



Notes from the Field

April 2011

Volume 8 No 2

An Ecologist Goes to Washington

-Dave Mortensen



Pest organisms have a way of adapting to the control strategies thrown at them. As the selection pressure narrows and intensifies, the rate at which new species evolve resistance increases. Over the past decade most of U.S. soybean production (along with corn and cotton) has moved to the use of genetically modified glyphosate resistant cultivars (93 percent) with a concomitant overreliance on glyphosate herbicide. Not surprisingly, an increasing number of weedy plant species have evolved resistance to glyphosate, so much so that approximately 11.4 million acres are now infested with resistant species.

I was called to testify before the U.S. House Committee on Oversight and Government Reform in late July addressing the question: “Should EPA and the Animal Plant Health Inspection Service be more involved in oversight of GE herbicide resistant crops?” I argued strongly that more oversight is needed, pointing to work of current student, Franklin Egan, and former students and postdocs, Matt Ryan, Joe Dauer, and Rich Smith. Together, their research supports the need for oversight and shows that alternatives to the “transgene facilitated herbicide treadmill” exist and should be incentivized. For more on the testimony ([text and CSPAN footage](#)), visit [online](#).

Behind the Scenes of an “Ecologist Goes to Washington”

-J Franklin Egan

I suspect that many Penn State ecology students are like myself and hope that our research will someday make a contribution to sound environmental policy. But when an opportunity arises to interact with policymakers on an important environmental issue, how can we be confident we know what we are talking about?

In response to a global outbreak of glyphosate resistant weeds caused by overreliance on glyphosate herbicide and genetically modified (GM) cropping systems, the biotech industries are developing new crop cultivars resistant to additional herbicide active ingredients, including dicamba and 2,4-D. My adviser, Dave Mortensen, and I strongly feel that if not properly regulated, these biotechnologies will incentivize overuse of dicamba and 2,4-D, leading to the evolution of more resistant weeds and creating additional eco-toxicological risks. In 2010, Dr. Mortensen, Entomology Professor John Tooker, his student Eric Bohnenblust, and I were invited to present our concerns in Washington D.C. before officials in the EPA Office of Pesticide Products. Last July, Dr. Mortensen also spoke before a U.S. House committee and shaped his testimony based on ongoing research in Penn State’s weed ecology group.

On both occasions, I feel that our words had significant potential to influence the perspectives of key policymakers. In both instances, we were forced to draw on incomplete datasets and provisional knowledge to make our case. Of course, all

ecological knowledge is provisional, and scientists interacting with policymakers and the public are forced to weigh facts and uncertainties against the need to make timely recommendations.

Therefore, these experiences have given me ample food for thought on navigating a difficult balance between the roles of scientist and advocate. If nothing else, they have provided additional motivation to pursue high standards in my research and to strive to understand my system as thoroughly as possible; you never know when someone may decide your research is relevant.

For information on Franklin's research and the research in the Mortensen Weed Ecology Lab at Penn State check out <http://weedecology.psu.edu>, and visit <http://extension.psu.edu/weeds> to learn more about the wide range of weed management research at Penn State.

SEECoS: Outreach with Underprivileged High School Students

-Laura Russo

Last summer, I mentored three teenagers on a six-week research project as part of a Penn State program known as SEECoS, Summer Experience in the Eberly College of Science, for low income high school students. At the outset, I had no idea how enthusiastic and curious my students would be. I mentored Katherine, a senior at Reading High School in Pennsylvania; Kianu, a sophomore at SciTech High in Harrisburg, PA; and Musa, a senior at Boys Latin of Philadelphia Charter School. I was amazed by their ambition to make the most of every minute. We spent six hours a week collecting nectar and pollen from flowers, photographing and measuring plants, and even performing experiments with live bees in a garden with our "Pollinator Preference Device" that we built out of PVC pipes and duct tape. They had so much fun when we did outdoors activities. Can you

believe that my students had never used a butterfly net before?

At the end of the six weeks, we put together a presentation and the students addressed an audience of their peers and Penn State scientists from a number of other research groups. I was so proud when they won second place out of all the SEECoS presentations! This is a great opportunity for the high school students; they get to take advanced classes in everything from English literature to chemistry and they get research experience in real labs. Since this program started in 2000, ninety-nine percent of the students who participated were accepted into post-secondary educational institutions. It was also a fantastic opportunity for me to share my research, and it was worth every minute. Any graduate student can design a project to do with these kids, and I think it would be great to see more ecology activities.

Contact Jackie Bortiatynski at jxb46@psu.edu to get involved or me at lar322@psu.edu for more information.



Second place winners for their presentation on pollinator ecology, Musa, Katherine, and Kianu, who were mentored by Laura Russo during the SEECoS program for high school students.

Ecology Cookbook is a Hit!



Eco-Edibles, an eclectic compilation of recipes, presented by the Penn State Ecology Graduate Student Organization

The students in the Ecology program

published an ecology themed cookbook this winter titled, "Eco-Edibles." The cookbook, spearheaded by Lindsey Swierk, Laura Russo, & Jenny Tennessen, has been a huge success. It is in its second printing and copies are going fast. The proceeds from the cookbook sales help to support student travel to conferences. Contact Lindsey for prices and ordering information at lns146@psu.edu.

Please join us in welcoming Jason Hill, the 2011-2012 program service assistant.

Congratulations to Penn State Ecology Students, Faculty and Postdocs on their Recent Achievements*

KEVIN MUELLER was awarded an Alumni Association Dissertation Award for his dissertation, "The Influence of Trees on Soil Biogeochemistry." Kevin's research explored the effect of common tree species on soil carbon storage, nutrient availability, and acidification. Kevin received a dual-degree Ph.D. in ecology and biogeochemistry (co-advised by Dave Eissenstat and Katherine Freeman).

Faculty member **Andrew Stephenson** was named Distinguished Professor of Biology. Andy is conducting research on the ecology and evolutionary biology of plant mating systems, plant ecology, and plant-insect-pathogen systems. He has been a long-time active faculty member in the Intercollege Graduate Degree Program in Ecology and is also involved with the Center for

Infectious Disease Dynamics, the Plant Biology Graduate Program, and the Center for Chemical Ecology.

ANJEL HELMS and **JEFF KERBY** received National Science Foundation (NSF) Graduate Research Fellowships in 2011. Anjel's (advisers, Mark Mescher and John Tooker) research is titled, "Plant Responses to the Perception of Insect Pheromones." Jeff's (adviser, Eric Post) research is titled, "Spatial Scales of Resource Synchrony and Herbivore Dynamics in a Variable Climate."

BRAD CARLSON (adviser, Tracy Langkilde) received an honorable mention for his NSF Fellowship proposal titled, "The Ecology of Local Adaptation: Microgeographic variation in an amphibian."

Ken Tamminga, Penn State professor of landscape architecture, and Deno De Ciantis, director of the Penn State Center-Engaging Pittsburgh received the 2011 Penn State Award for Community Engagement and Scholarship for The Pittsburgh Studio, a joint initiative that aims to instigate change within Pittsburgh's economically depressed areas while simultaneously giving Penn State's landscape architecture students real-world design experience. The studio involves a good dose of applied ecology in dealing with inner-city socio-ecological systems and green infrastructure.

JENNY TENNESSEN (adviser, Susan Parks) received a Penn State Academic Computing Fellowship for her research titled, "Using Propagation Modeling to Explore the Effects of Masking Noise on the Communication Range of North Atlantic Right Whales." Jenny's research combines field observations with sound propagation models to explore the potential for noise from commercial shipping to degrade whale habitat by disrupting mother-calf communications.

FRANKLIN EGAN (adviser, Dave Mortensen) was awarded the 2011 Evans Family Award for Graduate Student Extension Achievement. The Evans Family Award recognizes outstanding graduate students who work to translate and

communicate their research to the public. Franklin was recognized for the policy work he and Dave described in lead newsletter articles, as well as his leadership in the Penn State Community Gardens.

LARRY YORK and **CHRIS FERNANDEZ** won competitive grants through the Penn State College of Agricultural Sciences. Larry (adviser, Jonathan Lynch) won for his proposal, "Molecular Method for Quantifying Roots of Intercropped Maize Genotypes." Chris (adviser, Roger Koide) for his proposal, "Melanin: A Key Trait Determining both the Assembly of Ectomycorrhizal Fungal Communities and Ecosystem Function."

KRISTINE AVERILL (adviser, Dave Mortensen) received the Northeastern Weed Science Society's Robert D. Sweet Outstanding Graduate Student Award at the society's annual meeting in January.

Matt Ryan (Ph.D. 2010, Mortensen lab postdoc) received the Weed Science Society of America Outstanding Graduate Student Award at the society's annual meeting in February.

Dave Mortensen received the Outstanding Research Award and a Weed Science Society of America Fellow Award also at the society's annual meeting in February.

JEFF LAW and **JASON GLEDITSCH** won awards at the 2011 Graduate Exhibition. Jeff (adviser, Rob Gallagher) won a first place award in the health and life sciences category for his research presentation, "Self-regulating weed control through the enhancement of beneficial ground-dwelling invertebrates." Jason (adviser, Tomas Carlo) won a third place award in the same category for his presentation, "Fruit quantity of invasive shrubs predicts the abundance of common native avian frugivores in central Pennsylvania."

LUKE MCCORMACK and **DAN GREAR** received the 2011 Frank A. Andersen Ecology Travel Awards. Luke is traveling to the Ecological Society of America conference to present his work on fine root turnover in temperate trees, controls and constraints on fine root lifespan. Dan

is traveling to the Ecology and Evolution of Infectious Diseases conference to present his work on feeding behaviors and foraging networks interact to influence the parasite community of the eastern chipmunk (*Tamias striatus*).

*Students' names are denoted in small capital letters.

Recent Publications

(Listed in alphabetical order with student first-authored publications first)

KRISTINE M. AVERILL, A. DiTommaso, C.L. Mohler, and L.R. Milbrath (2011) Survival, growth, and fecundity of the invasive swallowworts (*Vincetoxicum rossicum* and *V. nigrum*) in New York State. *Invasive Plant Science and Management* 4, doi: 10.1614/IPSM-D-10-00034.1

J. FRANKLIN EGAN, B.D Maxwell, **David A. Mortensen**, **Matthew R. Ryan**, and **Richard G. Smith** (2011) 2, 4-Dichlorophenoxyacetic acid (2, 4-D)-resistant crops and the potential for evolution of 2,4-D-resistant weeds. *Proceedings of the National Academy of Science*, 108, E37, doi: 10.1073/pnas.1017414108

JASON M GLEDITSCH and **Tomas Carlo** (2010) Fruit quantity of invasive shrubs predicts the abundance of common native avian frugivores in Central Pennsylvania. *Diversity and Distributions*, 73: 1-10.

DANIEL A. GREAR and **Peter J. Hudson** (2011) The dynamics of macroparasite host-self-infection: A study of the patterns and processes of pinworm (Oxyuridae) aggregation. *Parasitology*, 138, 619-627. doi: 10.1017/S0031182011000096

JEFF KERBY, C. Wlimers, and **Eric Post** (2011) Climate change, phenology, and the nature of consumer-resource interactions: Advancing the Match/Mismatch Hypothesis. In: *Ecology and Evolution of Trait-Mediated Indirect Interactions: Linking Evolution, Community, and Ecosystem*. Editors Takayuki Ohgushi, Oswald Schmitz, & Robert D. Holt. Cambridge University Press



Photo: Jeff Kerby from, *The Circle*, Issue 1

JEFF KERBY (2011) Global warming: Timing is

everything. *The Circle*, *WWF Arctic Programme Newsletter*, 1, 6-7.

DAVE LIEB, R.W. Bouchard, and R.F. Carline. (2011) The crayfish fauna of southeastern Pennsylvania: Distributions, ecology, and changes over the last century. *Journal of Crustacean Biology* 31, 166-178.

Campbell, C., **Suann Yang**, Albert, R. and **Katriona Shea**. (2011) A network model for plant-pollinator community assembly. *Proceedings of the National Academy of Science* 108(1), 197-202.

Drake, Delucia, Gallet-Budynek, Hofmockel, Bernhardt, Billings, Jackson, Lichter, **M. LUKE MCCORMACK**, Moore, Oren, Palmroth, Phillips, Phippen, Pritchard, Treseder, and Finzi. (2011) Nitrogen limitation of net primary production prevents soil carbon sequestration under elevated concentrations of atmospheric CO₂. *Ecology Letters* 14, 349-357.

Filipová, L., F. Grandjean, **DAVE LIEB**, A. Petrusek. (2011) Genetic variation in the spiny-cheek crayfish, *Orconectes limosus*: Implications for the origin of European populations and the distribution and conservation of native stocks. *Journal of the North American Benthological Society*, in press

Roger T. Koide, **CHRISTOPHER W. FERNANDEZ**, and Peoples M. (2011) Can ectomycorrhizal colonization of *Pinus resinosa* roots affect their decomposition? *New Phytologist*. doi: 10.1111/j.1469-8137.2011.03694.x

Roger T. Koide, **CHRISTOPHER W. FERNANDEZ**, and **KRITTIKA PETRAKOB** (2011) General principles in the community ecology of ectomycorrhizal fungi. *Annals of Forest Science*. 68, 45-55. doi: 10.1007/s13595-010-0006-6

Adam D. Miller, Roxburgh, S.H. and **Shea, K.** (2011) How frequency and intensity shape diversity-disturbance relationships. *Proceedings of the National Academy of Science*, 108(14), 5643-5648

Suann Yang, **Matt Ferrari**, and **Katriona Shea**. (2011) Pollinator behavior mediates negative interactions between two congeneric invasive plant species. *American Naturalist*, 177, 110-118.

Ecology Spring Seminar Series 2012

Saving a changing world: Ecology in the public eye

Next spring's seminar series will examine the science and the scientists who get the public's attention. The aim will be to invite speakers with distinguished careers in ecology and ask them to devote a portion of their seminar to explicitly talk about their public involvement, including interactions with journalists, policymakers, non-governmental organizations, and beyond.

The ecological topics covered will be broad, but tied together by a philosophical discussion of how ecologists can and should engage with the public. If you have suggestions for topics or speakers, contact Britta Teller: bjt162@psu.edu.

ECOLOGY GIFT FUND

We have established a gift fund that the Ecology program can use to support its various functions including stipend support, social functions and seminar speakers. As many of you know, our funds from the Graduate School are quite limited. Donations to this fund can allow us to continue to enhance our commitment to providing a quality graduate education for our students.

For more information about financially supporting the Ecology program, please contact Dave Eissenstat, program chair, at dme9@psu.edu.

