



ATBI QUARTERLY

Great Smoky Mountains National Park, Great Smoky Mountains Association, Friends of the Smokies, and Discover Life in America

Slime Mold Workshop

Steve Stephenson

On Friday 16 July, approximately 30 individuals, including Park Service scientists and staff, DLIA volunteers, university professors, public school science teachers, students, and amateur scientists attended a workshop on slime molds. This event, co-sponsored by DLIA, the Slime Mold TWIG of the ATBI, the Mycological Society of America, and the University of Arkansas, was held at the Great Smoky Mountains Institute at Tremont. The workshop was designed to serve as a basic introduction to the biology, ecology and taxonomy of the three major groups of slime molds (myxomycetes, dictyostelids, and protostelids), and a two-hour session was devoted to each group. The instructor for the myxomycete session was Steve Stephenson, who was assisted by Satyendra Rajguru and Lora Lindley-Settlemyre. Fred Spiegel and John Shadwick served as instructors for the protostelid session, whereas John Landolt and Andy Swanson had the same role for the dictyostelid session. John Landolt is a professor of biology at Shepherd University in West Virginia. All of the other instructors are associated with the University of Arkansas.

Workshop participants learned the basic techniques used to collect, identify, and study members of each group of slime molds. For the myxomycetes, this means working with fruiting bodies that develop under natural conditions in the field as well as those cultured in the laboratory from samples of organic material (e.g., bark or leaf litter) obtained from the field. Fruiting bodies of dictyostelids and



Satyendra Rajguru

Metatrachia vesparium, one of the more common myxomycetes in the Park.

protostelids are generally observed only in laboratory culture. For these two groups, culture plates prepared in advance of the workshop were made available to the participants, so that they could observe actual living specimens of some of the more common species. For myxomycetes, participants had an opportunity to go out into the nearby forest and look for fruiting bodies, which were then brought back to be examined under a stereomicroscope. Additional specimens representing more than 40 different species of myxomycetes were available on demonstration.

In addition to the instruction given as part of the workshop, all participants were provided with a useful little gift to take home with them—a CD containing identification keys, various types of general information, and images relating to myxomycetes, dictyostelids and protostelids. The CD was developed with professors, teachers and environmental educators in mind, since teaching materials and other resources on slime molds are exceedingly limited.

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Bonnie Stephenson

John Landolt describes some of the basic features of dictyostelids, one of the three groups of slime molds covered in the workshop.





Photo by Ron McConathy/Aronsha

A Message from Jeanie Hilten

Discover Life in America Staff Activities:

What a difference talented, enthusiastic, and skilled people make in the operation of any organization! Over the last six months, DLIA has been fortunate to have Anne Ramsden, Chuck Cooper, and P.J. Nabors working on a variety of programs for the ATBI. Although they work only on a part-time basis, they make the most of their hours and things are really hopping in our office! Thanks to Anne, we now have our equipment and supplies much better organized, the housing calendar is very orderly, a volunteer database has been set up, and many other business matters are conducted professionally.

Thanks to Chuck, database help to scientists is available and web entry forms are now in the works. Thanks to P.J., we have dozens of new bird species pages on the DLIA website and also clear procedures for using and cataloging images from the high resolution scanner. In addition, interns Jess Hoffman and Jessica Brown have made fine contributions this summer. (See their articles on page ten.)

It is my hope that we can continue to build the crucial infrastructure that the ATBI deserves—a framework to support the efforts of scientists, Park staff, educators, and volunteers. A dedicated staff, working as a team that is supported by the DLIA Board and by our partners, provides the sturdy beams that will “raise the roof” of the ATBI!

Jeanie Hilten
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Ron McConathy/Aronsha

Chuck Cooper and Jessica Brown entering data during the Lepidoptera Quest.



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Note to Readers

The ATBI Quarterly newsletter is now available in color on our website. To sign up for notification of when the next issue is online, go to www.dlia.org/atbi/press/quarterly.html. We will keep your name in our general database, but will not send a hard copy of the newsletter to you. This will save us some money in printing and mailing -- and save a tree too!

If you wish to continue to receive the Quarterly by mail, please consider sending a donation of \$10 to Discover Life in America and mail it to Friends of Great Smoky Mountains National Park, P.O. Box 5650, Sevierville, TN 37864-9902.

Note to Authors

We welcome brief articles, reports and images from researchers, educators, and volunteers. Text files should be no longer than 600 words for a double page spread, and for a single page, 250 to 300 words, with one image of about 3" x 5". Fewer words allow more space for images. Send photos as high resolution color JPG files. The deadline for the Autumn issue is October 1, 2004.

Ruthanne Mitchell, ATBI Quarterly Newsletter Coordinator
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Eric Millwood

Chris Carlton presenting a Leaf Litter Blitz “patio talk” to Park visitors. Look for a related article in the Autumn issue.

ATBI Taxa Table

New Discoveries from 1998 to Present

| TAXON | New to Science | New to Park |
|--|----------------|-------------|
| <u>Microbes</u> | | |
| Archaea | 6 | 1 |
| Bacteria | 92 | 59 |
| Microsporidia | 1 | 4 |
| Protozoa | 2 | 14 |
| <u>Slime molds</u> | | |
| Dictyostelids | 10 | 8 |
| Protostelids | 8 | 12 |
| Myxomycetes | 2 | 130 |
| <u>Algae</u> | 67 | 163 |
| <u>Plants</u> | | |
| vascular | 0 | 47 |
| non-vascular | 0 | 9 |
| <u>Fungi</u> | 3 | 104 |
| <u>Lichens</u> | 9 | 60 |
| <u>Nematomorpha</u> (horsehair worms) | 0 | 4 |
| <u>Mollusks</u> (snails, mussels, etc.) | 3 | 23 |
| <u>Annelids</u> | | |
| aquatic oligochaetes | 0 | 16 |
| earthworms | 4 | 2 |
| leeches | 0 | 8 |
| <u>Nematodes</u> (roundworms) | 1 | 2 |
| <u>Tardigrades</u> (waterbears) | 8 | 46 |
| <u>Arachnids</u> | | |
| spiders | 39 | 461 |
| mites | 6 | 14 |
| ticks | 0 | 2 |
| <u>Crustaceans</u> (crayfish, copepods, etc.) | 28 | 56 |
| <u>Diplopoda</u> (millipedes) | 1 | 2 |
| <u>Paupoda</u> (pauropods) | 10 | 40 |
| <u>Symphyla</u> (symphylans) | 3 | 1 |
| <u>Protura</u> (proturans) | 4 | 3 |

| TAXON | New to Science | New to Park |
|---|----------------|--------------|
| <u>Collembola</u> (springtails) | 36 | 92 |
| <u>Diplura</u> (dipdurans) | 2 | 2 |
| <u>Microcoryphia</u> (jumping bristletails) | 1 | 1 |
| <u>Ephemeroptera</u> (mayflies) | 4 | 4 |
| <u>Odonata</u> (dragonflies, damselflies) | 0 | 19 |
| <u>Orthoptera</u> (grasshoppers, crickets, etc.) | 0 | 6 |
| <u>Blattaria</u> (cockroaches) | 0 | 1 |
| <u>Plecoptera</u> (stoneflies) | 3 | 4 |
| <u>Psocoptera</u> (barklice) | 0 | 24 |
| <u>Pthiraptera</u> (lice) | 0 | 7 |
| <u>Hemiptera</u> (true bugs, hoppers) | 3 | 84 |
| <u>Neuroptera</u> (lacewings, antlions, etc.) | 0 | 19 |
| <u>Megaloptera</u> (dobsonflies, alderflies, etc.) | 0 | 1 |
| <u>Coleoptera</u> (beetles) | 25 | 837 |
| <u>Mecoptera</u> (scorpionflies) | 1 | 10 |
| <u>Siphonaptera</u> (fleas) | 1 | 2 |
| <u>Diptera</u> (flies) | 32 | 99 |
| <u>Trichoptera</u> (caddisflies) | 4 | 62 |
| <u>Lepidoptera</u> (butterflies, moths, skippers) | 72 | 684 |
| <u>Hymenoptera</u> (bees, ants, etc.) | 25 | 60 |
| <u>Vertebrates</u> | | |
| amphibians | 0 | 2 |
| reptiles | 0 | 2 |
| mammals | 0 | 1 |
| TOTAL: | 516 | 3,314 |

Taxa Table prepared by Becky Nichols
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Mycoblitz a Great Success

Dennis Drehmel



Karl-Henrik Larsson collecting fungi.

Mycoblitz scientists came from all over the world. Countries represented include the United States and Puerto Rico, Belgium, Canada, England, Estonia, Finland, France, Norway, Sweden, Costa Rica, Mexico, and Slovakia



Rytas Vilgalys, Orson Miller, and Hope Miller in front of the Cosby House just before going to collect.



Pete Whelihan, Roz Lowen, and Sandy Scheine, in the Greenbrier field station where lab work was done.

All photos by the author.

In the tradition of the butterfly blitz and the beetle blitz, mid-July saw the meeting of approximately 30 Ph.D. scientists in Great Smoky Mountains National Park (GSMNP) to conduct a fungal blitz. The original plan, conceived over three years ago, was modest and called for one team of a dozen scientists to come early for a Mycological Society of America (MSA) meeting in Asheville and collect in GSMNP while based at Purchase Knob. Thanks to a recently successful grant application by Ron Petersen and Karen Hughes of the University of Tennessee, there was enough money to support two teams of scientists – one on each side of the Park. The Tennessee group was referred to as the University of Tennessee team, and the North Carolina group, which had to be moved from Purchase Knob to Cosby, became known as the Cosby team (See next article).

The focus of the University of Tennessee team was on gilled mushrooms, while that of the Cosby team was a broader approach that included mushrooms with pores (no gills) and mushrooms with neither pores nor gills. Thousands of collections were made, to be taken back to research labs for intensive analysis. Preliminary analysis of the pored mushrooms found on dead wood indicates that new genera as well as many new species will be identified.

Another preliminary finding concerns mushrooms that can be very small and do not look like what most people would expect. Rather than having their spores on a pedestal, such as the gilled mushrooms (basidiomycetes), these mushrooms have their spores in sacks or asci (plural of ascus); hence they are known as ascomycetes. Species in this group can grow on acorns, magnolia seed pods, burnt wood, on the ground, and on other fungi and insects. In addition to confirming the presence of species from many genera (i.e., *Chlorociboria*, *Daldinia*, *Hypomyces*, *Leotia*, *Microglossum*, *Otidea*, *Scutellinia*, *Spathularia*, *Xylaria*, *Wynnea*), many overlooked tiny mushrooms were collected that should lead to species newly reported to the Park and perhaps species new to science.

A highlight of the mycoblitz was the collection of unusual species that are only rarely found in the Park, for example, a blue amanita. *Amanita* is a genus often recognized because some species have warts on the cap, but blue is an uncommon color for mushrooms and very uncommon for amanitas. Collection of this specimen will provide tissue for DNA testing so as to place it in the proper systematic relationship with other members of its family. Also unusual was the collection of *Gloeocantharellus purpureus*, which is the only mushroom to be considered for listing on the endangered species list.

Mycological studies generally require intensive microscopic examination, which will be necessary before any final conclusions can be reported. However, it appears at this time that future reports will be confirming exciting new finds in the Smokies!

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Mycoblitz: Beating the Weather

Ron Petersen and Jean Lodge

As the month ended, the *Knoxville News-Sentinel* newspaper lamented about the fifth wettest June on record. Nearby campground owners cried the blues as day after day brought afternoon thunder-showers. But a small band of renegades was pleased, and as the pattern continued into July, they began to gather for a unique event called, appropriately, the "Mycoblitz." The intent was to take a "snapshot" census of the mushrooms and other fungi fruiting in Great Smoky Mountains National Park over a short period (July 12-14, 2004), and to augment the fungi records for the ATBI. Rain and warm weather generally bring out a flush of mushrooms, so the wishes of participants were answered.

Professional mycologists and amateur mushroom hunters descended on Knoxville, where Karen Hughes and Ron Petersen led "Mycoblitz I", operated out of the University of Tennessee (UT). Another, larger group of 40 professional, amateur, and student mycologists (including the Asheville Mushroom Club and two volunteers from DLIA) gathered at the Cosby campground and the new UT Greenbrier Field Station, where "Mycoblitz II" was housed. The third group of seven, led by Steve Rehner and Joey Spatafora, specialized in *Cordyceps* fungi, and converged on the Cosby motel later the same week after searching the Cataloochee area of the National Park. There was a total of 70 participants in the three groups, many of which were world experts on certain groups of fungi, ranging from tiny, obscure black dots on rotten wood, brown spots on leaves, thin crusts on the undersides of logs, woody shelves on dead trees, to the many shapes and colors of organisms recognizable as mushrooms.

The groups were international in profile. Some mycologists were already familiar with the diverse fungi of our southern mountains, while others were exposed to this rich resource for the first time. While collecting took place over only three days, the specimens will furnish material for study for months and years to come.

The "snapshot" revealed over 200 species which were immediately recognizable; a number which may be as much as 10 times higher after all identifications are in. All species are included in a database which will become part of the Park inventory. Some of the species collected were rare finds (e.g., the waxcaps, *Hygrocybe purpureofolia*, and *H. appalachianensis*), and at least one was a species new to science (*Tomentella* n. sp., found by Urmas Koljag of Euston). Once collected, specimens are preserved by drying, and within a few days, these preserved specimens will be distributed to workers all over the globe. In addition to names and voucher specimens, the experience has already spawned new interest to revisit the area by some mycologists (especially the international folks) and perhaps to repeat the event. If this should happen, mycologists will again lobby for a rainy June. Campground owners stay in touch!

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Catherine Aime sorts collections.



Coleman McCleneghan explains mushrooms. Ron Petersen in background.



Meredith Blackwell examines a specimen.

Results of the Smokies 2004 Lepidoptera Blitz

Dave Wagner

At 3:00 pm on 19 July, 2004, we poured out of the Sugarlands Training Room and fanned out to the far reaches of the Park. Our odd collecting gear, sheets and traps illuminated with mercury vapor bulbs and blacklights, were set out at more than 40 trapping stations, representing the Park's many elevations, plant communities, and forest types. The night's treasures—moths, legions of the night—were brought to Sugarlands by 8:00 am to be sorted, identified, counted, databased, and vouchered over a non-stop two-day effort. It was a focused full-throttle effort fueled by endless cups of coffee and donuts, and by the time the dust and scales had cleared on Wednesday afternoon, the sleep-deprived 40-member team had recorded and vouchered 795 moth and butterfly species.

In addition to the 10 pre-assigned taxonomic working groups (or TWIGS), volunteers and scientists were assigned to four additional teams. The geo-referencing and databasing team, headed by DLIA's Chuck Cooper and intern Jessica Brown, received and mapped all blacklight trap collections as soon as they entered the Sugarlands facility—the team also generated archival museum labels for all vouchers.

The DNA team, headed by Dr. Paul Hebert from the University of Guelph, collected single leg samples from definitively determined specimens for subsequent DNA extractions. Hebert has committed to sequencing a 700-base pair section of each moth's mitochondrial genome (COI). We estimate that sequences for some 1,000 individuals representing 642 moth and butterfly species will be posted on his "Barcodes of Life" website by September 2004 (www.barcodinglife.com/).

Rene Twarkins, a team of one, headed up the image capture effort. He worked non-stop to image more than 500 of the DNA vouchered insects, all of which will be loaded onto Hebert's website. For many species of microlepidoptera, his images will be the first and only of these species available in any printed or digital form. The cryo-preservation team, headed up by Marcia Jumblatt (University of Louisville), archived tissue from over 300 species of GSMNP Lepidoptera. These have since been deposited in the Ambrose Monell Collection for Molecular and Microbial Research, where they will be available to anyone who wishes to use the tissues.

The blitz yielded 24 new Park records, including two new family records: Opostegidae and Epipyropidae. The latter is an especially odd creature, being the Park's only ectoparasitic moth—its larvae feed externally on the bodies of plant hoppers and cicadas! Also, the beautiful olive hairstreak butterfly was added to the list. The team was struck as much by what it found as what it didn't—for example



Jeanie Hillen

Tommy Allen and Robert Pyle at the sorting table.



Ron McConrthy/Aronsha

Student Conservation Association intern Valeria Taylor (L) assists Marcia Jumblatt prepare specimens.



Jeanie Hillen

DNA team headed by Paul Hebert from the University of Guelph.

the intensive, 40-person effort failed to add any new geometrid (inch-worm), slug, silk, or tiger moths. Only a single hawkmoth, the day-active hummingbird-sphinx, was added. The consensus among the scientists was that the moth and butterfly checklist for GSMNP is near completion for larger moths and butterflies, at least for mid-summer species.

The blitz added yet another new dimension—two famous authors were invited to participate: Paul Opler, author of the Peterson Field Guide to Eastern Butterflies and several other books on butterflies, and Robert Pyle, author of the Audubon Field Guide to Butterflies and more than a dozen other books. Pyle is regarded to be the founding father of the “butterfly watching” movement in the US as well as the founder of the Xerces Society, an international society committed to the conservation of invertebrates. His book Wintergreen recently won a John Burroughs Medal for nature writing. Pyle presented a splendid public lecture and is planning to write an article on the 2004 blitz for Orion Magazine.

We are especially pleased about this year’s student participation. Travel honoraria were provided to 15 students with interests in lepidopteran systematics—the youngest of which were two extremely knowledgeable high school students: Craig and Ian Segebarth, who may have known more Appalachian moths by name than any of the graduate students in attendance. The 16 or so hours logged by most of the participants in the Sugarlands Training Room proved to be incredibly fertile times for the exchange of taxonomic knowledge, life history data, and other biosystematic information—one could scarcely hope to have a better venue for the wholesale exchange of knowledge among fellow lepidopterists.

With the support of the GSMNP Resource Education Division’s Scott Pardue, six “Patio Talks” were presented to the public by Tommy Allen, James Adams, Brian Scholtens, and Sybil Bulchellit. These show-and-tell programs drew

| Taxa Group | Total Species | Undescribed Species | DNA Vouchered Species | New Park Records |
|-------------------------|---------------|---------------------|-----------------------|------------------|
| Butterflies | 42 | 0 | 38 | 1 |
| Primitive Moth Families | 57 | 2 | 13 | 2 |
| Micro-moth Families | 9 | 0 | 3 | 2 |
| Moth Superfamilies: | | | | |
| Gelechioidea | 96 | 2 | 78 | 10 |
| Tortricoidea | 66 | 0 | 50 | 1 |
| Zygaenoidea | 21 | 0 | 17 | 2 |
| Pyraloidea | 116 | 1 | 105 | 3 |
| Geometroidea | 103 | 0 | 88 | |
| Bombycoidea | 32 | 0 | 30 | 1 |
| Noctuoidea | 253 | 4 | 220 | 2 |
| Totals | 795 | 9 | 642 | 24 |

dozens of Park visitors, eager to learn about the fascinating world of moths, butterflies, and other insects, as well as to find out about the ATBI.

The tired and spent scientists, students, and staff and volunteers who trickled out of Sugarlands on Wednesday afternoon left with a tremendous sense of accomplishment: all left better lepidopterists, the Park list had grown by 24 species, more than 300 adults had been cryo-preserved, 500 adults had been imaged, and more than 4,000 specimens saved as permanent vouchers. Over the ensuing months, 642 species will be sequenced and thousands of specimens will be databased for the Park. By all accounts, this blitz proved to be a winning blend of collecting, science, training, and outreach.

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Calliphrys gryneus, the olive hairstreak butterfly.

Dave Wagner

Lepidoptera Blitz at Acadia National Park

David Manski

On June 12-14, 2004, the National Park Service, the Maine Entomology Society, and the Maine Forest Service hosted 35 professional and amateur entomologists who volunteered 1,492 hours to conduct the first-ever moth and butterfly blitz at the Schoodic District of Acadia National Park, Maine. The 2,400 acre Schoodic Peninsula is the only part of Acadia National Park located on the mainland - the remainder of the Park consists of numerous offshore islands. Schoodic boasts granite headlands, rocky intertidal habitats, coniferous forests, and elevations ranging from sea level to 440 feet. Participants sorted/identified specimens (and were housed and fed) at the Park's Schoodic and Education Center, one of 13 National Park Service Research Learning Centers.

Preliminary results from the blitz recorded 18 butterfly and 128 moth species plus another 20-30 additional moth species which will require additional taxonomic work. One of these species is possibly undescribed. Considering that the blitz took place during late spring/early summer and that night-time temperatures were in the mid 40's, participants were very pleased with the recorded species diversity.

We had two very qualified taxonomists leading the blitz: Brian Scholtens from the University of Charleston, SC, and Reggie Webster from Fredrickton, New Brunswick, Canada. The event was extensively covered by local media, including filming by the Maine Public TV science series "Quest". They will be producing a program on our blitz for broadcast next winter.

To date, vouchers of about 80% of the collected species have been deposited in the William Otis Sawtelle Collections and Research Center, and Acadia National Park's museum collection facility. Given the interest and success of this blitz, Park staff and the Maine Entomology Society are hoping to conduct future annual collecting efforts for Lepidoptera and/or other invertebrate species at Acadia National Park.

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Lepidoptera Blitz participants sorting.



Artistic scientist preparing a watercolor.



Brian Scholtens sorting.

National Science Foundation Funds Research Experience for Teachers

Trish Smith

Recently, I was invited by Harold Keller of Central Missouri State University to apply for a supplemental Research Experience for Teachers grant to accompany his NSF grant entitled "Biodiversity and Ecology of Tree Canopy Biota in the Great Smoky Mountains National Park." I am a seventh grade life science teacher from Warrensburg, Missouri. With the cooperation of Discover Life in America, my husband Stan (also an educator) and I stayed at Cosby during late June and began what can only be called an exciting field experience in GSMNP!

We began documenting Keller's research project in Warrensburg with interviews and photographs of the student climbers learning the double rope tree climbing technique, which was part of a tree climbing school. We also attended introductory seminars on entomology, ecology of the GSMNP, field techniques and tools, and sampling protocols. The days and evenings in the Smokies were filled with learning about the different organisms collected, exploring several locales of the GSMNP, acting as ground crew for the climbers, and documenting the procedures and experiences of the research team.

I was able to use this experience to increase my own knowledge of myxomycetes, lichens, and insects, and to broaden my field research skills. It was an exciting beginning to learn how to locate and recognize myxomycetes in the field! I am now working to create a two-tiered website that will allow worldwide access to the field experiences of tree canopy research and also allow my secondary students the opportunity to conduct parallel field research in our outdoor laboratory at Pertle Springs near the University campus. The website activities will mirror the three phases of Keller's original project: the Adventure Phase, the Laboratory Phase, and the Publication Phase. Anyone who visits this future website will be able to experience a virtual I-ADVENTURE of tree canopy research and get a good understanding of what the ATBI is all about. Interested student groups can then choose to continue to the second tier of the web activities and conduct similar field research in their region.

Back at Pertle Springs, my seventh grade class will be collecting bark samples from living trees and will install flight intercept traps to collect insects. Moist chamber cultures of bark samples will enable students to observe a living miniature ecosystem composed of myxomycetes, fungi, lichens, mosses, liverworts, algae, cyanobacteria,



Trish Smith

Millipede feeding on *Tubifera ferruginosa*.



Trish Smith

Central Missouri State University students climbing to the canopy.

myxobacteria, tardigrades, insects, nematodes, and possibly other invertebrates. This website experience will encourage other secondary students, in Warrensburg and beyond, to choose some form of field biology as their future career.

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*Masters degree students are still needed for this project. For more information contact,
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DLIA Summer Interns: Tales from Two Jessicas

Greetings! My name is Jessica Brown and I was an intern this summer for DLIA. Reflecting back on the summer, I would like to tell you about myself and my contributions to DLIA and the ATBI. I came as an intern for DLIA through the Joint Institute for Energy and Environment (JIEE), which was established by Oak Ridge National Laboratory in conjunction with the Tennessee Valley Authority and the University of Tennessee to collectively do research. As a recent graduate from Miami University (Oxford, Ohio) with a B.A. in Geography, my interest lies in natural resource management. By working under both DLIA and the Park Service (Vegetation Management staff), I have had the opportunity to see the inside operations of environmental management from both a non-profit and a federal agency perspective.

I have had the chance to work on both the Exotics and Hemlock woolly adelgid crews as part of the Vegetation Management staff which involved working in the field, database updates, and GIS digital formatting. The other half of my time was spent assisting with ATBI projects including Fern Forays, bio-quests and outreach programs. More specifically, my work for DLIA has included updating the fern database, going out on field days with scientists, making presentations to Tennessee Sierra Club delegates and school groups, as well as attending and presenting environmental decision-making seminars along with other JIEE interns from the southeast Tennessee area. This summer was my first time spending more than just a few days in this region and I enjoyed the opportunity to experience the environmental contributions of these valuable organizations.

Jessica Brown
JIEE summer intern
DLIA and GSMNP Vegetation Management

Howdy y'all! Well, at least that's how they say it in my neck of the woods. My name is Jessica Hoffman and I have had the pleasure of being one of this summer's interns for Discover Life in America. I'd like to tell you a little bit about myself and what I've been working on for the summer. I came to Great Smokies from Texas A&M University where I am a graduate student working on my Masters of Wildlife Sciences with an interest in

community-based conservation. I had heard about the great work that DLIA is doing and the scientific discoveries that are coming out of the ATBI, but what I was most amazed with was the tremendous volunteer force mobilized to make this work successful. At the top of my list of queries was, "How the heck do you get a community excited about slime molds, fungi, bugs, lichens, and all the other creepy crawlies that make up the biodiversity of the Smokies?" So, I figured I'd come see first hand just how it's all done. Well, I'm certainly glad I did. Not only did I see how to get a community excited, I got excited myself and learned a great deal. So, after talking with Jeanie Hilten, we came up with a plan of action for my internship.

Because of the interest that other parks are starting to exhibit about doing their own inventories, it was decided that a resource manual about how to conduct an ATBI would be an important contribution. This resource manual will include chapters on all the different aspects that are required to successfully run an ATBI. The primary goal is to pass on the knowledge that the Smokies and DLIA have gained thus far about what has worked and, just as important, what has not worked, so that other interested parks can learn from our experience and not re-invent the wheel. Although a manual of this scale is a large project and not something that can be completed in one summer, I was able to get a good start in collecting background information. I had the chance to interview many board members, volunteers, Park staff,

researchers, and other participants to get their views about how the ATBI has gone so far. I also sent out a survey to parks that have expressed interest in inventorying, to get their thoughts on what questions and concerns they would like to have addressed with a manual. I was able to explore a lot of the documentation and records that have been collected through the years and really get a feel for the complexity of such a program. By far, the best part of my experience here was participant observation through the various events of the summer. I was able to meet so many great people and learn about the ATBI process. Thanks to everyone who helped me in my quest, and keep searchin!

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Jessica Brown and Jessica Hoffman

Kenneth Davis, Jr.

Mayfly (Ephemeroptera) Diversity in the Great Smoky Mountains

Luke M. Jacobus and W. P. McCafferty

As part of our inventory of mayflies, seasonal sampling trips were made during May, June, August, September, and December. Also, we have received samples taken in additional months by volunteers and other entomologists. Presently, we have confirmed the presence of 112 species representing 36 genera and 12 families (Ameletidae, Baetidae, Baetiscidae, Caenidae, Ephemerellidae, Ephemeridae, Heptageniidae, Isonychiidae, Leptophlebiidae, Neoephemeridae, Potamanthidae, and Siphonuridae). Here we highlight some genera with the greatest diversity in the Park. For more general information about mayflies, see our article in the Winter 2003 issue of the *ATBI Quarterly*.

Species of the genus *Ephemerella* (family Ephemerellidae - spiny crawler mayflies) fill a range of niches in flowing water habitats. The genus is distributed throughout North America, Europe, and Asia, with a center of diversity in the Blue Ridge Mountains of the Southern Appalachians. Material collected during the ATBI was therefore of critical importance to a recent taxonomic revision of this genus in North America. Seven of the ten known eastern North American species (a much smaller number of valid species than previously thought) have been identified from the Park. Large numbers of *Ephemerella subvaria* larvae (pictured) can be collected from Deep Creek and Abrams Creek during the fall and winter months. It is one of the first species to emerge in the springtime and has long been a favorite of early-season fly fishers.

Adult males of the genus *Isonychia* (family Isonychiidae - brushlegged mayflies) have been dubbed White-gloved Howdy's because of their white tipped forelegs, although fly fishers more commonly refer to these moderately sized mayflies as Mahogany Duns. Larvae frequent stream and river riffles where they face into the current and use hairs on their forelegs to filter out small food items. The genus is known from North America and Asia. One notable Park record is *Isonychia hoffmani*, known previously from only a few locales in Virginia and West Virginia.

The genus *Maccaffertium* (family Heptageniidae - flatheaded mayflies) recently has been raised from subgeneric status under *Stenonema*. Species are moderate to large in size and are among the most common mayflies in eastern North America. The extremely flattened, sprawling larvae often are found on the bottoms and sides of rocks and debris in slower reaches of streams. The genus is endemic to North America, and 11 of the 16 species have been confirmed from the Park.



W. P. McCafferty (photo from slide)

Ephemerella subvaria, male larva.

Larvae of the genus *Plauditus* (family Baetidae - small minnow mayflies) are adapted for residing on mixed substrates in moderate to fast currents. They are sleek and highly streamlined in shape, and are referred to as "two-tailed nymphs" because their middle tail is greatly reduced. They usually are less than 5 mm long. The winged stages sometimes are referred to as Blue-winged Olives. *Plauditus* is endemic to North America, and a concentration of diversity is found in the Park and surrounding areas. *Plauditus* species are among the most difficult mayflies to identify. Perhaps a comparative study of these mayflies in Great Smoky Mountains National Park will provide clues for improving their taxonomy.

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Visit MAYFLY CENTRAL on the World Wide Web:
(<http://www.entm.purdue.edu/entomology/research/mayfly/mayfly.html>)



ATBI-DLIA Calendar of Events Fall/Winter2004

Jeanie Hilten



As fall begins, there are four programs related to the All Taxa Biodiversity Inventory presented by DLIA, the Park, or our Partners. Mark these events on your calendar and stay tuned for more details about our Annual Conference, which will be held during the first week in December. See the website at www.discoverlifeinamerica.org or www.dlia.org. For more detailed information, to learn about DLIA's volunteer "project teams", or to sign up for activities, contact Jeanie Hilten, 865-430-4752 or Jeanie@dlia.org

Friday, September 17—Sunday, September 19: High School Science Consortium at Great Smoky Mountains Institute at Tremont. High school student groups (grades 9-12) and their teachers will gather at Tremont to conduct real research in the national park. Call 865-448-6709 to register and for more information or visit www.gsmit.org.

Friday, September 24—Sunday, September 26: Tennessee Environmental Education Association (TEEA) Annual Conference. Theme: "BIODIVERSITY—Everything Counts". Paris Landing State Park, TN. For more information contact Gina Harris, 901-685-1566, ext. 110, or Education@memphisbotanicgarden.org.

www.dlia.org

Sunday, November 7: Fall Volunteer Potluck Picnic. Noon-6:00pm. Great Smoky Mountains Institute at Tremont. Discover Life in America volunteers, scientists, and Park staff and partners gather for a fine fall afternoon to enjoy good food and fellowship. Stay a while later and sit around the campfire! DLIA will provide hot dogs, burgers (including veggie), and drinks. RSVP to Anne Ramsden, 865-430-4756 or anne@dlia.org. Bring a covered dish or dessert to share.

December 7—10, 2004: ATBI/DLIA Annual Conference, Glenstone Lodge, Gatlinburg, TN. Our keynote speaker this year is renowned oceanographer and National Geographic Society Explorer in Residence, Dr. Sylvia Earle, <http://www.literati.net/Earle/index.htm>. She will be speaking in Friday, December 10. General sessions will be December 8 (Friday, December 9). There will be a Pre-Conference workshop on database and GIS on Tuesday, December 7. The DLIA Board meeting will be Saturday, December 11 at the GSMNP Sugarlands Training Room. Make plans now to attend this exciting gathering and find out about the fascinating research and education that took place over the last year. There will also be the silent auction, socials, and a pre-conference workshop on a topic of interest. Keep an eye on the website for more details and to register: www.dlia.org

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