

## **Niedzwiecki Lab**

Questions in our lab deal with how Ecological Factors affect the behavior and Life History of Organisms, and then ultimately lead to divergence between populations into species. Projects fall into two main categories: 1) experiments in behavioral ecology 2) into molecular phylogeography and population genetics. Some students have worked on other aspects of behavior or ecology, which have basically fit into the scope of the laboratory.

## **Study Systems**

### **The Streamside Salamander**

*Ambystoma barbouri* is a Salamander found only in Central Tennessee, Kentucky, and southern Ohio and Indiana. Unlike all other American ambystomatids, *A. barbouri* breeds in streams rather than vernal ponds. This allows us to examine how the unique challenges of stream life have affected the behavior and life history of this salamander. One new environmental challenge has been the presence of fish predators, and much of our work has focused on that aspect. We are also developing molecular phylogenetic and population ecology projects with a variety of ambystomatid salamanders, including *A. barbouri* and *A. maculatum*, the spotted salamander.

### **Physid Snails**

Like the streamside salamander, the small freshwater snails in our streams face predators, and like the Streamside salamander, they detect these predators chemically (They smell them in the water!). We have been working on various aspects of this predator-prey system over the past few summers. Because snails are small and have shorter generation times, we plan that in the future, snails will open opportunities to study other aspects of behavior ecology, including mating systems.

### **Other Systems**

I have had students work with zebrafish, cichlids, local bird populations, and stream communities. If students can generate interesting testable hypotheses of an ecological nature they are welcome to work in our lab.

## **Publications**

Eastman, J.M., J.H. Niedzwiecki, B.P. Nadler and A. Storfer. 2009. Duration and consistency of historical selection are correlated with adaptive trait evolution in the streamside salamander, *Ambystoma barbouri*. *Evolution* 63:2636-2647.

Niedzwiecki, J. 2009. Book Review, *Life in Cold Blood*. *The American Biology Teacher* 71(2): 121-122.

Bogart, J.P., K. Bi, J. Fu, D.W.A. Noble and J. Niedzwiecki. (2007) Unisexual salamanders (genus *Ambystoma*) present a new reproductive mode for eukaryotes. *Genome* 50: 119-136.

Robertson, A.V., C. Ramsden, J. Niedzwiecki, J. Fu, and J.P. Bogart. 2006. An unexpected recent common ancestor of unisexual *Ambystoma*. *Molecular Ecology*. 15: 3339-3351.

Niedzwiecki, J.H. 2005. Evolutionary history and hybridization of two mole salamander sister species from different habitats. Ph.D. Thesis, University of Kentucky.

- Rohr, J.R., A.A. Elskus, B.S. Shepherd, P.H. Crowley, T.M. McCarthy, J.H. Niedzwiecki, T. Sager, A. Sih, and B.D. Palmer. 2004. Multiple stressors and salamanders: Effects of an herbicide, food limitation, and hydroperiod. *Ecological Applications*. 14:1028-1040
- Rohr, J.R., A.A. Elskus, B.S. Shepherd, P.H. Crowley, T.M. McCarthy, J.H. Niedzwiecki, T. Sager, A. Sih and B.D. Palmer. 2003. Lethal and sublethal effects of atrazine, carbaryl, endosulfan, and octylphenol on the streamside salamander (*Ambystoma barbouri*). *Environmental Toxicology and Chemistry* 22:2385-2392.
- Havel, J.E., J. Link and J. Niedzwiecki. 1993. Selective predation by *Lestes* (Odonata: Lestidae) on littoral microcrustacea. *Freshwater Biology* 29:47-58.

### **Presentations and Abstracts at Meetings**

- Niedzwiecki, J., **L.Oeser** and **S. Bentley**, 2011. The specificity of the anti-predator response in the streamside salamander, *Ambystoma barbouri*. Poster Presentation at Behavior 2011, Bloomington, Indiana.
- Binkley, C.** and J. Niedzwiecki. Persistence of a Predator Cue in the environment. Poster at TAS annual Meeting 2010, Oral presentation at TAS regional Meeting and Belmont Undergraduate Research Symposium, Spring 2011
- Fehrmann, A.C.**, and J. Niedzwiecki. The effects of compound chemical cues on the anti-predatory behavior in Physid (sp.) snails Poster at TAS annual Meeting 2010, Oral presentation at TAS regional Meeting and Belmont Undergraduate Research Symposium, Spring 2011
- McFarland, M.E.**, and J. Niedzwiecki, Sublethal effects of pH on the Activity of Physa Snails. Poster at SEPEEG 2010, Oral presentation at TAS Regional Meeting and Belmont Undergraduate Research Symposium, Spring 2011
- Osinusi, A.A.**, and J. Niedzwiecki. Indirect effects of predation risk on dragonfly nymph foraging. Poster at SEPEEG 2010, Oral presentation at TAS Regional Meeting and Belmont Undergraduate Research Symposium, Spring 2011.
- Niedzwiecki J.\* 2010. Introgression of Habitat Specific Traits in an Ambystomatid Hybrid Zone. An Oral Presentation at Southeast Population Ecology and Evolutionary Biology (SEPEEG) Meeting, Madison, Florida. October 8-10, 2010.
- Niedzwiecki J.\* and **E. Schriener**. 2010. The Effect of Predation Threat on Asymmetric Intraspecific Competition in the Streamside Salamander, *Ambystoma barbouri*. An Oral Presentation at Ichthyologists and Herpetologists Joint Meeting. Providence, Rhode Island, July 7-11 2010.
- Bentley, S.** and J. Niedzwiecki- Behavioral response of *Ambystoma barbouri* to cues from distantly related fish, Poster at SEPEEG 2009, Oral presentation at TAS Regional Meeting and Belmont Undergraduate Research Symposium, Spring 2010. (First Place at TAS Collegiate Meeting- Ecology)
- Cowan, K.** and J. Niedzwiecki - The effect of acute exposure of ethanol on Zebrafish learning, Poster at SEPEEG 2010, Oral presentation at TAS Regional Meeting and Belmont Undergraduate Research Symposium, Spring 2011. (Third Place at TAS Collegiate Meeting- Biology II)
- Niedzwiecki, J. Comparing divergence times for major geographical grouping of populations among eastern Ambystomatid salamanders. Tennessee Herpetological Society Annual Meeting, 9/24/2009, Martin TN.
- Niedzwiecki, J. and K. Petren. Influences on migration in Darwin's finches. SEPEEG 2009, 10/18/2009, Dahlonega, GA.

- Pilney, C.** and J. Niedzwiecki-- Calculating a dosage response curve to sunfish predator cues, Poster at SEPEEG 2010 and SURS 2010.
- Schriner, E.** and J. Niedzwiecki The effect of predation on intraspecific competition in the streamside salamander, Poster at SEPEEG 2009 and TAS State Meeting, , Oral presentation at Tennessee Herpetological Society 2009 Research Symposium, Fall 2009. **Honors Thesis Submitted December 2009.**
- Baugher, W.** and J. Niedzwiecki. Aquatic Macro Invertebrates and the Distribution of the Streamside Salamander, *Ambystoma barbouri*, in Central Tennessee. Poster at SEPEEG 2008, Oral presentation at TAS regional Meeting and Belmont Undergraduate Research Symposium, Spring 2009. 3<sup>rd</sup> place Award Entomology at TAS.
- Beazley, V.** and J. Niedzwiecki. The Effect of Larval Size on the Anti-predator Behavioral Response of the Streamside Salamander, *Ambystoma barbouri*. Poster at TAS 2008, Oral presentation at TAS regional Meeting and Belmont Undergraduate Research Symposium, Spring 2009.
- Henson, A.** and J. Niedzwiecki. Resolving Conflicts in Ambystomatid Salamander Phylogeny with Nuclear DNA. Poster at SEPEEG 2008, Oral presentation at TAS regional Meeting and Belmont Undergraduate Research Symposium, Spring 2009. 3<sup>rd</sup> Place award, Evolutionary Biology at TAS
- Oeser, L** and J. Niedzwiecki. Specificity of anti-predator behavior in streamside salamander larvae. Poster at TAS 2008, 1<sup>st</sup> Place Zoology State, Oral presentation at TAS regional Meeting and Belmont Undergraduate Research Symposium, Spring 2009. 1<sup>st</sup> Place award Zoology Section at TAS regional.
- Reagan, A.** and J. Niedzwiecki. A Phylogeny for the Salamander Family *Ambystomatidae* Based on a Nuclear Marker. Poster at TAS 2008, Oral presentation at TAS regional Meeting and Belmont Undergraduate Research Symposium, Spring 2009. 2<sup>nd</sup> Place award Evolutionary Biology at TAS.
- Niedzwiecki, J. Testing Common Patterns in the Biogeography of Ambystomatid Salamanders in the Eastern United States. Research talk. *Southeastern Population Ecology and Evolutionary Genetics (SEPEEG) Annual Meeting 2008*, Eatonton, GA.
- Niedzwiecki, J. Geographic influences on migration in Darwin's Finches Research talk at 2008 *Center for Ecology, Evolution and Behavior Spring Symposium*, Lexington, KY.
- Niedzwiecki, J. Migration Patterns revealed through genetic Marker's in Darwin's Finches. Invited Seminar at Austin Peay State University, Clarksville, TN. March 2008.
- Niedzwiecki, J. and K. Petren. Geographic influences on migration in Darwin's Finches. Research talk. *Evolution 2006*, Stony Brook, NY

**Bold- Denotes student author.**