department of Botany.  
Thesis: An electrophoretic study of two closely related species of *Isoetes* L. from the southern Appalachians. Advisor: Dr. A. Murray Evans.

1989. B.S. - Biology. Calvin College, Grand Rapids, Michigan.

### PROFESSIONAL EXPERIENCE

August 2010 – present	Professor, Biology, University of Akron
August 2005 – July 2010	Associate Professor, Biology, University of Akron
August 2006 – 2008.	Associate Chair, Dept. of Biology, University of Akron
August 1999 – July 2005.	Assistant Professor, Biology, University of Akron.
October 1998- July 1999.	Postdoctoral Research Associate. Southern Illinois University, Dept. Plant Biology. Characterization of chloroplast DNA genomes of holoparasitic plants. Laboratory of Dr. Daniel L. Nickrent.
March – September 1998.	Postdoctoral Research Associate. Southern Illinois University. Molecular physiological studies of desiccation tolerance in <i>Tortula ruralis</i> (Bryophyta). Laboratory of Dr. Andrew. J. Wood.
June 1995 - February 1998.	Postdoctoral Research Associate. Southern Illinois University. Molecular evolutionary and systematic studies of holoparasitic plants. Laboratory of Dr. Daniel L. Nickrent.

### HONORS AND AWARDS

- BCAS “Johnny” Award, 2022/2023 – Professional Service and Community Engagement Award recognizing my efforts in the area of public understanding of science
- Sullivant Award – Best paper in the journal “The Bryologist” for 2008
- Early Career Research Award, 2004. College of Arts and Sciences, University of Akron
- Honors Colloquium Instructor of the Year 2000/2001, Honors College, University of Akron
- Margaret Menzel Award – Best paper: Genetics Section of the Botanical Society of America. 2000
- Professional Promise Award, College of Science, University of Tennessee, 1995

- Edgar Wherry award: Best Student paper AIBS Pteridological Section, 1994
- University of Tennessee, Science Alliance Award, 1992, 1993, 1994
- Sigma Xi paper competition, 1993 (Second Place)
- Holton Graduate Student Teaching Award, 1991.

## **SCIENTIFIC PAPERS**

### **Published:**

52. Buo, Carrie, Matthew Brookover, Garrett Decker, Rachael Kindig, **R. Joel Duff**, and Nidaa Makki. 2021 (Summer) "Camp Bioscience: Developing a Biology Summer Camp for Upper Elementary Students." *Journal of STEM Outreach* 4, no. 1 (2021): 1-14.
51. **Duff, R. Joel**, Thomas R. Beatman, and David S. MacMillan. "Dissent with modification: how postcreationism's claim of hyperrapid speciation opposes yet embraces evolutionary theory." *Evolution: Education and Outreach* 13 (2020): 1-16.
50. Beatman, T. R., & **Duff, R. J.** (2019). Pleistocene preserve: a population growth problem of mammoth proportions. *Evolution: Education and Outreach*, 12(1), 16.
49. Beatman, Thomas & **Joel Duff, Robert**. 2019 (Jan.). Games in Learning: Shedding Light on a Problematic Taxonomy. EAI Endorsed Transactions on Game-Based Learning. 156151. 10.4108/eai.13-9-2018.156151.
48. Rokenetz, Lara, S. Donnelly, **R. Joel Duff** and S.C. Weeks. 2017 (Nov). Phylogeographic Characterization of Genetic Variation in the Biological Control Agent Milfoil Weevil (*Euhrychiopsis lecontei*) throughout North America. *Am. Midl. Nat.* 178:260-274.
47. Londrville, Richard Lyle, Jeremy W. Prokop, **Robert Joel Duff**, Qin Liu, and Matthew Tuttle. "On the Molecular Evolution of Leptin, Leptin Receptor, and Endospanin." *Frontiers in Endocrinology* 8 (2017).
46. Ball, H. C., R. L. Londrville, J. W. Prokop, John C. George, R. S. Suydam, C. Vinyard, J. G. M. Thewissen, and **R. J. Duff**. "Beyond thermoregulation: metabolic function of cetacean blubber in migrating bowhead and beluga whales." *Journal of Comparative Physiology B* 187, no. 1 (2017): 235-252.
45. Reed, Sadie K., **R. Joel Duff**, and Stephen C. Weeks. "A systematic study of the genus *Eulimnadia*." *Journal of Crustacean Biology* 35, no. 3 (2015): 379-391.
44. Ball, Hope C., Madeline Stavarz, Jonathan Oldaker, Sharon Usip, Richard L. Londrville, John C. George, Johannes GM Thewissen, and **Robert Joel Duff**. "Seasonal and Ontogenetic Variation in Subcutaneous Adipose of the Bowhead Whale (*Balaena mysticetus*)." *The Anatomical Record* (2015).
43. S. C. Weeks, C. Benvenuto, S.K. Reed, **R. J. Duff**, Z. –H. Duan, P. David. 2014 (Oct). A field test of a model for the stability of androdioecy in the freshwater shrimp, *Eulimnadia texana*. *Journal of Evolutionary Biology*, 27. 2080-2095. doi: 10.1111/jeb.12459
42. Prokop, Jeremy W., Cameron Schmidt, Donald Gasper, Robert J. Duff, Amy Milsted, Takeshi Ohkubo, Hope C. Ball et al. "Discovery of the elusive leptin in birds: identification of several 'missing links' in the evolution of leptin and its receptor." *PloS one* 9, no. 3 (2014): e92751.
41. Londrville, R. L. Y. Macotela, R. J. Duff, M. Easterling, Q. Liu, and E. J. Crespi. 2014 (February). Comparative endocrinology of leptin: Assessing function in a phylogenetic context. *General and Comparative*

Endocrinology. Feb 2014. <http://dx.doi.org/10.1016/j.ygcn.2014.02.002>

40. Brantner, J.S., Ott, D.W., **Duff, R.J.**, Sanoamuang, L., Simhachalam, G.P., Babu, K.K.S., & Weeks, S.C. 2013 (March). Androdioecy and hermaphroditism in five species of clam shrimp (Crustacea: Branchiopoda: Spinicaudata) from India and Thailand. *Invertebrate Biology*, 132(1): 27-37.
39. Brantner, J.S., Ott, D. W. **R. J. Duff**, J. I. Orridge, J. R. Waldman, and S. C. Weeks. 2013 (January). Evidence of selfing hermaphroditism in the clam shrimp *Cyzicus gynecia* (Branchiopoda: Spinicaudata). *Journal Crustacean Biology* 33(2): 184-190.
38. Ball HC, Holmes RK, Londraville RL, Thewissen JGM, **Duff RJ**. 2013 (January) Leptin in Whales: Validation and Measurement of mRNA Expression by Absolute Quantitative Real-Time PCR. *PLoS ONE* 8(1): e54277. doi:10.1371/journal.pone.0054277
37. Prokop, J.W., R.J. Duff, H.C. Ball D.L. Copeland and R.L. Londraville. 2012 (October). Leptin and leptin receptor: Analysis of a structure to function relationship in interaction and evolution from humans to fish. *Peptides* 38: 326-336.
36. Copeland, D.S., **R. Joel Duff**, Q. Liu, J. Prokop, and Richard L. Londraville. June 2011. Leptin in teleost fishes: an argument for comparative study. *Frontiers in Physiology* 2:26:1-11 [http://www.frontiersin.org/Journal/Abstract.aspx?s=54&name=aquaticphysiology&ART\\_DOI=10.3389/fphys.2011.00026](http://www.frontiersin.org/Journal/Abstract.aspx?s=54&name=aquaticphysiology&ART_DOI=10.3389/fphys.2011.00026)
35. Weeks, S.C., C. Benvenuto, T. F. Sanderson, and **R. Joel Duff**. 2010 (Online March 5). Sex Chromosome Evolution in the Clam Shrimp, *Eulimnadia texana*. *Journal of Evolutionary Biology* 23(5): 1100-1106.
34. Liu, Q., Y. Chen, D. Copeland, H. Ball, **R. J. Duff**, B. Rockich, R. L. Londraville. March 2010. Expression of leptin receptor gene in developing and adult zebrafish. *General and Comparative Endocrinology*. 166: 346-355.
33. Villarreal J. C., B. Goffinett, **R.J. Duff**, and D. C. Cargill. March 2010. Phylogenetic delineation of *Nothoceros* and *Megaceros* (Anthocerotophyta: Dendrocerotaceae). *The Bryologist*. 113(1): 106-113.
32. Wood, A. J. and **R. J. Duff**. 2009 (March). The aldehyde dehydrogenase (ALDH) gene superfamily of the moss *Physcomitrella patens* and the algae *Chlamydomonas reinhardtii* and *Osteococcus tauri*. *The Bryologist*. 112(1): 1-11.
31. Ford, C.S, K. L. Ayres, N. Toomey, N. Haider, J. Van Alphen Stahl, L.J. Kelly, N. Wikstrom, P.M. Hollingsworth, **R. J. Duff**, S. B. Hoot, R. S. Cowan, M.W. Chase, M.J. Wilkinson. 2009 (Jan). Selection of candidate coding DNA barcoding regions for use on land plants. *Bot. J. Linnean Soc.* 159: 1-11.
30. **R. Joel Duff**. 2008 (Sept). Flood geology's abominable mystery. *Perspect. Sci. Christ. Faith.* 60(3): 162-171.
29. Renzaglia, K. S., J. C. Villarreal A., and **R. Joel Duff**. 2008 (December). New insights into morphology, anatomy, and systematics of hornworts. In "Bryophyte Biology, Vol II" (Eds. Shaw and Goffinett). 2008. Cambridge MA.
28. **R. Joel Duff**, H. Ball, and P. J. Lavrentyev. 2008 (July). Application of combined morphological-molecular approaches to the identification of planktonic protists from environmental samples. *J. Eukaryot. Microbiol.* 55(4): 306-312.
27. Renzaglia, K. S., S. Schutte, **R. J. Duff**, Ligrone, J. Shaw, B. Mishler, and J. Duckett. 2007 (June). Bryophyte phylogeny: advancing the molecular and morphological frontiers. *The Bryologist*, 110(2): 179-213.

26. **Duff, R. Joel**, J. C. Villarreal, D. C. Cargill, and K. S. Renzaglia. 2007 (June). Progress and challenges toward developing a phylogeny and classification of the hornworts. *The Bryologist*, 110(2): 214-243.
25. **Duff, R. Joel**, Benvenuto, C. Branch T and S.C. Weeks. 2007 (January). DNA extraction from resting cysts of the conchostracan shrimp *Eulimnadia texana* (Crustacea, Banchiopoda, Spinicaudata). *Journal Crustacean Biology*, 27: 154-157.
24. Qiu, Yin-Long, ...**R. J. Duff**. et al. 2006 (October). The Deepest Divergences in Land Plants Inferred from Phylogenomic Evidence. *PNAS* 103(42): 15511-15516.
23. Liu, B. **R. J. Duff**, R. L. Londrville, J.A. Marrs, and Q. Liu. 2006 (May 8 2006, on-line). Cloning and expression of cadherin-7 in the central nervous system of the embryonic zebrafish. *Gene Expression Patterns*.
22. Liu, Q, **R. J. Duff**, B. Liu, A. Wilson, S. Babb-Cledenon, J Francl, and J. Marrs. 2006 (Feb 20, on-line). Expression of *cadherin10*, a type II classic cadherin gene, in the nervous system of the embryonic zebrafish. *Gene Expression Patterns*.
21. **R. Joel Duff**. 2006 (January on-line and print). Divergent RNA editing frequencies in hornwort mitochondrial *nad5* sequences. *Gene* 366: 285-291.
20. **R. Joel Duff** and Francisco Moore. 2005 (October on-line, November print). Pervasive RNA Editing Inferred among Hornwort *rbcl* transcripts except *Leiosporoceros*. *Journal of Molecular Evolution*. 61: 571-578.
19. D. Christine Cargill, Karen S. Renzaglia, Juan Carlos Villarreal and **R. Joel Duff**. 2005 (February). Generic Concepts within Hornworts (Phylum Anthocerotophyta). *Australian Systematic Botany*. 18:1-10
18. **Duff, R. Joel**, C. Cargill, J. C. Villarreal and K. S. Renzaglia. 2004 (September). Phylogenetic relationships of the hornworts based on *rbcl* sequence data: novel relationships and new insights. *Monographs of the Annals Missouri Botanical Garden*. 98: 41-58.
17. **Duff, R. Joel**, W. R. Hoeh, D. Cook, and S. W. Weeks. 2004 (Summer). Isolation and characterization of thirteen polymorphic loci from the clam shrimp *Eulimnadia texana* (Crustacea: Spinicaudata). *Molecular Ecology Notes*. 4: 397-399.
16. Weeks, S. C. and **R. J. Duff**. 2002. A genetic comparison of two species of clam shrimp in the genus *Eulimnadia*: An electrophoretic approach. *Hydrobiologia*. 486: 295-302.
15. Nickrent, D. L, Parkinson, Palmer, and **R. J. Duff**. 2000. Multigene phylogeny of plants: hornworts are basal and mosses are sister to liverworts. *Molecular Biology Evolution*. 17(12):1885-1895.
14. Wood, A. J., **R. J. Duff**, and M. J. Oliver. 2000. The translational apparatus of *Tortula ruralis*: polysomal retention of transcripts encoding the ribosomal proteins RPS14, RPS16, and RPL23 in desiccated and rehydrated gametophytes. *Journal Experimental Botany*. 51: 1-8. (October 2000)
13. **Duff, R. Joel** and E. E. Schilling 2000. The chloroplast structure and consensus gene order of *Isoetes* (Isoetaceae) is similar to the liverwort *Marchantia*. *American Fern Journal* 90:51-59.
12. Renzaglia, Karen, **R. J. Duff**, D. L. Nickrent, and D. Garabary. 2000. Vegetative and reproductive innovations of early land plants: implications for a unified phylogeny. *Transactions of the Royal Society, London* 355:769-793.
11. Wood, A. J., **R. J. Duff**, Q. Zeng, and M. J. Oliver. 2000. Molecular architecture of Bryophyte genes: putative polyadenylation signals in cDNA 3'-ends of the desiccation-tolerant moss *Tortula ruralis*. *The Bryologist* 103:44-51.

10. **Duff, R. Joel**, M. J. Oliver, and A. J. Wood. 1999. Isolation and characterization of a Bryophyte (*Tortula ruralis*) cDNA encoding ribosomal protein S3a. *Bryologist* 102: 418-425
9. **Duff, R. Joel** and D. L. Nickrent. 1999. Phylogenetic relationships of land plants using mitochondrial small-subunit rDNA sequences. *American Journal of Botany* 86: 372-386.
8. Gray, L. E., L. Achenbach, **R. J. Duff**, and D. Lightfoot. 1999. Pathogenicity of *Fusarium solani* f. sp. *glycines* in isolates on soybean and greenbean plants. *Plant Pathology* 147: 281-284.
7. Wood, Andrew, **R. J. Duff**, and M. J. Oliver. 1999. Expressed sequence tags (ESTs) from desiccated *Tortula ruralis* identify a large number of novel plant genes. *Plant Cell Physiology* 40(4): 361-368.
6. Nickrent, D. L., **R. J. Duff**, A. E. Colwell, A. D. Wolfe, N. D. Young, K. E. Steiner, and C. W. dePamphilis. 1998. Molecular Phylogenetic and Evolutionary Studies of Parasitic Plants. Pp. 211-241 (Chapter 8) In: *Molecular Systematics of Plants II. DNA Sequencing*. D. Soltis, P. Soltis, J. Doyle (eds.). Kluwer Academic Publishers, Boston, MA.
5. **Duff, R. Joel.**, and D. L. Nickrent. 1997. Characterization of mitochondrial small-subunit ribosomal RNAs from holoparasitic plants. *Journal Molecular Evolution* 45: 531-539.
4. Nickrent, D. L., **R. J. Duff**, and D. M. Konings. 1997. Structural analysis of plastid-derived 16S rRNAs in holoparasitic angiosperms. *Plant Molecular Biology* 34: 731-743.
3. Nickrent, D. L., Y. Ouyang, **R. J. Duff**, and C. W. dePamphilis. 1997. Do nonasterid holoparasitic flowering plants have plastid genomes? *Plant Molecular Biology* 34: 717-729.
2. Nickrent, D. L, and **R. J. Duff**. 1996. Molecular studies of parasitic plants using ribosomal RNA. In: *Advances in Parasitic Plant Research*. Edited by M. T. Moreno, J. I., Cubero, D. Berner, L. J. Musselman, C. Parker. Cordoba, Spain: Junta de Andalucia, Direccion General de Inverstigacion Agraria;1996: 28-52.
1. **Duff, R. Joel**. and A. M. Evans. 1992. Allozyme electrophoresis of two closely related taxa of *Isoetes* in the southern Appalachians. *American Fern Journal* 82: 129-141.

#### FUNDED RESEARCH GRANTS

- 1) 2009-2012: NSF ARC: "Impacts of Climate Change and Ice Conditions on Microbial Food Web Dynamics in the Barents Sea" ca \$600K. 8/15/09-7/31/2012. PI Lavrentyev (Duff, un-named participant – see narrative for explanation)
- 2) 2008. U. of Akron summer fellowship. "Microsatellite development for genetic markers for clamshrimp" \$10,000. PI. J. Duff
- 3) 2008. U. of Akron RIG (Research in Integrative Biology) grant. "Novel bio-control of an invasive aquatic weed using a native aquatic herbivore: preliminary genetic and chemical assays of *Myriophyllum spicatum* and *Euhrychiopsis lecontei*. PIs Weeks (Biology), Duff, and Wesdemiotis (Chemistry) \$10,000
- 4) 2006. Ohio Board of Regents. "OBR-RC for purchase of ABI3130 Genetic Analyzer and PCR machine" Funded \$150,000 PI. J. Duff, co-PI Monte Turner.
- 5) 2003-2006. National Science Foundation: DEB: Systematic Biology. "Biodiversity, phylogeny, and biogeography of hornworts. Funded \$115,922. J. Duff Principle Investigator
- 6) 2003-2006. Ohio Board of Regents Individual Research Challenge Match to Collaborative Research: Biodiversity, Phylogeny and Biogeography of Hornworts. Funded \$20,000. J. Duff Principle Investigator.
- 7) 2003-2006. National Science Foundation: Microbial Observatories. "Eukaryotic microbial communities of the Old Woman Creek National Estuarine Reserve Reserve" Funded: \$220,574. P. Lavrentyev Principle Investigator, J. Duff co-Principle Investigator

- 8) 2003-2006. Ohio Board of Regents Individual Research Challenge Match to Collaborative Research: Eukaryotic microbial communities of the Old Woman Creek National Estuarine Reserve Reserve. Funded \$15,000. P. Lavrentyev Principle Investigator, J. Duff co-Principle Investigator.
- 9) 2002-2003. Herman Muehlstein Foundation (Fall 2002 – Fall 2003) at ca. \$300,000. J. Duff Senior Scientist
- 10) 2002-2005. National Science Foundation. IBN: Animal Behavior. “Reproductive tactics in an androdioecious crustacean – Laboratory and field tests of a model for the maintenance of a mixed mating system” Funded \$120,000, anticipated final funding level over 3 years - \$340,004. S. Weeks Principle Investigator, J. Duff co-Principle Investigator
- 11) 2002-2005. Ohio Board of Regents Individual Research Challenge Match to Collaborative Research: Reproductive tactics in an androdioecious crustacean – Laboratory and field tests of a model for the maintenance of a mixed mating system. Funded \$20,000. S. Weeks Principle Investigator, J. Duff co-Principle Investigator.
- 12) 2004-2005. National Science Foundation. IBN. Animal Behavior. “Reproductive tactics in an androdioecious crustacean – Laboratory and field tests of a model for the maintenance of a mixed mating system, REU supplement. Funded \$5,928. S. Weeks Principle Investigator, J. Duff co-Principle Investigator
- 13) 2001. University of Akron summer fellowship. “Phylogeny of an Ancient Plant Lineage” The Hornworts” PI. \$8000
- 14) 2001. U. of Akron Research II Equipment Matching Funds Program. \$7700
- 15) 2001. U. of Akron Research II Incentives Seed Grant. \$2000
- 16) 2000. U. of Akron summer fellowship. “Evolution of Ribosomal DNA Genes in Plant Mitochondria” \$8000
- 17) 2000. U. of Akron Research II Equipment Matching Funds Program. \$7700
- 18) 1994-1996. NSF: Dissertation Improvement Grant, National Science Foundation. Systematic Analysis of *Isoetes* in North America. **\$6,385**