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Department of Ecology & Evolutionary Biology

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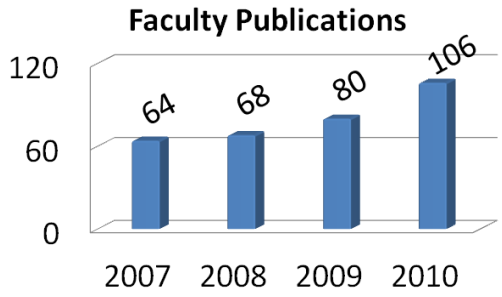
THE UNIVERSITY of TENNESSEE KNOXVILLE

Department of Ecology and Evolutionary Biology

EEB Newsletter

The Value of your Degree is Increasing

By Prof. Gary McCracken, Head



If you have a degree from UTK, your degree has increased in value. If your degree is from EEB (or any of EEB's associated units: e.g., Biology, Zoology, Botany, etc.), you are doing exceptionally well in accumulating degree "equity value." Your degree is worth more because you are a graduate of an increasingly better department and University. Our successes reflect on you, just as your successes reflect on us. Congratulations to us all.

Of course, there is no single metric for the value of a college degree, just as there is no single metric for the quality of a department. But the ultimate metric for scholarly activity in a department like EEB is the number of peer-reviewed research papers we produce. Citations to those publications by other researchers, are the best measure of impact of this research on the ideas and work of others. We are enjoying a dramatic increase in EEB's scholarly activity and its impact on other researchers. As you browse this Newsletter, you'll find that "research" is referred to in every section, demonstrating that increased research productivity does not reflect an overemphasis on research at the expense of teaching and other activities, but rather that research pervades and enhances all of our activities. For example, in the 2010-11 academic year, 81 students engaged in undergraduate research with 20 EEB faculty, resulting in several undergraduate publications. In EEB, research is part of our teaching, and teaching enhances our research.

In this edition of the EEB Newsletter, you'll find highlights of the many activities of our faculty and students, including the publication of two recent books: *Encyclopedia of Biological Invasions* and *The Amphibians of Tennessee*. In this issue, you will meet one of our most engaged alumni, Mike Dennis. You'll also find a tribute to our long-time colleague, the eminent plant geographer Hal DeSelm.

Winds and Hail Destroy Fred Norris Greenhouses

TOP: The freestanding greenhouse collapsed in strong winds on April 25.
BOTTOM: The attached greenhouse was pelted with hail on April 27.

On April 25th and 27th, severe storms hit east Tennessee, causing an enormous amount of property damage and a number of deaths. The two Fred Norris Greenhouses located behind the Hesler Biology Building were heavily damaged.

The first storm brought strong winds that blew down the freestanding greenhouse but left the second greenhouse, which is attached to Hesler, intact. The second storm brought golf ball-sized hail, which smashed through the glass roof of the second greenhouse, leaving glass shards dangling from the roof supports.

The greenhouses housed class projects, student and faculty research projects, teaching collection plants, an extensive succulent plant collection, and more.

Within a week of the storms, a demolition crew started removing wreckage from the collapsed greenhouse. Salvageable plants were moved to the White Ave. Biology Annex greenhouse. This third greenhouse suffered only minor damage from the storms due to its tempered glass.

Within two weeks of the storms, workers had knocked out the broken roof glass in the hail-damaged facility, making it safe to enter. It took more than two months and 900 panes of safety glass to complete the repair.

One graduate student lost an entire year of work. His efforts, of finding plants in the field, making cross pollinations, collecting and stratifying seeds, and planting hundreds of seeds in the greenhouse, were destroyed by the storms. The Division of Biology also lost many of its plants from this catastrophe. Fortunately, the most valuable teaching collection plants survived. Ken McFarland, who manages the greenhouses, has started replacing some of the lost plants. A replacement glasshouse structure is planned, and construction will begin in early 2012.

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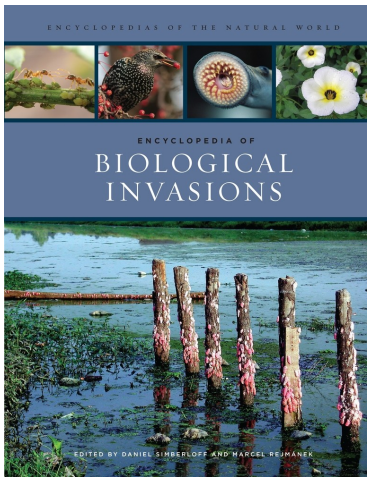
Recommended Reading

Encyclopedia of Biological Invasions



The 765-page *Encyclopedia of Biological Invasions*, edited by EEB faculty member Dan Simberloff and Marcel Rejmánek (U.C. Davis), was published by the University of California Press in 2011. With 152 articles by 197 experts from 25 countries, the *Encyclopedia* is the first comprehensive reference work on the many facets of introduced plants, animals, and microbes – their biology, history, impacts, evolution, and management. Included are detailed descriptions of many noteworthy invaders like the Burmese python, brown tree snake, cane toad, starling, small Indian mongoose, zebra mussel, sea lamprey, giant reed, killer alga, and tamarisk as well as local scourges such as the gypsy moth, hemlock woolly adelgid, red imported fire ant, chestnut blight, Japanese honeysuckle, tree-of-heaven, kudzu, and rock snot.

Impacts of several invasions have long been recognized – e.g., chestnut blight, starlings, and gypsy moth in North America, ragweed and muskrats in Europe, rinderpest in Africa, prickly pear in Australia, beavers in South America, and Norway and ship rats worldwide. However invasions as a global phenomenon worthy of its own field of study – invasion biology – arose only in the mid-1980s as the rapid growth in global travel and trade brought a flood of new species to almost every shore and the environmental and economic costs became increasingly obvious and onerous. Aside from ecological impacts such as myriad extinctions of flightless island birds by introduced predators and transformation of entire landscapes by invasive plants (cheatgrass in the western U.S.; Brazilian pepper and Australian pine and paperbark in Florida) or by plant pathogens (chestnut blight in the eastern U.S.), economic costs are staggering, estimated at well over $100 billion annually in the U.S. alone. A series of meetings in the 1980s convened by the international Scientific Committee on Problems of the Environment (SCOPE) produced two widely read books of proceedings, co-edited by EEB faculty member Jim Drake, that crystallized the concern with invasions and inspired many research programs.

EEB faculty member Nathan Sanders contributed the *Encyclopedia* entry on ants, while several former EEB graduate students wrote articles on their specialties (Arijana Barun, Marc Cadotte, Julie Lockwood, Diego Vázquez, and Betsy Von Holle). Simberloff's entries are on the SCOPE project, kudzu, rodents (other than rats), native species that become invasive, and Charles Elton (an early ecologist who foresaw and publicized many of the problems associated with invasions). Many EEB faculty and students conduct research on biological invasions, and Simberloff established the Institute for Biological Invasions at UTK upon his arrival in 1997. The leading international journal in the field, *Biological Invasions*, has been edited in EEB since 2003, with Simberloff taking over as Editor-in-Chief from Drake in 2009.

The Amphibians of Tennessee

Tennessee is an amazing state for amphibian diversity and is home to 80 species, including many endemics found nowhere else in the world. The Southern Appalachians are considered to be the global center of biodiversity for salamanders, and the Great Smoky Mountains National Park alone is home to at least 31 species.

In order to celebrate this diversity and to disseminate information about Tennessee's amphibians in a single resource, Matthew Niemiller (Ph.D. '11) and Graham Reynolds (Ph.D. '11), along with seven contributors, have written and edited the first comprehensive guide and reference to Tennessee's amphibians. Contributors include former EEB students Stesha Pasachnik (Ph.D. '10) and J.R. Jones (M.S. '09).

The 369-page work includes 287 color photographs and provides a much-needed popular identification book as well as a scientific reference to all eighty species of amphibians occurring in Tennessee. The body of the text is organized as a standard field guide, with an entry for each species that includes: a detailed range map complete with county records; natural history; conservation information; and photos of various life stages of the species. Detailed taxonomic keys are also included to assist in identification. Five introductory chapters introduce readers to amphibian biology and conservation, as well as the geology, hydrology, and habitats in the state. A comprehensive glossary and recommended reading sections allow readers to further their understanding of amphibian biology. Finally, "Field Notes" sections describe stories from the editors' adventures while searching for amphibians in Tennessee, including a magical night they found hundreds of Red-Cheeked Salamanders spotting the forest floor, or when the "acoustic jewels" of calling Bird-Voiced Treefrogs dotted the tops of trees in a cypress swamp.

Dr. Joe DiPietro (center), President of UT, receives a copy of *The Amphibians of Tennessee* from Graham (left) and Matt (right).

The book is intended for amateur naturalists as well as professional herpetologists. It is detailed enough to serve as a scientific reference or a resource for college herpetology and vertebrate biology classes. This type of reference has long been needed for our state and will be valuable to anyone interested in the natural history or amphibian diversity of Tennessee.

The book is on sale now through the University of Tennessee Press (www.utpress.org) and Amazon (www.amazon.com). Please visit the book's website (www.AmphibiansofTN.com) to learn more.

Matthew L. Niemiller and R. Graham Reynolds earned their doctorates in EEB under the supervision of Dr. Ben Fitzpatrick. Niemiller is now a Donnelly Postdoctoral Fellow at Yale University. Reynolds is now a postdoctoral researcher at the University of Massachusetts, Boston.

Student News

Naturalist Club Reinstated

The Naturalist Club is EEB's official club for undergraduate students. It unites EEB students and gets them involved in the department, both academically and socially. The Naturalist Club connects EEB undergraduates with faculty, graduate, and other undergraduate students.

After being dormant for several years, the Naturalist Club was reinstated in the spring of 2008 by Jessica Welch ('10) and Lauren Breza ('11), becoming an official club in the fall of 2009. While the club was created specifically for EEB undergraduate students, it is open to anyone who is interested in Ecology or Evolutionary Biology. Meetings are held monthly, with members from a variety of majors, including EEB, Anthropology, Biochemistry and Cellular and Molecular Biology, and English.

The Naturalist Club provides a place for students to learn about research, internship and volunteer opportunities, how to apply for graduate school, and career paths for those with an EEB degree. The Naturalist Club has invited guest speakers, including faculty members from EEB and the Forestry, Wildlife, and Fisheries Department. In past years, the Naturalist Club has helped with Darwin Day, the Darwin Day Teacher Workshop, Ijams Nature Center TN River Clean-up, and the Tennessee Science Olympiad. The Naturalist Club has also taken field trips to the Gray Fossil Museum in Johnson City (with a special behind the scenes tour), the Annual Wildflower Pilgrimage, and others.

The Naturalist Club benefits from an endowment to EEB from an alumnus whose wish was "to enhance the undergraduate experience."

If you are interested in more information or would like to join the Naturalist Club, please contact Mary Glover (mglover6@utk.edu).

Undergraduate Student Headlines

Congratulations to the 29 EEB undergrads who graduated in 2010-11!

Our EEB undergraduate student body continues to grow. We now have 108 declared EEB majors, up from 82 in 2009. Our students are also well trained; the majority of our students graduate with research experience (81 students engaged in EEB undergraduate research in 2010-11).

Lauren Breza won the award for Outstanding EEB Undergraduate at the EEB annual awards ceremony on May 6. Lauren was also involved in work at Oak Ridge National Labs this summer on the effect of rising carbon dioxide levels on plant growth.

Heather Tran was an REU (Research Experience for Undergraduates) student at the Sevilleta LTER this summer.

Sarah Wood received a $4500 scholarship to work at the Rocky Mountain Biological lab (RMBL) this summer. She was also one of nine undergrads selected to present a poster at the Middle Tennessee State University's 5th Annual Science, Technology, Engineering, and Mathematics Education Research Conference, in February.

Graduate Research: Reproductive Processes in Water Lilies

Taylor pollinates *Trithuria* in Western Australia

Water lilies are one of the most well-known ornamental flowers in the world. They are of special interest to botanists, as they comprise one of the oldest groups of living flowering plants, Nymphaeales, and have a fossil record as far back as the Early Cretaceous (around 125 million years ago). Because this group originated so early in angiosperm history, understanding their biology gives clues about the biology of the first flowering plants.

In her dissertation, EEB graduate student Mackenzie Taylor studied the developmental events that occur in the flower after pollination. At pollination, pollen grains are transferred to the stigma of a flower where they germinate and produce a pollen tube that grows down the flower style. This tube carries the sperm cell to the egg, enabling fertilization. Many of the structures involved in pollen tube growth, such as the stigma and style, are novel to angiosperms and are thought to be have been important for the early diversification of flowering plants.

Mackenzie's work took her from the waters of Tennessee and Alabama to Southwestern Australia, where she studied the smallest of water lilies, the genus *Trithuria. Trithuria* plants are less than 3 cm tall and the flowers are less than 2 mm in diameter. Because of its small size and distribution (it is found only in parts of Australia, New Zealand, and India), almost nothing was known about *Trithuria* prior to 2007.

In the first study of reproductive processes in *Trithuria*, Mackenzie investigated pollen tube growth in three species. She waded into swamps and lakes, at the edges of snake-infested Eucalyptus forests, to hand-pollinate the tiny flowers. She then collected the flowers and studied them under the microscope to document developmental events. She found that in one species, fertilization occurs around 30 min after pollination, which is one of the shortest periods amongst angiosperms. Mackenzie also found that *Trithuria* shares many traits with other water lilies. This gives us insight into what early water lilies may have been like.

Mackenzie finished her Ph.D. under the supervision of Joe Williams in the spring. She is now in a tenure-track position in the Department of Biology at Creighton University in Omaha, NE.

Graduate Student Headlines

Congratulations to the graduate students who graduated in 2010-11!
Master's degree: **Lauren Wilmoth** (now teaching H.S. biology and environmental science in Dandridge, TN)
Doctorate degrees: **Arijana Barun**, **Matt Niemiller** (now a post-doc at Yale), **Graham Reynolds** (now a post-doc at Boston U.), **Premal Shah** (now a post-doc at U. Pennsylvania), and **Mackenzie Taylor (**now an Assistant Prof. at Creighton U.)

EEB held its annual awards ceremony on May 6. Recipients were: Excellence in Progress Towards a Degree— **Romina Dimarco**, **Mark Genung**, & **Katie Stuble**; Outstanding Student Paper— **Emmi Felker-Quinn**; Jim Tanner Award for Outstanding Dissertation— **Premal Shah**; Biology GTA Award— **Lauren Wilmoth**; Sandy Echternacht Outstanding Teaching Award— **Mackenzie Taylor**.

Other Headlines:

- **Emily Austin**, **Matt Niemiller**, and **Graham Reynolds** received UT -ORNL Science Alliance awards.
- **Melissa Cregger** and **Phillip Hollingsworth** received Cokkinias-Graduate Fellowships.
- **Melissa Cregger** also received the DOE's Marvin L. Wesely Award and was one of only a few graduate students invited to attend the National Academy of Sciences, Arthur M. Sackler Colloquium on climate change in Washington, DC.
- **Jennifer Krauel** received a Bat Conservation International Research Scholarship.
- **Mariano Rodriguez-Cabal** received an NSF DDIG fellowship.
- **Joshua Birkebak** received a Ben Woo Scholarship Award.

Departmental Headlines

Brandon Matheny and Neale Bougher (Department of Conservation, Western Australia) have received a grant from the Australian Biological Resources Study, with matching funds from the Western Australia Naturalists' Club, Inc., to add a systematic volume to the Fungi of Australia series. Brandon has also recently received a Carlos C. Campbell Fellowship from the Great Smoky Mountains Conservation Association and a Research Experiences for Undergraduates (REU) grant from the NSF.

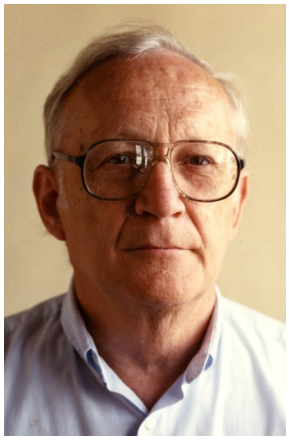
Mike Gilchrist received an NSF grant to develop models that describe the costs and errors associated with protein translation. These models will be fit to genomic sequence data allowing an estimation of the magnitude of these costs and rates of these errors.

Nate Sanders received a $2 million grant from NSF (also funded by the DOE and the Australian Research Council) to examine how rising temperatures will affect population structure, ranges, and evolution of ants, to help forecast the effects of climate change on biodiversity. Read more about the importance of his research on ants on page 6.

Postdoctoral researcher **Lara Souza** was recently awarded an American Association of University Women (AAUW) postdoctoral fellowship to investigate the role of temperature and nutrient gradients on intra-specific variation and diversity in a dominant old-field plant species .

Paul Armsworth, with colleagues from other UT colleges, has co-founded The Baker Center Interdisciplinary Group on Energy and Environmental Policy (http://web.utk.edu/~jlarivi1/bcinter.html). The forum hosts speakers from diverse fields who have a common interest in environmental and energy issues.

EEB faculty, researchers, and students published well over 100 peer-reviewed articles in 2010-11. They published in the highest impact journals in our field, including 5 papers in *Science*, 5 papers in *PNAS*, 1 paper in *Nature*, and 3 papers in *Ecology Letters*.



Henry Rawie "Hal" DeSelm Remembered

By Prof. Frank Harris

The world of plant ecology and classic field biology grew considerably dimmer with the passing of Hal DeSelm on July 12. A native of Columbus, OH, Hal received his PhD from Ohio State under the supervision of John Wolfe (who later became chief of the Environmental Sciences Branch of the Atomic Energy Commission). Hal joined UT's Botany faculty in 1956. In 1989 he became Professor Emeritus. Even though Hal had been in poor health for quite a few years, news of his passing struck me as simply not possible. Hal had been a part of UT and field biology since forever.

I was Hal's first PhD student from 1964-1970. Hal believed in hard work. For example, his MS thesis at the famed Neotoma Woods at OSU involved studying the carbon dioxide profile in a forest canopy. In the early 1950's, this was accomplished by climbing up and down trees hourly during the night, collecting bicarbonate bottles and titrating them on site. Think about that as you take your measurements with automated instruments of today, and then tell yourself about "hard work!"

I recall many things about Hal—some humorous, some serious but all speak to who the man was. His coffee was the consistency of Karo Syrup. You could put Hal in a $1000 suit and it would look like he had slept in it. He was the scariest driver you can imagine; he could classify plants to the variety level (beyond species and subspecies) at 65 mph. By his own admission, Hal was a bit of a curmudgeon.

On a more serious note, Hal left me with many lessons. I share two examples. Just a few months into my doctorate, Hal took Bill Martin (also a DeSelm student) and me to the Tennessee Academy of Science meeting to give a paper. At the time, this was beyond painful. His message: you have got to learn how to talk before groups if you are going to teach. Little did I realize then just how important that experience would be, since I spent most of my career on my feet selling research, at ORNL and NSF, and teaching at UT.

My second serious remembrance was the gift that Hal conveyed to me to be able to "read" a landscape. The vegetation and underlying soils tell a story if you know how to read it. To this day, I enjoy traveling across the land "reading" the history and sometimes the future of a landscape. Thank you, Hal; may you rest in peace having given your best to so many of us.

Recent Research

O'Meara: Estimating Species Boundaries, Evolutionary Relationships

There are two ways to discover a new species. One is to discover a population of organisms clearly distinct from other species. For example, the okapi, a relative of the giraffe, was described as a new species based on very little information (second-hand accounts and two partial skins), because it was clearly different from everything else known at that time (Sclater, 1901). A more common, if less thrilling, way to discover a new species is to find that a group of organisms originally thought to be one species is actually two or more. For example, chimpanzees and bonobos are different species, but this was not suspected until 1929 (Coolidge, 1933).

This latter kind of species discovery can be difficult. First, speciation is often a gradual process. Species are like clouds; as two clouds move closer together, there comes a point where people would disagree about whether there is just one cloud or two nearby clouds. Second, many taxonomists define species as groups of interbreeding populations that are reproductively isolated from other such groups. This is difficult to assess directly; breeding studies in captivity are expensive and often do not map well to natural systems, for example.

Assistant professor Dr. Brian O'Meara recently developed a method that uses information from different genes in a group of organisms to jointly estimate both species boundaries and an evolutionary history (a phylogeny) joining those species (O'Meara, 2010). Work from coalescent theory in genetics has shown how a phylogeny of genes may not match the phylogeny of the species containing those genes. "This can make inference of a species history a complex problem," says O'Meara, "but we can also use this disagreement to tell us about species boundaries." This new method only uses information about the shape of the gene trees, and so does not require a taxonomist to have preconceived ideas about which sets of organisms might form species. It searches over all the possible divisions of individuals into species and arrangements of species on a tree to find the one that maximizes the congruence of gene trees between species while minimizing congruence of gene trees within species. The method was evaluated using over seventy computer-years of analyses.

The southern cavefish, *Typhlichthys subterraneus*, from Big Mouth Cave in Grundy County, TN. Photo courtesy of Dante Fenolio.

This method is already being adopted by taxonomists. Recent EEB graduate Dr. Matt Niemiller (*et al.*, 2011) used it to infer species boundaries in a set of cavefish from across the eastern US.

References: *Coolidge HJJ. 1933. Am. J. Phys. Anthropol. 18:2-59.
*Niemiller ML, Near TJ, Fitzpatrick BM. 2011. Evolution. Published online Nov. 2011.
*O'Meara BC, 2010. Systematic Biology 59:59-73.
*Sclater PL, 1901. Proc. Zool. Soc. London 1:50-52.

Knowledge Progression and the Nature of Science

By Dr. Elisabeth Schussler

As one of the 'new breeds' of Ph.D. scientists embarking on research in science education, it has been exciting to bring my experience researching student learning of biology to UT's EEB department. My research program has varied in topic, depending on current curriculum projects or the research interests of my students. However, my research always involves identifying a need relative to student learning, collecting data, and using that data to inform educational practice.

A Biology 130 laboratory session

Much of my current research has been focused on the progression of undergraduate science knowledge. As the director of the core biology curriculum at UT, it is of great interest to me to understand what students are learning and retaining as they progress through our core courses. I have studied development of student understanding of the nature of science (NOS) – the values and beliefs inherent in the development of scientific knowledge. I found that undergraduate biology majors increase their understanding of NOS as they take more biology courses at UT, which is contrary to research done elsewhere. I also found that biology majors concentrating in EEB were more likely to outscore non-biology majors in their understanding of NOS, compared to students concentrating in other biology areas. Further research will focus on whether these differences are a result of inherent differences in student perception of scientific knowledge and its development among different biology majors, or a function of differential coursework they may be undertaking.

My current research has broadened to assessment of student understanding of core concepts in Biology. I have begun piloting core biology concept questions with non-science majors, students in core biology courses, and upper-level biology undergraduates to test whether these questions can capture knowledge progression as students advance in the major. These results will inform current teaching and learning in the biology departments and also be used as baseline data for monitoring changes in student learning as the core curriculum is revised.

My graduate student, Denise Kendall, is researching student perception of graduate student instructors versus faculty member instructors, to identify generalizations that can be used to inform professional development of graduate students. I am also supervising an EEB undergraduate, Kashina Hickson, who is probing undergraduate confidence in their abilities to succeed in the critical first-semester biology course – Biology 130 – that many students take at UT. We are hoping to better understand what impacts student confidence and how instructors of Biology 130 can support student success in the course.

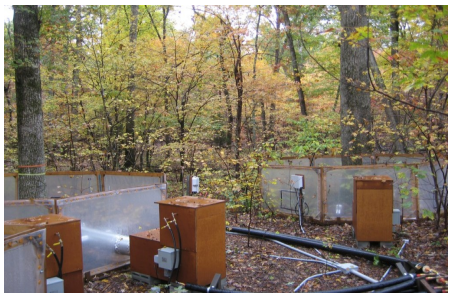
Recent Research, Continued

The Effects of Climate Change on Ants

By Dr. Nate Sanders

One of the long-standing questions in ecology and biogeography is why the number of species varies from place to place on the planet. Our group has addressed this question, mostly focusing on ants in Great Smoky Mountains National Park. One of the things we found, which is slightly counter to previous research, is that temperature rather than the amount of energy available (estimated as primary productivity) accounts for most of the variation in the number of ant species. Put another way - warmer places in the Smokies (e.g. Twin Creeks) tend to have more ants than colder places (e.g. Clingmans Dome). In a project led by my former postdoc, Rob Dunn (now an Associate Professor at North Carolina State and an amazing popular writer), we compiled data for around 2000 ant communities and generally found the same thing at global scales. That is, as long as it is not too dry, warmer places on the planet tend to have more ants than do colder places.

Taken together, these observational studies have important implications for forecasting the effects of global climate change on biodiversity, because we know that different ant species are associated with different temperatures, and temperature seems to be an important predictor of diversity and abundance. But these are only observational studies. In 2008, we started a Department of Energy funded experiment at Duke Forest and Harvard Forest where we experimentally heat up patches of forest (see photo). We chose these sites because they are the northern and southern range boundaries for about 15 common forest ant species, so we can see what happens under warmed conditions at range boundaries. There are 15 experimental chambers at each site (each approximately 5 meters in diameter and 1.5 meters tall), and they are experimentally warmed, between 0.5 to 6 degrees Celsius above ambient conditions, in 0.5 degree steps.



These enclosures experimentally heat up patches of forest.

Thanks to Herculean efforts by PhD student Katie Stuble and undergraduate David Fowler, along with collaborators from North Carolina State, the University of Vermont, Harvard Forest, Duke University (and many other places), we are beginning to learn how ant communities (and many other things) respond to increased temperatures. Perhaps the most dramatic result so far is that the activity of the most common ant species, *Aphaenogaster rudis*, plummets to near zero when the temperature is just slightly warmer than ambient. If you have been in forests in southern Appalachia, you have seen *A. rudis*. It is everywhere, and it is important. Work by others has shown that perhaps more than 50% of understory plant species in southern Appalachian forests rely on *A. rudis* to disperse their seeds. A few summers ago, we put out seeds of a common understory plant species. We saw seeds get dispersed 147 times; amazingly *A. rudis* was responsible for 146 of those dispersals. So, it is important for plants in southern Appalachia, but it is dramatically affected by warming.

Alumni Focus

By Dr. W. Michael Dennis (Ph.D. Botany 1976)

I am not an alumnus of EEB. But as an alumnus of the once Botany Department here at UT, I am now an adopted member of EEB, and I am glad to be! My formal educational training as a plant taxonomist / systematist, and plant ecologist would lead me to reflect on my pathway here in either terms of phylogeny or perhaps succession. At any rate it has not been direct or predictable.

Dennis shows the class how to pick edible American Lotus *(Nelumbo lutea)* seeds.

You see, I am not primarily either a plant taxonomist or a plant ecologist; I am the owner and president of an environmental consulting firm. This is a profession that did not exist, at least in its present form, when I received my Ph.D. in Botany. How I ever got to UT, from a small southern town in the Piedmont of Georgia growing up in my father and grandfather's general mercantile store (right out of Faulkner!); through Oxford College and Emory University; the U. S. Army; and W. T. Batson mentored "Genus focused" approach to learning plants at the University of South Carolina, where I studied a swamp for a master's thesis, is too full of evolutionary jumps and dead ends to mention further here.

From my first visit to UT, I knew I had found a home, a home I have moved from but never left. Education is more than mastering a field of study with its own literature, methods, and theories; it is learning how to think critically and apply that thinking. I may not key out unknown plants every day as I once did, but I am daily faced with new and different problems to solve. The orderly approach to keying out a plant has been of great value in leading me to a productive approach to problem-solving.

After graduating from UT, I went to TVA and worked with aquatic and wetland plants in TVA reservoirs and rivers. It only took me a day at TVA to realize that there were practical aspects of the study of aquatic and wetland plants for which I had not been prepared. Consequently, I have served as a volunteer visiting professor for the past 30+ years, teaching a "practically focused" course in aquatic and wetland plants. Also, I have been fortunate enough to be able to provide funding to support fieldwork for graduate students of the Botany Department and now EEB. I have found it really takes so little to make a big difference in this area. Whether it's volunteering to teach a class to fill an educational void, supporting students, serving on committees such as the College of Arts and Sciences Dean's Advisory Board, or contributing in your own special ways, staying involved with the University, the Department and its educational programs can be an ever evolving succession process that contributes much to EEB and the University and is personally rewarding.

Thank You

Dear Alumni and Friends of EEB,

We have for a number of years now greatly benefited from the generosity of our dedicated alumni who make gifts to the Department. These gifts, for example, help us maintain our herbarium collection and support the activities of our undergraduate student Naturalist's Club. Other areas of our mission where targeted philanthropic giving helps the Department include: supporting research experiences for undergraduates or high school teachers, undergraduate prizes, and field research for graduate students. Those activities can receive funding from our new EEB Enrichment Fund which we hope you will support.

We encourage you to consider including EEB in your charitable giving plans this year. If you would like to consider a larger, more targeted gift which can have a specific impact, we would encourage you to please contact us to discuss your ideas. The Department works with a College development officer who facilitates matching the interests of our donors with our funding priorities. Please contact us by phone (865-974-3065), by mail (569 Dabney Hall; Knoxville, TN; 37996-1610), or by email (eeb-alumni@utk.edu).

Alumni gifts, of whatever amount, help us continue to enrich and grow our mission and make our alumni outreach activities easier to maintain.

Regards,

Gary McCracken
Professor and Head of Department
Ecology and Evolutionary Biology

Giving Opportunities

EEB Enrichment Fund

The EEB Enrichment Fund (still called the "Zoology Enrichment Fund" on some UT websites) is the primary departmental account. It supports instructional and academic programs within the department, including:

- Undergraduate and graduate research;
- Travel funds for students to participate in meetings and workshops;
- Other departmental activities that are in need of support.

If you have specific philanthropic goals, you may wish to consider one of EEB's other funds, a few of which are listed here. Please contact us if you wish to support a fund not shown here.

Graduate Research in Ecology and Evolution Fund

H. R. DeSelm Graduate Award Fund

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