

ATBI QUARTERLY

Great Smoky Mountains National Park, The Natural History Assoc., Discover Life in America, and Friends of the Smokies



Susan Farmer demonstrated the DLIA website to biologist David Porter.

DISCOVER LIFE IN AMERICA ATBI MEETING SUMMARY

Thanks to the partnership of Great Smoky Mountains National Park, Discover Life in America, Friends of the Smokies, and the Great Smoky Mountains Natural History Association, the December 19-20, 2000, ATBI annual meeting was a fine forum for scientific reports, educational presentations, lively discussions among project participants, and exhibits of Park biodiversity. Over 80 attendees came from throughout the nation and included university scientists and researchers, Park

Service and Forest Service scientists and staff, DLIA board members, college and high school students, educators, photographers, and interested citizens.

Session topics included ATBI research done on aquatic worms (Mark Wetzel), earthworms (Sam James), slime molds (Steve Stephenson), mammals (Don Linzey, Ed Pivorun, Michael Harvey), wasps (Elizabeth Skillen) and Lepidoptera (Dave Wagner). There were summaries and exhibits of projects such as the study and mapping of soils (Anthony Khriel), vegetation (Mike Jenkins), and geology (Scott Southworth), work at the Cosby Sorting Center (Becky Nichols and Ian Stocks), the operation of the overall ATBI database (Norm Johnson), DLIA's website (John Pickering), and other reports from Taxonomic Working Groups (Mike Sharkey, David Porter, Rich Harrington).

The ATBI plot work of the USGS Biological Resources Division was reviewed by Chuck Parker. A visit to the Park archives was arranged and led by Don Defoe. Discussion of current and future funding opportunities included the NPS Vertebrate Study (Keith Langdon), the DLIA Mini-Grant program (John Morse), and upcoming funding prospects (Frank Harris, Charles Maynard, George Ivey, Keith Langdon).

The Importance of education to the overall ATBI effort was highlighted by Park Resource Education staff (Karen Ballentine, Susan Sachs), Great Smoky Mountains Institute moth studies (Paul Super), and Glen Este High School's Ecology Club. These young people with their teacher Jon Souders braved the snow and ice to travel from Cincinnati to attend and share their work on caddisflies.

Volunteer photographers Kevin Fitz Patrick and Kemp Davis documented the programs and a DLIA proposed Volunteer Plan was presented by Jeanie Hilten. Many volunteers helped in the planning and running of the Conference. Exhibits were an excellent asset to the meeting. Susan Farmer arranged for internet access and a poster chart displayed her ATBI inventory status website.

Participants were made comfortable and welcomed by the employees of the Glenstone Lodge which gave a discounted rate to the meeting attendees in order to support the Park and ATBI efforts. There was opportunity for social time, music by the "Woodpickers," and exchange of ideas throughout the conference. Everyone seemed to benefit from the chance to recharge batteries, get up-to-date on the latest research, and prepare for future exciting ATBI projects.



Karen Ballentine and Mike Maslona reviewed The Purchase exhibit.

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As you will see elsewhere in this issue, the annual ATBI meeting was a success. Rather than just talking about how to conduct an All Taxa Biodiversity Inventory, we heard one report after another addressing what is actually being done! My hat is off to all the scientists, students, lay volunteers and Park personnel who are bringing substance to what was but an idea a few years ago. How many species are there in the Smokies? We don't know but we'll get our first preliminary idea at the next ATBI meeting (Winter 2001) when Chuck Parker (USGS-BRD) presents results of one year of systematic sampling. Estimating how many species there are is important to developing accurate projections of time and funding needed to complete the ATBI. It is clear that we have a critical mass of dedicated people who want this bold vision to succeed.

A major topic of the December, 2000, DLIA Board meeting was raising the money to truly accomplish the ATBI. We talked about just how much money it will take to realize the vision. Relying on grant funds alone is not a successful, long-term strategy, the realities that many of us know to be the norm for science funding agencies.

From our discussions, the Board made some important financial decisions. First, we will commit resources this year to hire a fund-raiser— someone who wakes up every morning with the desire and purpose to seek support for DLIA. A job description is being developed. If you know of potential candidates for such a position, please contact Charles Maynard <fotsdir@icx.net>.

A second change in direction is the DLIA Board composition. Discover Life in America needs new expertise not thoroughly represented on the Board — marketing, finance, contact with major philanthropic organizations and so forth. Therefore, at the May 18, 2001, Board meeting we will expand the Board to invite other members who have an interest in the mission of biodiversity and conservation education but who also bring skills, contacts, and insights from the development, business, and financial sectors. I invite you to seek out such individuals, discuss the ATBI with them and bring their credentials to the attention of any Board member, but particularly Mike Sharkey who chairs the Board's Nominating Committee.

I am confident that with these changes — a person with direct responsibility for fund raising and a Board composition with requisite development and financial expertise — we can move forward to realize our vision for the ATBI.

MISSION STATEMENT

Discover Life in America will develop a model for research in biodiversity. DLIA will use this knowledge to develop and disseminate information to encourage the discovery, understanding, preservation and enjoyment of natural resources.

ANOTHER GREAT IDEA

Jeanie Hilten, DLIA Administrative Officer

The remarkable vision and tremendous task of an All Taxa Biodiversity Inventory is possible today in large part because of farsighted efforts of people who had another great idea: the establishment of America's National Parks. The special heritage and link to this inspired conservation movement has allowed those who care about the protection of all components of the natural environment to say, "It can be done!"

One hundred and sixty-five years ago, painter George Catlin, famous for his western landscapes and vivid scenes of Native American life, was taken with an idea. As he roamed the Great Plains, encountering and expressing on canvas the vastness, wildness, and beauty of the American continent, Catlin was concerned that these bold elements of our heritage would disappear. His vision was for "a Nation's Park" where the grandeur of his beloved west would be protected from exploitation and expansion.

In 1869, John Wesley Powell explored the rampaging Colorado River in flimsy boats, and John Muir began climbing into the heart of the Sierra Nevada. A territorial survey party traveled in the amazing Yellowstone country and around a campfire one night the outdoorsmen shaped a vision of National Parks.

Soon, these early sparks found some good tinder and the National Park movement truly caught fire. In 1872, Yellowstone was set aside by Congress as "a public park or pleasuring ground for the benefit and enjoyment of the people." But how to manage these places? In 1916 the National Park Service was born to "conserve the scenery and wildlife therein and provide for the enjoyment of the same... by such means as will leave them unimpaired for the enjoyment of future generations."

Great Smoky Mountains National Park was established from over 6,000 different private parcels of land not an easy task! There are now over 350 National Park units in the United States. They are as diverse as our society and protect much more than scenery. Of course, legal dedication is only one aspect of protection. Parks are continually threatened by many of the things that damage our environment as a whole: over-population, air and water pollution, resource abuses at the borders of the park, exotic pests, and our lack of understanding of complex ecosystems. This last threat is one that we are obligated to correct in order to conquer the others. We believe the ATBI is the best way to accomplish this.

When scientists, students, teachers, naturalists, and others who love the Great Smoky Mountains National Park visit this natural wonderland, they also are walking into a dream — one which became a reality from the union of vision and action. Who knows what challenges the future may hold? The All Taxa Biodiversity Inventory's scientific and educational work within these green forests and wild mountains will generate better stewardship based upon vastly expanded ecological comprehension. What a great idea!

CALL FOR ATBI RESEARCH GRANT PROPOSALS

John C. Morse, Clemson University

Fifty thousand dollars is allocated for research activities in support of Great Smoky Mountains National Park's All Taxa Biodiversity Inventory (GRSM's ATBI) for the current funding cycle. This is a call for proposals for research grants to be awarded for work during the upcoming (2001) field season. Award amounts will generally be \$5,000 or less. Please submit a short (500-word) proposal outlining what you would do at that level of funding and why, including how the funds would be spent (i.e., a budget), research objectives, and expected products (e.g., webpages, keys, checklists, etc.). Please indicate, also, any assured or anticipated funding (actual dollars or "in-kind" support) that will be leveraged by a DLIA grant award.

DLIA policy does not permit use of these funds for purchase of equipment or for payment of indirect charges. Proposals are more likely to be successful if they are fully integrated with the DLIA Science Plan, available on the DLIA website <http://www.discoverlife.org/>.

Note that if your proposal is funded, a written and oral report of your results to date should be provided at the Winter 2001 annual meeting of the ATBI, with a final report by 1 May 2002. Proposals from previous grant recipients will be evaluated in part on their provision of products promised in earlier awards including reports and data from those awards for the ATBI annual meeting, the ATBI website, and the ATBI database.

To conduct research in the Park, a collecting permit is required. For an application contact Janice Pelton grsm_research_permits@nps.gov.

Your proposal should be sent electronically as e-mail text and as an MS Word attachment to me at jmorse@clemson.edu by 15 February 2001. If awarded, the funds will be made available to you beginning on or about 1 April 2001. Coordination and additional information may be obtained through Jeanie Hilten jeanie@discoverlife.org. We look forward to receiving your proposals and to working with you to complete the ATBI.

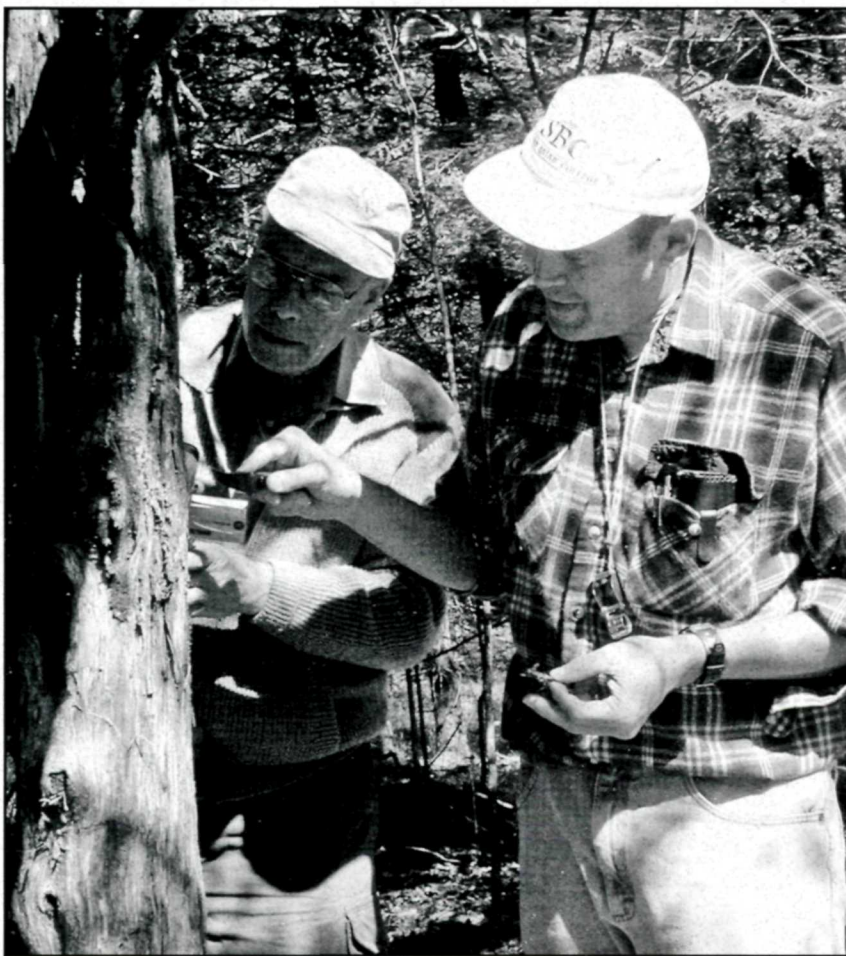


Photo courtesy of Steve Stephenson

David Mitchell (from England) and Steve Stephenson collecting myxomycetes from the bark of a tree in Cades Cove.

SLIME MOLD ODYSSEY

Steve Stephenson

A decaying log or stump would seem an unusual place to look for one of nature's most extraordinary creatures. However, for the past three years, throughout Great Smoky Mountains National Park, such habitats have been subjected to intense scrutiny by scientists who have come from as far away as Germany, England, and Russia. These scientists, along with their counterparts from a number of institutions here in the United States, are all working towards the goal of carrying out as complete an inventory as possible of one of the lesser known but also one of the more fascinating groups of organisms found in the Park—the slime molds.

Slime molds, or myxomycetes, as biologists call them, may not have a particularly attractive name, but members of

the group produce fruiting bodies that exhibit incredibly diverse forms and colors and are often objects of considerable beauty. Most myxomycete fruiting bodies are small, reaching no more than a millimeter or two in height. Although large enough to be seen with the naked eye, they are best observed with a hand lens or under a stereomicroscope. Only then can their intricate nature be fully appreciated. Fruiting bodies may take the shape of tiny goblets, globes, plumes, or other shapes more difficult to describe. Some occur in tightly packed clusters, while others are scattered or even solitary. Many of the more intricate forms have a spore case held aloft on a delicate stalk, but others are attached directly to the substrate by their bases.

Myxomycetes have long intrigued and perplexed biologists because they possess characteristics of both animals and fungi. The fruiting bodies and spores produced by myxomycetes resemble those of many fungi, but some of their other attributes, including

the capability for locomotion, are normally associated only with animals. For most of its life, a myxomycete exists as a thin, free-living mass of protoplasm. Sometimes this mass is several centimeters or more across, and as the very name of the group suggests, viscous and slimy to the touch. The mass of protoplasm, which is called a plasmodium (plural: plasmodia), can change form and creep slowly over the substrate upon which it occurs, much like a giant amoeba. As it moves along, it feeds by engulfing bacteria and tiny bits of organic matter, another animal-like characteristic. Myxomycete plasmodia typically occur in cool, moist, shady places such as within crevices of decaying wood, beneath the partially decayed bark of logs and stumps, and in leaf litter on the forest floor. As such, they are not observed in nature as frequently as are the fruiting bodies.

After a period of feeding and growth, the plasmodium moves out of its normal habitat and into a drier, more exposed location. Here it gives rise to one or more fruiting bodies. This remarkable transformation from an animal-like to a fungus-like form seems more like some-

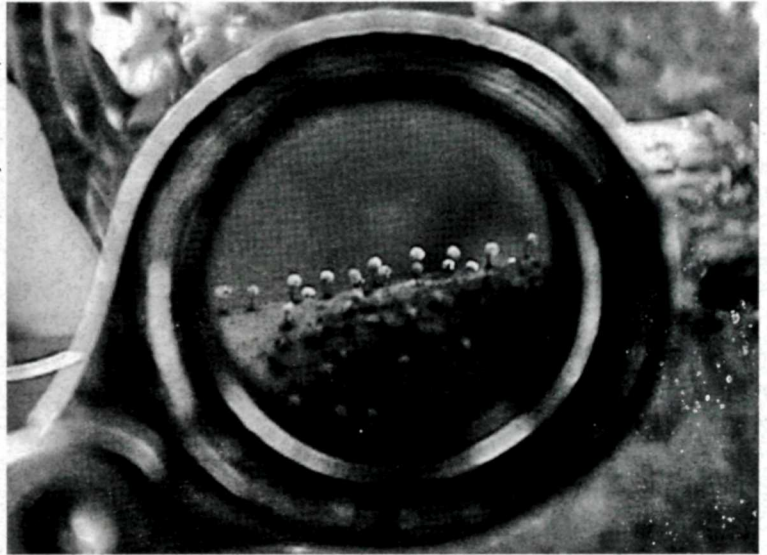
thing from science fiction than an actual science fact. Each fruiting body contains numerous spores, which are dispersed by the wind and, under suitable conditions, germinate—the first stage in the development of a new plasmodium.

Prior to the beginning of the ATBI, 92 different species of myxomycetes had been reported from the Park, and the majority of these records were based upon specimens collected more than a half century ago. In the past three years, more than 75 species have been added to this total. The most surprising finds are four species of myxomycetes not previously known from North America and two others that appear to be new to science. However, it is anticipated that there are many more species to be found. *In fact, based upon the results obtained thus far, Great Smoky Mountains National Park appears to be one of the world's "hot spots" for myxomycetes, with as many species present in the Park as anywhere else on earth.*

The myxomycetes are actually just one of three groups of organisms to which the name "slime mold" has been applied, and the inventory currently underway in the Park also includes these other slime molds—the dictyostelids and protostelids. Members of both groups are so small that they are virtually impossible to observe directly in the field. Instead, surveys for dictyostelids and protostelids are carried out in the laboratory by culturing these organisms from various types of organic material brought in from the field. The primary habitat for dictyostelids, or cellular slime molds, is the layer of humus that occurs between soil and the layer of leaf litter on the forest floor, whereas protostelids are found in the leaf litter itself and also in aerial litter (dead but still attached portions of plants above the ground). Twelve species of dictyostelids had been reported from the Park prior to the ATBI, and this total has been increased by two. There are no pre-ATBI reports of protostelids, a group of organisms unknown to science until 1959, from the Park, but recent surveys have yielded 21 species, including two that are apparently undescribed.

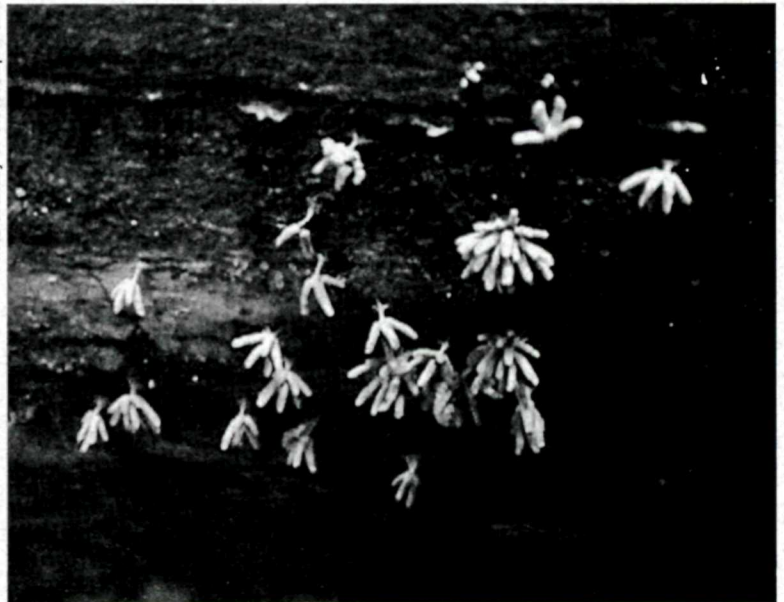
The book "Myxomycetes: a Handbook of Slime Molds" (originally published by Timber Press in

Photo courtesy of Steve Stephenson



A species of *Didymium* as viewed through a hand lens.

Photo courtesy of Steve Stephenson



Arcyria cinerea, a relatively common myxomycete in the Park.

1994 and reprinted as a paperback edition in 2000) provides a good general introduction to the myxomycetes, including methods used to study these organisms and keys to many of the more common species.

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LAND SNAILS OF THE GREAT SMOKY MOUNTAINS NATIONAL PARK

Dan Dourson



Vitrinizonites latissimus



© D. Dourson

The Great Smoky Mountains lie within an area described as the Cumberland, the most distinctive molluscan province in the eastern United States, which has several special genera (*Chappiella*, *Gastrodonta*, *Pilsbryna*, *Vitrinizonites*), and many endemic species. The Park's great range of altitude, plant communities, and soils are home to more than 100 species of land snails, of which several species are found nowhere else on earth.

The high peaks of the Smokies are shrouded in cool, moist air and are islands in themselves, harboring an array of land snails isolated by elevation. One such example, *Mesodon altivaga*, a beautifully banded endemic snail, thrives only in forests above 4000 feet. While the high elevation forests harbor many of the Park endemics, the lowland forests are home to most of the land snail diversity found within the Park. The richest sites are located in hardwood forests where limestone outcrops of rock occur. To date, the greatest assemblage of snails that has been found within the Park is located at White Oak Sinks, where Ron Caldwell (Lincoln Memorial University) collected some 25 species in a relatively small area. One snail found by Caldwell, *Paravitrea umbilicaris* is new to the Park.

Great Smoky Mountain National Park is home to the largest eastern land snail, *Mesodon chilhoweensis*, which can reach a shell diameter of more than 40 millimeters, slightly smaller than a silver dollar. In contrast, the smallest snail found in the Park, *Carychium nonnodes*, is around 1.3 millimeters and can easily crawl around on top of a pinhead. The surface of snail shells can range from smooth, glass-like surfaces such as exhibited in *Mesomphix andrewsae* to coarsely ribbed like *Anguispira mordax*, while some species like *Stenotrema altispira* surprisingly display short hairs that can cover the entire shell surface. Two species, *Haplotrema concavum* and *Haplotrema kendeighi*, both represent the Appalachian "tiger" of land snails in the Smokies. These snails are believed to hunt and eat other land mollusks. The Blue Ridge snail, *Vitrinizonites latissimus*, also known as the biting snail is a common resident of the Park and is unusual in that its shell is constructed of protein instead of calcium. If placed in your palm and left a few minutes, the snail will bite with its radular teeth, which are also used to obtain their food. The biting action is a defense thought to ward off would-be predators such as shrews. Other snail species like *Mesomphix perlaevis* produce unpleasant tasting mucus as a defense and still others like *Triodopsis denotata* have developed teeth in their aperture, which discourage snail-eating beetles. With all their defenses, land snails are still consumed by a large assortment of predators such as white-footed mice, red-cheeked salamanders, and wood frogs.

Land snail surveys conducted for the ATBI have added three species not previously known from the Smokies and possibly two species new to science. The list of new records is expected to increase many fold as more inventories are completed.

Dan Dourson
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**YES, I WANT TO SUPPORT
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AND THE ALL TAXA
BIODIVERSITY INVENTORY!**



*© Don McGowan,
Courtesy Friends of the Smokies*

**There's No Such Thing
As A Free Lunch**

Don't worry. He's not about to have a salamander sandwich. This student is helping out with the search for new salamander species in America's most visited national park. Whether it's volunteer work or financial contributions, the success of the All Taxa Biodiversity Inventory depends on generous individuals, businesses, and foundations. We hope we can count on your support!



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For more information on volunteer opportunities, call Jeanie Hilten,
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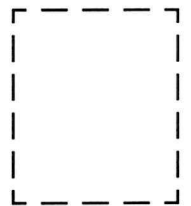
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Photo courtesy of Ed Pivorun

Carolyn Fernandez from Clemson University
baiting traps for Ramsay ATBI Site.

ATBI MAMMAL ACTIVITIES

Donald W. Linzey and
Christy B. Brecht

The Mammal Taxonomic Working Group (TWIG) consists of Dr. Donald Linzey (leader), Wytheville Community College; Ms. Christy B. Brecht, Wytheville Community College; Dr. Michael Harvey, Tennessee Technological University; Dr. Robert Keller, University of Tennessee-Chatanooga; Dr. Michael Pelton, University of Tennessee-Retired; and Dr. Ed Pivorun, Clemson University.

Primary emphases during the year 2000 were fieldwork and the prepa-

ration of web pages for each of the 67 species of mammals known to occur in the Park. Dr. Linzey and Mrs. Brecht sampled small mammal populations on Andrews Bald. No prior mammal trapping has ever been recorded at this site. They also sampled mammal populations in several unique habitats including bogs and marshy fields. Through their efforts the first meadow jumping mouse (*Zapus hudsonius*) in 65 years on the North Carolina side of the Park was recorded. In addition several populations of meadow voles (*Microtus pennsylvanicus*) were recorded. The only previous record of this species in the Park was a single individual taken by Dr. Linzey in December, 1965.

Dr. Harvey worked extensively with the Park's bat populations during the past year. Through his efforts a new species of bat, the evening bat (*Nycticeius humeralis*) was added to the mammalian fauna known to occur in the Park. Dr. Harvey has also discovered a maternity colony of endangered Indiana bats (*Myotis sodalis*) in the western portion of the Park. Dr. Keller has worked primarily in Cades Cove and on Gregory Bald. He will concentrate on sampling small mammal populations in the Twentymile area during the upcoming summer. Outside of Cades Cove, very little work has been done on small mammal populations of low elevations.

See Dr. Ed Pivorun's research report on page 8-9 in this newsletter.

Ed Linzey and Christy Brecht finalized a format for the mammal web pages and began having them put onto the web. Each account contains information concerning the description of the species, its national distribution, its Park distribution, its habitat, and information concerning its reproduction, ecology, longevity, predators, and parasites. Each account contains a national range map and color photograph (courtesy of Dr. Don Wilson) and a map of its distribution within the Park (courtesy of Richard Schulz, GRSM). Each account ends with a list of pertinent references. Five accounts are on the web <<http://www.discoverlife.org>> with 15 more in various stages of preparation. Intensified fieldwork and preparation of additional species accounts will occur during 2001.

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Christy B. Brecht
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Thanks to
DLIA Volunteers!

Just about everyone involved in the All Taxa Biodiversity Inventory makes volunteer contributions, going above and beyond their normal duties. Scientists donate expertise and hours of field and lab work; National Park, Friends of the Smokies, and Natural History Association staff work on extra projects; DLIA Board members give hours for planning, writing, meeting, and decision-making. These crucial efforts are on-going and much appreciated.

I'd also like to especially recognize some recent volunteers who have assisted with a variety of work this fall and winter.

Help with ATBI annual conference: Ruthanne Mitchell, Paul Super and Tremont Staff, Dick McHugh, Bob Hightower, Jim Burbank, Susan Farmer, Kevin Fitz Patrick, Kemp Davis; ATBI Field Assistance: Rebecca Schiflett, Bob Hightower; ATBI House Cleaning: Jim Burbank; Cosby Sorting Center/Taxonomy: Tom Rogers.

Gracias!

Jeanie Hilten



Photo courtesy of Ed Pivorun

The golden mouse, *Ochrotomys nuttalli*.

SMALL MAMMAL ATBI INVENTORY

Edward B. Pivorun

Small mammals are very important "keystone" species that provide a multitude of predators with nutrients, vitamins, protein, fat and carbohydrates. In addition, these warm-blooded vertebrates consume and influence populations of invertebrates, fungi, plants and other small vertebrates. Although, many laypeople recognize and appreciate the large and "charismatic" mammals such as the squirrels, chipmunks, foxes and bears, there is less knowledge of the importance of the small mammalian insectivores and rodents as indicators of the "health" or status of various terrestrial ecosystems.

I was fortunate enough to have been granted sabbatical leave during the initial year of the ATBI program in the Park. My own experiences in the mountains bordering the Carolinas suggested that small mammal inventory work in the Park would be very fruitful during the fall, winter and spring months.

Sherman live traps were used to assess the small mammal fauna of various ATBI plots from October 1999-December 2000. As of January 2001 over 799 captures have been recorded. Trapping (4-5 consecutive days) is performed with 49 Sherman live traps per site set out in a grid of 7 rows and 7 columns (30 ft between traps). Pitfalls are also placed in the plots to assess insectivore populations.

Trapping was initiated in October 1999 at the Twin Creeks, Indian Gap and Clingmans Dome ATBI sites. Both the Indian Gap and Clingmans Dome ATBI sites were re-sampled three times over the year. Twin Creeks supports a population of white-footed mice (50% of captures), deermice (36%) and short-tailed shrews (14%). The high altitude sites of Clingmans Dome (spruce-fir) and Indian Gap (beech gap) both support populations of deer mice (23% and 79% respectively), red backed voles (46% and 17%) and masked shrews (7% and 2%). In addition,

Clingmans Dome has a population of rock voles (14%) and smoky shrews (5%) and Indian Gap a population of short-tailed shrews (2%). This study is the first to document the presence of rock voles on Clingmans Dome. Although the Clingmans Dome ATBI site is characterized by a die-off of mature Fraser fir, the site displays a high degree of heterogeneity consisting of young firs and coarse woody debris. This environment supports a higher species diversity than the more open beech gap site. An exciting finding occurred last November when Steve Thomas (Wildlife Diversity Program, Kentucky Department of Fish & Wildlife Resources) joined me on the Clingmans Dome site for a survey of woodrat populations. Instead of woodrats, we trapped a male endangered northern flying squirrel on the ATBI site. This squirrel is Federally endangered, and although known from the Park, it was not known from this high up. It was measured and released and the US Fish and Wildlife Service contacted.

In December and January 2000, two undergraduate students from Erskine College, Jason Burkhart and Meredith Sexton, and one undergraduate student from Clemson, Carolyn Fernandez, joined me and became invaluable support personnel that allowed for intensive sampling of the Ramsay Cascade, Snake Den Ridge, Tremont, Goshen Prong, and Cades Cove ATBI sites. The Ramsay Cascade site (xeric oak/3000 ft) has a large population of deer mice (77% of captures) and smaller populations of white-footed mice (16%) and short-tailed (6%) and masked shrews (2%). Tremont (tulip poplar/1500 ft) displayed a similar species assemblage (69% deer mice/27% white-footed

mice/ 18% short-tailed shrews). Snake Den Ridge (hemlock/3300 ft) and Goshen Prong (cove hardwood/3000 ft) only yielded deer mice. The Goshen Prong ATBI site is considered a very "rich" cove hardwood ecosystem. We were surprised that our total number of mammals captured was very small compared to some fairly stressful environments such as the Clingmans Dome ATBI site. I believe that the low population densities at the Goshen Prong site are partly explained by the lack of coarse woody debris and understory. The grassland of Cades Cove (treeless old field/1700 ft) supports a population of least shrews and wild hogs that crave the taste of peanut butter and aluminum traps. The open forests adjacent to Abrams Creek harbor populations of white-footed mice, while the closed forests of Forge Creek and Rowan's Creek support large populations of deer mice and smaller populations of white-footed mice and short-tailed shrews.

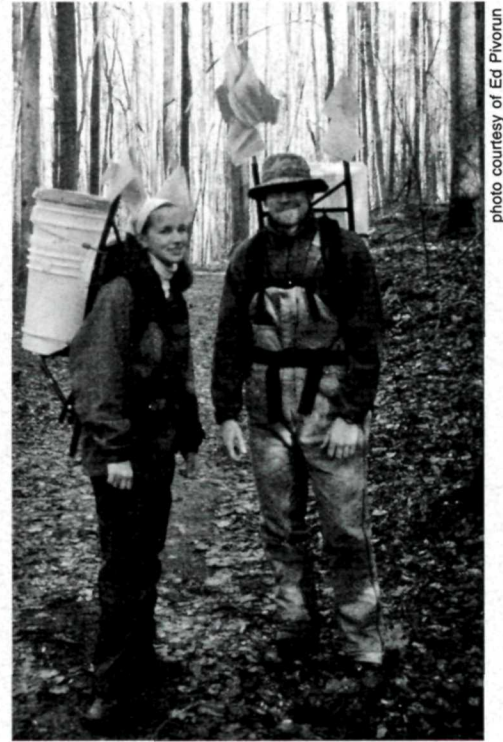
In February I trapped the Oconaluftee ATBI site (bottomland hardwood/2000 ft) and the wetlands adjacent to the Blue Ridge Parkway. The Oconaluftee site has a large population of deer mice (66%) and a smaller population of white-footed mice (34%). The wetland is populated primarily by white-footed mice and a small population of golden mice.

Our spring trapping efforts were concentrated on the Andrews Bald, Purchase Knob, Cataloochee and Mt. LeConte ATBI sites. Clay Guerry, an MS student at Clemson, helped me sample the bald proper (5800 ft) and the bog located on the bald. A mixed population of deer mice (33% of captures), red-backed voles (33%), rock voles (5%) and short-tailed shrews (26%) occupy the bald. We trapped

one golden mouse and several red-backed voles on the bog. This is the first study to document the presence of red-backed voles on Andrews Bald and establishes the highest known altitude for the golden mouse in the Park. I had the privilege of camping on the Purchase Knob property as a base camp for the sampling efforts of the Cataloochee (mesic oak/4300 ft) and Purchase Knob (northern hardwood/5000ft) ATBI sites. Both sites are dominated by the deer mouse.

In May, because of the efforts of Keith Langdon, I had the golden opportunity of using a helicopter and llamas to transport camping and trapping gear up to and down from the top of Mt. LeConte. The two ATBI sites on Mt. LeConte are designated spruce-fir vegetation types. In contrast to the Clingmans Dome site, these sites have a dense growth of blackberry, which tends to make trapping an "adventure." Using data from the Clingmans dome ATBI site, I predicted that the dominant species on these two sites would be the red-backed vole and deer mouse. Indeed, I found that both sites were dominated by the red-backed vole (69% and 63% of captures) and the deer mouse (15% and 25%). Rock voles and smoky shrews were also captured and short-tailed shrews were important components of the blackberry-dominated portions of these sites.

We plan to resample many of these sites and to place more pitfall traps at the sites to get a better understanding of the shrew populations. Sampling over the summer months will also allow us to determine the populations of woodland and meadow jumping mice. These small rodents hibernate and disappear from late fall to early spring.



Jason Burkhart and Meredith Sexton from Erskine College on trail to Snakeden Ridge ATBI site carrying traps and pitfall supplies.



Rock vole, *Microtus chrotorrhinus*

We need to mention that external parasites are also being collected on each species, and are being sent to ATBI parasitologists in Georgia, Virginia and elsewhere.

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ATBI RELATED DISCOVERY CENTER EXHIBIT OPENS AT OCONALUFTEE VISITOR CENTER

Susan Sachs



Cherokee Elementary School children examine insect display.



Students listening to interviews with ATBI biologists.



Photos courtesy of NPS

Girl opening Diversity Quilt exhibit panel.

On 10 January 2001, Great Smoky Mountains National Park officially opened the Discovery Center at the Oconaluftee Visitor Center, a new interactive, educational exhibit that focuses on the ATBI and the biodiversity of the Park. Among the colorful 8-foot high panels is a board updating park visitors on ATBI news and discoveries including a scorecard of species.

A highlight of the opening was watching students from Cherokee Elementary School in Cherokee, North Carolina interact with the exhibit. The children were engaged in viewing insect wings under a microscope, turning cranks to discover which animal group is the most abundant in the Park and lifting logs to see what lives underneath. Along with some students at Pi Beta Phi Elementary School in Gatlinburg, Tennessee, some of these students were involved in testing the activities before they were fabricated. For their input, the children were rewarded with Jr. Ranger badges.

The center was made possible by a unique partnership between the Coca-Cola Foundation, the National Park Foundation, the Friends of Great Smoky Mountains National Park, and the National Park Service. It is part of a national education initiative that is being funded through a \$1.5 million grant made possible by the Coca-Cola Foundation. The grant is enabling 12 National Parks across the country to provide visitors a distinctive interactive learning experience that brings to life each park's natural and cultural diversity. In addition to the original \$100,000 provided, the Friends of Great Smoky Mountains National Park provided an additional \$12,000 to complete the project.

As well as the funders, the Park wishes to thank the ATBI biologists and educators who assisted in making this exhibit possible. ATBI biologists Liz Raulerson, David K. Smith, Eugene Wofford, Dan Perlmutter, Ernie Bernard and Harols Keller were interviewed about their research work in the Park. Their portraits and recorded interviews contributed to the success of the Discovery Center Exhibit. Park officials encourage you to stop by the Oconaluftee Visitor Center to interact with the exhibit.

Susan Sachs, GRSM Park Ranger
susan_sachs@nps.gov

DRAGONFLY BIO-BLITZ AT CADES COVE

Jerrell J. Daigle and Ken J. Tennessen

The 2000 Southeast Dragonfly Society of the Americas (DSA) Regional Meeting was held in Cades Cove, Blount County, Tennessee, in Great Smoky Mountains National Park from 26-28 May. Twenty-two odonatologists from all over the East, participated in the meeting.

The purpose of the meeting was to inventory the dragonflies and damselflies of Cades Cove for the ATBI. Collecting was done in Cades Cove, mostly at the Cable Mill at Mill Creek. One of the Park staff, Ronnie Click, let us into the campground wastewater ponds which were literally teeming with dragonflies and damselflies!

We netted the following species: *Calopteryx maculata*, *Chromagrion conditum*, *Enallagma aspersum*, *E. civile*, *E. signatum*, *Ischnura hastata*, *I. posita*, *I. verticalis*, *Lestes disjunctus australis*, *Tachopteryx thoreyi*, *Cordulegaster bilineata*, *C. maculata*, *C. obliqua*, *Anax junius*, *Boyeria vinosa* (larvae), *Epiaeschna heros*, *Arigomphus villosipes*, *Gomphus exilis*, *G. lividus*, *G. rogersi*, *Lanthus vernalis*, *Hagenius brevistylus* (larvae), *Macromia* sp. (larvae), *Epithea cynosura*, *Ladona deplanata*, *Pachydiplax longipennis*, *Perithemis tenera*, *Plathemis lydia*, and *Tramea lacerata*. Not surprisingly, most are new county and GRSM records! Data from this survey will be used in conjunction with surveys done by Don Defoe (GRSM), East Tennessee State University's Dan Johnson, Bryan Reece, and others to compile a master ATBI list for the entire Great Smoky Mountains National Park. Specimens will be deposited in the Park museum.

My thanks to the rangers, Park personnel, Jody Flemming (formerly of DLIA), and all of you for making this meeting a very enjoyable and successful one! See you there next year for the fall dragonfly bio-blitz!

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WWW.DISCOVERLIFE.ORG

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WWW.NPS.GOV/GRSM/NHAHOME.HTM

CALLING ALL DISCOVER LIFE IN AMERICA VOUNTEERS:

As plans for the 2001 field season of the All Taxa Biodiversity Inventory get underway, we are recruiting interested people with the time, energy and desire to help. Volunteers are involved in many phases of the project, from assisting scientists in the field to education, photography, web page construction, computer and office assistance, range mapping, and ATBI plot tasks.

Discover Life in America is hosting a Volunteer Training Day, Saturday, March 10, 2001. You are invited to join us for a day of learning, fun and camaraderie, beginning at 9:00 am at Great Smoky Mountains Institute at Tremont, then an afternoon in the field at Twin Creeks Natural Resources Center or other ATBI locations.

Park staff and fellow volunteers will provide orientation to the Smokies and the ATBI, as well as training in specimen collection and processing, data management, photography, GPS, and other skills. There will be time to get to know each other and share our knowledge and interests.

Just bring a lunch, water, comfortable shoes or boots and something on which to jot down fascinating facts and figures! If you wish to attend, please RSVP to me by March 1 so we can plan accordingly. We'll look forward to seeing you!

Jeanie Hilten, Administrative Officer,
DLIA Ph. 865-430-4752
jeanie@discoverlife.org



NOTE TO AUTHORS

Thank you for contributing articles and illustrations to the newsletter. We sincerely appreciate your efforts to share your knowledge with us. The ATBI Quarterly newsletter welcomes short news stories/articles (from 200 to 700 words). Please send your text electronically as an e-mail and attach a MS Word 6.0 document. Drawings, photographs, charts or tables can be sent as B/W TIF files at 300 dpi.

Note: TIF images are generally large and take a long time to download from the Internet, so please send TIF files one at a time. A general rule is to limit photograph format size to 3 x 5". You may attach both text and graphic files to your e-mail message. The deadline for submitting stories/articles for the spring 2001 newsletter is April 1, 2001.

Ruthanne Mitchell
Newsletter Coordinator/Producer
cwmitchell@ntown.com



BEETLE BLITZ 2001



GREAT SMOKY MOUNTAINS NATIONAL PARK
107 Park Headquarters Rd.
Gatlinburg, Tennessee 37738
Thursday 28 June - Sunday 1 July 2001

Sponsored by Discover Life in America for the All Taxa Biodiversity Inventory

Coleopterists from around the country and possibly overseas as well will converge at Great Smoky Mountains National Park on the 28th of June to participate in the All Taxa Biodiversity Inventory. The coleopterists will collect and identify beetles in various parts of the Smokies as a first step in understanding the diversity and distribution of this fascinating group of insects in the Park. DLIA volunteer Tom Rogers is coordinating the "blitz" and will be in touch with researchers who wish to be involved. Anyone interested in being a part of this exciting and productive effort should contact Tom <medent@earthlink.net>, Jeanie Hilten <jeanie@discoverlife.org> of DLIA, or Keith Langdon <keith_langdon@nps.gov> with Great Smoky Mountains National Park. More details will be forthcoming.

Beetle Blitz Goals:

1. To deposit in the Park collection identified specimens of as many species as possible during the blitz.
2. To develop a preliminary inventory of the beetles of the Park (to include information from scientists' personal experience, collections and literature).
3. To collect a nucleus of specimens for further study and to develop an understanding of the layout of the Park for future individual or joint collecting trips to the Park.
4. For those who are interested, to share collecting methods and the joy of entomology with high school and college students and enthusiastic amateurs who will volunteer their time to help.
5. To see old friends and make new ones, and to share ideas, methods, and experiences.

Note: Permits Required! Contact: Janice Pelton, Office Manager, Twin Creeks Natural Resources Center, at grsm_research_permits@nps.gov. Permits will be valid from the date of issue until the 31st of December, 2001.

Discover Life in America
1314 Cherokee Orchard Rd.
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