

DANIEL Z. ATWATER: CURRICULUM VITAE

Assistant Professor of Biology, Earlham College
Director, Hill Memorial Greenhouse
Director, Earlham College Herbarium
Head Instructor, Indiana Ki-Aikidō Kai
Advisor, Earlham Aikidō Club & Earlham Women's Rugby

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EDUCATION

Ph.D. Ecology & Evolutionary Biology & NSF Graduate Research Fellow. 2012. The University of Montana: “Interplay between competition and evolution in invaded and native plant communities”.

B.S. Organismal Biology, Honors. 2004. University of Kansas.

EMPLOYMENT HISTORY

Assistant Professor. 2018–present. Earlham College, Department of Biology.

Lecturer. 2017. North Carolina State University, Department of Biological Sciences.

Affiliate Faculty. 2017–present. Virginia Tech; Department of Plant Pathology, Physiology & Weed Science.

Postdoctoral Research Associate. 2014–2017. Virginia Tech; Department of Plant Pathology, Physiology & Weed Science. Advisor: Jacob Barney.

Postdoctoral Research Associate. 2012–2014. University of Nevada, Reno; Department of Natural Resources and Environmental Science. Advisor: Elizabeth Leger.

Adjunct Instructor. 2009 & 2012. The University of Montana, Department of Organismal Biology and Ecology.

Graduate Student and NSF Graduate Research Fellow. 2007–2012. The University of Montana, Department of Organismal Biology and Ecology. Advisor: Ragan Callaway.

Research Assistant. 2006–2007. The University of Montana, Department of Chemistry. Advisor: Klára Briknarová.

Research Technician. 2004–2007. Cornell University, Department of Clinical Sciences. Advisor: Richard Goldstein, DVM, DACVIM (SAIM), DECVIM-CA.

Research Technician. 2003–2004. University of Kansas, Department of Ecology and Evolutionary Biology. Advisor: Craig Martin.

NSF Summer REU. 2003. Harvard University, Harvard Forest. Advisor: Aaron Ellison.

Dual NSF Yearlong REUs. 2001–2003. University of Kansas, Department of Ecology and Evolutionary Biology. Advisor: Daphne Fautin.

PEER-REVIEWED PUBLICATIONS

29 peer-reviewed publications

721 citations

h-index: 13

29. †**Atwater DZ**, RM Callaway & S Xiao. *In press*. Competition as a demolition derby: Why tolerating competitors is more important than suppressing them. *Oikos*. 00:000–000.
28. Xiao S, **DZ Atwater** & RM Callaway. *In press*. The ERI model: A novel framework for evaluating plant-soil feedbacks among multiple competing species. *Oikos* 00:000–000. DOI: 10.1111/oik.05915.
27. Smith AL*, **DZ Atwater** & RM Callaway (2019). Early sibling conflict may ultimately benefit the family. *American Naturalist* 194:482–487.
26. Leger EA, **DZ Atwater** & JJ James (2019). Seed and seedling traits have strong impacts on establishment of a perennial bunchgrass in invaded semi-arid systems. *Journal of Applied Ecology* 56:1343–1354.
25. Boheemen LA, **DZ Atwater** & KA Hodgins (2019). Rapid and repeated local adaptation to climate in an invasive plant. *New Phytologist* 222:614–627.
24. Gibson A, C Nelson & **DZ Atwater** (2018). Response of bluebunch wheatgrass to invasion: Differences in competitive ability among invader-experienced and naïve populations. *Functional Ecology* 32:1857–1866.
23. †**Atwater DZ**, C Ervine** & JN Barney (2018). Climatic niche shifts are common in introduced plants. *Nature: Ecology and Evolution* 2:34–43.
22. †**Atwater DZ**, R Fletcher*, C Dickinson*, AH Paterson & JN Barney (2018). Evidence for fine-scale habitat specialization in an invasive weed. *Journal of Plant Ecology* 11:189–199.
21. †**Atwater DZ**, W Kim**, DR Tekiela* & JN Barney (2017). Competition and propagule density influence the efficiency of sexual and clonal propagation of an invasive plant. *Invasive Plant Science and Management* 10:17–25.
20. †Yang L, RM Callaway & **DZ Atwater** (2017). Ecotypic diversity of a dominant grassland species resists exotic invasion. *Biological Invasions* 19:1483–1493.
19. Sezen UU, Barney JN, **DZ Atwater**, GA Pederson, JF Pederson, JM Chandler, TS Cox, P Dotray, D Kopec, SE Smith, J Schroeder, SD Wright, Y Jiao, W Kong, V Goff, S Auckland, L Rainville, GJ Pierce, C Lemke, R Compton, C Phillips, A Kerr, M Mettler & AH Patterson (2016). Multi-phase US spread and habitat switching of a post-Columbian invasive, *Sorghum halepense*. *PLoS One* 11:e0164584.

18. †Luo W, RM Callaway & **DZ Atwater** (2016). Intraspecific diversity buffers the inhibitory effects of soil biota. *Ecology* 97:1913–1918.
17. Aschehoug ET, R Brooker, **DZ Atwater**, JL Maron, RM Callaway (2016). The mechanisms and consequences of interspecific competition among plants. *Annual Reviews in Ecology and Evolution* 47:263–281.
16. Fletcher RA**, RM Callaway & **DZ Atwater** (2016). An exotic invasive plant selects for increased competitive tolerance, but not competitive suppression, in a native grass. *Oecologia* 181:499–505.
15. †**Atwater DZ**, UU Sezen, V Goff, W Kong, AH Paterson & JN Barney (2016). Reconstructing changes in the genotype, phenotype, and climatic niche of an introduced species. *Ecography* 39:894–903.
14. Barney JN, MW Ho & **DZ Atwater** (2016). Propagule pressure alone cannot always overcome biotic resistance: The role of density-dependent establishment in four invasive species. *Weed Research* 56:208–218.
13. †**Atwater DZ** & RM Callaway (2015). Testing the mechanisms of diversity-dependent overyielding in a grass species. *Ecology* 96:3332–3342.
12. Yang L, **DZ Atwater** & RM Callaway (2015) Root contact responses and the positive relationship between intraspecific diversity and ecosystem productivity. *Annals of Botany, Plants*. DOI: 10.1093/aobpla/plv053.
11. Sun Y, JM Stine, A Sharmin, **DZ Atwater**, JB Alexander Ross, K Briknarovà. (2015) Structural and functional characterization of the acidic region from the RIZ tumor suppressor. *Biochemistry* 54:1390–1400.
10. †**Atwater DZ**, JJ James & EA Leger (2014) Seedling root traits strongly influence field survival and performance of a common bunchgrass. *Basic and Applied Ecology* 16:128–140.
9. †**Atwater DZ**, CM Bauer** & RM Callaway (2011) Indirect positive effects ameliorate strong negative effects of *Euphorbia esula* on a native plant. *Plant Ecology* 212:1655–1662.
8. Thorpe AS, ET Aschehoug, **DZ Atwater** & RM Callaway (2011) Interactions among plants and evolution. *Journal of Ecology* 99:729–740.
7. Briknarovà K, **DZ Atwater**, JM Glicken, SJ Maynard & TE Ness (2011) The PR/SET domain in PRDM4 is preceded by a zinc knuckle. *Proteins* 79:2341–2345.
6. Rawlinson JE, RE Goldstein, AM Reiter, **DZ Atwater** & CE Harvey (2011) Association of periodontal disease with systemic health indices in dogs and the systemic response to treatment of periodontal disease. *Journal of the American Veterinary Medical Association* 238:601–609.
5. Janeczko S, **D Atwater**, E Bogel, A Grieter-Wilke, A Gerold, M Baumgart, H Bender, PL McDonough, SP McDonough, RE Goldstein & KW Simpson (2008) The relationship of mucosal bacteria to duodenal histopathology, cytokine mRNA, and clinical disease activity in cats with inflammatory bowel disease. *Veterinary Microbiology* 128:178–193.
4. Hutton TA, R Goldstein, B Njaa, **DZ Atwater**, Y Chang, & K Simpson (2008) The search for intact *Borrelia burgdorferi* bacteria in kidneys from dogs suspected of suffering from 'Lyme nephritis.' *Journal of Veterinary Internal Medicine* 22:860–865.

3. Goldstein RE, **DZ Atwater**, DM Cazolli, O Goldstein, CM Wade & K Lindbad-Toh (2007) Analysis of Inheritance, Mode of Inheritance and Candidate Genes for Primary Hyperparathyroidism in Keeshonden. *Journal of Veterinary Internal Medicine* 21:199–203.
2. †**Atwater DZ**, JL Butler & AM Ellison (2006) Spatial distribution and impacts of moth larvae on northern pitcher plants. *Northeastern Naturalist* 13:43–56.
1. Butler JL, **DZ Atwater** & AM Ellison (2005) Northern pitcher plants: A sink for red-spotted newts. *Northeastern Naturalist* 12:1–10.

* Graduate student advisee (6).

** Undergraduate student advisee (3).

† Paper on which I am corresponding author (14).

TEACHING EXPERIENCE (AS INSTRUCTOR-OF-RECORD)

9. Field Botany (2019–). Earlham College.
8. Biological Diversity (2019–). Earlham College.
7. Ecological Biology (2018–). Earlham College.
6. Population and Community Ecology (2018–). Earlham College.
5. Student Research (2018–). Earlham College.
4. Introduction to Aikidō (2018–). Earlham College.
3. Critical and Creative Thinking in the Life Sciences (2017). NCSU.
2. Applied Statistics in Ecology and Agriculture (2016). VT.
1. Plant Physiology (2008, 2009, 2012). UMT.

GUEST-LECTURSHIP

2. Advanced Cell Physiology – How Plants See (2019). Earlham College.
1. Introduction to GIS – GIS in R (2019). Earlham College.

FORMAL GRADUATE MENTORSHIP

Becky Fletcher. 2016–2019. Virginia Tech. Ph.D. committee. I also advised Dr. Fletcher when she was an undergraduate at The University of Montana. Dr. Fletcher is now working as a researcher at USDA-APHIS.

Alyssa Smith. 2015–2017. Virginia Tech. Master’s committee. Ms. Smith is now a Ph.D. student and NSF Graduate Research Fellow at the University of Arizona.

UNDERGRADUATE MENTORSHIP

STUDENT RESEARCHERS:

- Emma Stinson.** 2019–present. Student research for credit. Independent study of the effect of invasive honeysuckle on native ash tree recruitment.
- Evan Hill.** 2019–present. Summer collaborative research and upcoming independent study.
- Amelia Richardson.** 2019–2020. Student collaborative research and student research for credit. Independent study of carbon sequestration of the Earlham Carbon Forest.
- Tung Phung.** 2019–2020. Student research for credit. Independent study of the effects of climate change on distribution models of 815 plant species.
- Sean Ahn.** 2019. Summer collaborative research.
- Sam Russo.** 2019. Summer collaborative research.
- Stacy Fanning.** 2015–2016. Field technician on multiple research projects.
- Wonjae Kim.** 2014–2016. Independent research funded by Virginia Tech Fralin Summer Undergraduate Research Fellowships Program and Weed Science Society of America Undergraduate Research Award. Studied seed dispersal in Johnsongrass. He presented his findings at symposia and published one paper with another in preparation.
- Eugene Dollete.** 2014–2015. Independent research funded by North Carolina Biofuels Center. Developed a landscape-scale bioenergy invasion risk model.
- Evan Forr.** 2014–2015. Independent research funded by North Carolina Biofuels Center. Implemented CUDA processing into invasion risk model.
- Carissa Ervine.** 2014. Independent research funded by USDA Controlling Weedy and Invasive Plants Award. She compiled a massive database of almost 14 million occurrence records of 1135 invasive plant species.
- Rose Peterson.** 2014. Field technician on multiple research projects.
- Ryan Schmitt.** 2014. Field technician on multiple research projects.
- Lindsey Boyer.** 2012–2014. Field technician on multiple research projects.
- Bryce Wehan.** 2012–2014. Field technician on multiple research projects.
- Emmanuel Matos-Negrón.** 2011. Independent research funded by IM-SURE (Introductory Multicultural Summer Undergraduate Research Experience in Environmental Biology) grant to study community impacts of invasion. He contributed to many field studies and presented his work at an undergraduate symposium.
- Rebecca Fletcher.** 2010–2011. Independent research funded by Howard Hughes Medical Institute. Studied evolution of competitive strategies during invasion. Her first-authored manuscript is published in *Oecologia* and has been presented at multiple research symposia. I am now serving on her Ph.D. committee.
- Annalisa Ingegnò.** 2009. Field researcher. Studied effects of ploidy on herbivory resistance of native and introduced meadowland species.

Carolyn Bauer. 2008. Independent research funded by Howard Hughes Medical Institute. Studied indirect interactions in invasive species. Her work resulted in a publication in *Plant Ecology*.

HILL MEMORIAL GREENHOUSE TECHNICIANS:

Tess Cunningham, 2020–; **Miette Hennessey**, 2020–; **Hazel Jordan**, 2020–; **Olivia Layne**, 2020–; **Thea Clarkburg**, 2018–; **Ian Shriner**, 2018–; **Overpower Gore**, 2020; **Lindsey Gearin**, 2019–2020; **Rhiana Peck**, 2018–2020; **Marena Sein**, 2018–2020; **Opy Akhter**, 2018–2019; **Ian Nichol**, 2018.

STUDENT LEADERSHIP IN AIKIDŌ:

Emi Hinosawa, 2020–, Business Manager; **Ian Shriner**, 2019–, Convener; **Eli Roessler**, 2019, Business Manager; **Geneva Beddell**, 2019, Co-Convener; **Grace Cornett**, 2019, Co-Convener; **Gyasi Anglade**, 2019, Business Manager.

GRANTS, AWARDS & HONORS

GRANT-WRITING:

National Science Foundation Graduate Research Fellowship. 2008-2012
(\$120,000).

OTHER AWARDS AND HONORS:

The University of Montana Juried Student Art Awards. 2009. Two pieces selected for display.

PUBLIC PRESENTATIONS

22. **Atwater DZ** and JN Barney. 2016. Invasive species undergo major niche shifts as they cross continents. Weed Science Society of America and Southeastern Weed Science Society of America Joint Meeting, San Juan, PR (talk).
21. **Atwater DZ** and JN Barney. 2016. Major climatic niche shifts in over one thousand invasive species. Northeastern Plant Pest and Soils Conference, Philadelphia, PN (talk).
20. **Atwater DZ** and JN Barney. 2015. Evidence of massive deviations in the climatic niches of over one thousand introduced plant species. Ecological Society of America 100th Annual Meeting, 2015, Baltimore, MD (talk).
19. Barney JN, **DZ Atwater**, UU Sezen & AH Paterson. 2015. Invasion at the margins: Evidence of genetic, phenotypic, and niche shifts in a widespread invader. Ecological Society of America 100th Annual Meeting, 2015, Baltimore, MD (talk).

18. **Atwater DZ**, JN Barney, UU Sezen & AH Paterson. 2015. Phenotypic differentiation, plasticity, and a surprising habitat shift in one of the world's worst weeds. Weed Science Society of America Annual Meeting, 2015, Lexington, KY (talk).
17. **Atwater DZ**, JJ James & EA Leger. 2014. Seedling root traits and field performance of *Elymus elymoides*. Great Basin Native Plant Project Annual Meeting, Boise, ID (talk).
16. **Atwater DZ**, JJ James & EA Leger. 2013, Seeding root architecture strongly influences field performance of genotypes of a common bunchgrass (*Elymus elymoides*). Great Basin Consortium Conference, Reno, NV (poster).
15. **Atwater DZ**, RM Callaway & S Xiao. 2013. Winning plant competition: Why neighbor suppression might not help. Ecological Society of America 98th Annual Meeting, Minneapolis, MN (talk).
14. **Atwater DZ**. 2012. Interplay between competition and evolution in native and invaded plant communities. Dissertation defense. University of Montana Ecology Seminar Series, Missoula, MT (talk).
13. **Atwater DZ** & RM Callaway. 2010. One invasive plant adapts to the presence of another. University of Montana Organismal Biology and Ecology Seminar Series, Missoula, MT (talk).
12. **Atwater DZ** & RM Callaway. 2010. One invasive plant adapts to the presence of another. Ecological Society of America 95th Annual Meeting, Pittsburgh, PA (talk).
11. **Atwater DZ**, CM Bauer & RM Callaway. 2010. Can invasive plants protect native plants from herbivory? University of Montana Organismal Biology and Ecology Seminar Series, Missoula, MT (talk).
10. Dial K, **DZ Atwater**, T Dial, M Ellis, A Heers, L Holsinger, H Johnson, E Lahr, K McNight, J Maron, L Mullen, K Padian & B Snead. 2009. University of Montana Tanzania Trip 2009: Wildlife. University of Montana Wildlife and Ecology Seminar Series, Missoula, MT (talk).
9. **Atwater DZ**, CM Bauer & RM Callaway. 2009. Can invasive plants protect native plants from herbivory? Ecological Society of America 94th Annual Meeting, Albuquerque, NM (talk).
8. **Atwater DZ**. 2008. Do plant interactions cause evolutionary responses? University of Montana Organismal Biology and Ecology Seminar Series, Missoula, MT (talk).
7. Goldstein RE & **DZ Atwater**. 2006. Serological and circulating immune complex analysis in dogs naturally infected with *Borrelia burgdorferi*. American College of Veterinary Internal Medicine Annual Forum, Louisville, KY (poster).
6. Shanies TA, RE Goldstein, BJ Njaa, **DZ Atwater**, YF Chang & KW Simpson. 2005. The search for intact *Borrelia burgdorferi* bacteria in kidneys of dogs suspected of suffering from 'Lyme nephritis.' American College of Veterinary Internal Medicine Annual Forum, Baltimore, MD (poster).
5. **Atwater DZ**. 2004. The distribution of damage caused by two species of moths (*Exyra fax* and *Papaipema appassionata*) to the northern pitcher plant

- (*Sarracenia purpurea*). University of Kansas Honors Research Symposium, Lawrence, KS (talk).
4. **Atwater DZ**. 2003. The distribution of damage caused by two species of moths (*Exyra fax* and *Papaipema appassionata*) to the northern pitcher plant (*Sarracenia purpurea*). Harvard Forest Annual REU Symposium, Petersham, MA (talk).
 3. **Atwater DZ**, & DG Fautin. 2003. Online common names database for Hexacorallia. University of Kansas Undergraduate Research Symposium (poster) and Sigma Xi University of Kansas Chapter Paper Competition, Lawrence, KS (talk).
 2. **Atwater DZ**, & DG Fautin. 2002. Online biographical database of taxonomists of sea anemones. Society for Integrative and Comparative Biology Conference, Anaheim, CA (poster).
 1. **Atwater DZ**, & DG Fautin. 2002. Online biographical database of taxonomists of sea anemones. University of Kansas Undergraduate Research Symposium, Lawrence, KS (poster).

ON-LINE SCIENTIFIC PUBLICATIONS

- Atwater DZ** & D Fautin. 2001. "Malacostraca" (On-line), Animal Diversity Web. Accessed February 13, 2009 at <http://animaldiversity.ummz.umich.edu/site/accounts/information/Malacostraca.html>.
- Atwater DZ** & D Fautin. 2001. "Hexactinellida" (On-line), Animal Diversity Web. Accessed February 13, 2009 at <http://animaldiversity.ummz.umich.edu/site/accounts/information/Hexactinellida.html>.

EARLHAM SERVICE

Faculty Advisor, Earlham Aikidō Club. 2018–present.
Faculty Advisor, Earlham Women's Rugby. 2019–present.
Coordinator, Biology Department website. 2018–present.
Coordinator, Earlham Biology Colloquium. 2018–present.
Member, Institutional Review Board. 2019–present.
Member, Search Committee for Visiting Assistant Professor of Biology. 2019.
Member, Search Committee for Administrative Assistant. 2019.

UNDERGRADUATE ADVISING

Claire Canady (2019–), Tess Cunningham (2019–), Hanh Le (2019–), Lucas Mulhall (2020–), Justice Vaughn (2019–), Vinny Widyono (2019–), Feven Naba (2019*)

PROFESSIONAL SERVICE

- Masters Committee.** 2016–2017. Alyssa Smith. Virginia Tech. Now a Ph.D. candidate at Arizona State.
- Ph.D. Committee.** 2016–present. Rebecca Fletcher. Virginia Tech. Now working full-time at USDA-APHIS.
- Graduate Student Representative to the Faculty.** 2011–2012. The University of Montana Department of Organismal Biology and Ecology.
- Peer Review.** I have peer reviewed over 30 papers for the following journals: *Basic and Applied Ecology*; *Biological Invasions*; *Biology Letters*; *Chemical Ecology*; *Ecological Modelling*; *Ecology Letters*; *Ecosphere*; *Functional Ecology*; *International Journal of Plant Sciences*; *Invasive Plant Science and Management*; *Journal of Ecology*; *Journal of Plant Ecology*; *Oikos*; *Perspectives in Plant Ecology, Evolution & Systematics*; *Plant Ecology*; *Plant Ecology & Diversity*; *Plant and Soil*; *Plant Species Biology*; *PLoS One*; *Scientific Reports*.
- Grant Review.** One NSF DEB Full Proposal.

ECOLOGY OUTREACH

- Nature Walk: Us and Trees.** 26 April 2019. Look at Life: Faith and Science Meet. Bethany Seminary, Richmond, IN. USA.
- What Can We Learn From the Perspective of Invasive Plants.** 27 April 2019. Quaker Farming Workshop. Earlham Farm, Richmond, IN. USA.

AIKIDŌ OUTREACH

- Aikidō Rugby.** 8 October & 29 October 2019. Earlham College Women's Rugby Club, Richmond, IN. USA.
- Harumatsuri: Aikido Demonstration.** 7 April 2019. Earlham College Harumatsuri (Spring Festival). Earlham College, Richmond, IN. USA.
- Outdoor Safety: Self-Defense.** 14 February 2019. Midwest Outdoor Leadership Conference. Earlham College, Richmond, IN. USA.
- Japan Table: Aikidō.** 7 February 2019. Earlham College, Richmond, IN. USA.
- PS|A: Situational Awareness.** 30 October & 1 November 2018. Presented in partnership with Earlham Public Safety. Earlham College, Richmond, IN. USA.
- Mindfulness in Aikido.** 30 September 2018. Mindfulness Day. Earlham College Mindfulness House, Richmond, IN. USA.