

ATBI QUARTERLY

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

Biodiversity and Sustainability: The Role of Inventories Excerpts from Dr. Peter Raven's Keynote Address - 2003 ATBI Conference

Dr. Raven's speech focused on the importance of learning about biodiversity, through projects such as the All Taxa Biodiversity Inventory (ATBI), and achieving environmental sustainability. "The first and most important stage of biodiversity management and sustainable use is unquestionably inventory. In this effort, knowledge is of fundamental importance, and...this information must be used as the basis for further exploration. The ultimate goal of inventories, of organizing information about plants, animals, fungi, and microorganisms, is to understand, conserve, and sustainably use them."

Attention was drawn to the fact that the ATBI has found 410 species of organisms new to science and an additional 2955 known species that are new to the Park. "When it becomes possible to deal in depth with the lesser known groups, such as fungi, mites, and nematodes, those figures will doubtless grow many times." Raven said "there might be some 60,000 kinds of eukaryotic organisms in the Park, ...but only about 10,000 have been discovered thus far - no more than one out of every six species that actually occurs in the area! For most of those that are known, probably 90% of them, little or nothing is known about their biology, habits, abundance, and their role in ecosystems - virtually nothing. So we have a very long way to go, with many exciting discoveries to be made along the way."

Raven added that "inventories, such as the one you are conducting, are important scientifically but when they involve a wide community of scientists, students, and the general public as is the case here, they have a much greater importance. For us all, there is no more powerful stimulus to love and preserve the organisms that live around us than to know them and to understand something about their properties, their habits, and the ways in which they fit into the communities and ecosystems that make up our world. The continued monitoring of the species and populations discovered, and especially the critically endangered ones, is of fundamental importance for their conservation."

Voicing his concern, Raven also discussed broad environmental issues, such as increased natural resource consumption, and unsustainable technology which result in chal-

lenges to environmental sustainability. He urged us to think about the massive world changes of the past 50 years, such as the human population increasing from 2.5 to 6.3 billion, the loss of agricultural land due to salinization, desertification, and unplanned urban growth, disappearing forests, declining fisheries, destroyed marine habitats, depleted fresh water supplies, extinction of organisms (and

loss of genetic diversity), increased alien invasive species, and reduced air quality. "The dead conifers on Mt. Mitchell bear testimony to the ways we are changing the world....". He believes that attaining global sustainability is the most important goal that lies before us, and stressed the point that humans are consuming the Earth's natural productivity at about 120% of its sustainable rate, a

percentage which continues to grow.

According to Raven, ways that we can help to preserve biodiversity include becoming educated about the issues involved and participating in the political process at all levels. Inventory and monitoring are of primary importance for the preservation of ecosystems in any area. "With as little as is known about the organisms that inhabit this glorious Parkit should not be surprising that we have so little information about the functioning of ecosystems or the ways that they can successfully be reconstituted when they have been destroyed." He added that "because of the scope and importance of your effort here, it has the potential to serve as a model for similar efforts in areas around the world...and it clearly has the potential to make contributions of fundamental importance to the management and preservation of the biodiversity they contain."

Dr. Raven ended on a hopeful and encouraging note, stating that "if we accept our role as citizens in an interconnected world....we will find ways to limit population, adopt sustainable levels of consumption, and develop the new technologies we need to move peacefully into the sustainable world that we need to build together in the future."

Peter Raven
Missouri Botanical Garden
praven@nas.edu



Peter White presents a scanned image of elm seeds

Kenneth Davis, Jr.



Kemp Davis, Jr.

A Note From The Chair

Making a List

We are fresh from the glow of excitement at December's Annual Meeting in Gatlinburg--from Peter Raven's astounding keynote to the larest numbers of species new to science and to the Park, to the amazing images that are illustrating the

intricacy, complexity and beauty of living things in the Smokies, it was a full and fun meeting (Make your plans for next year!)

We are the largest biodiversity inventory project anywhere (as far as I know). Yes, we are making a list of species, but we are also laying the groundwork for ecological understanding, monitoring, and conservation as well.

Your Board of Directors is also making a list! Our list is to make sure we focus on what needs to be done this year (and reported on at next year's Annual Meeting). The discussion sessions at the meeting yielded many ideas. The Board meeting that followed the Annual Meeting continued that process. At out next meetings we will take up a plan: objectives for this year and the next several years. Stay tuned--and keep sending your ideas to the Board.

Peter White, Discover Life in America Chairman
University of North Carolina
pwhite@unc.edu



Kemp Davis, Jr.

Photography and scanned image exhibit at the December Annual Meeting.



Kemp Davis, Jr.

About Peter Raven, Keynote Speaker

Peter Raven is Director of the Missouri Botanical Garden and one of the world's leading botanists and advocates of conservation, biodiversity, and a sustainable environment. Described by TIME magazine as a "Hero for the Planet", Dr. Raven champions re-

search around the world to preserve endangered plants and holds many positions, including: Chairman of the National Geographic Society's Committee for Research and Exploration, Chair of the Division of Earth and Life Studies of the National Research Council, President elect of Sigma Xi - The Scientific Research Society, past President and Chairman of the Board of the American Association for the Advancement of Science, which is the largest organization of professional scientists in the world, and Engelmann Professor of Botany at Washington University in St. Louis. Among his numerous awards is the National Medal of Science, the highest award for scientific accomplishment in this country, which he received in 2001 from the President of the United States.



Science Advisory Panel

Dr. Dan Janzen, University of Pennsylvania
Dr. Tom Lovejoy, The World Bank
Dr. Ron Pulliam, University of Georgia
Dr. Peter Raven, Missouri Botanical Garden
Dr. Edward O. Wilson, Harvard University

Board of Directors

Dr. Peter White - Chair
University of North Carolina-Chapel Hill

Dr. David Wagner - Vice-Chair
University of Connecticut

Tom Rogers - Secretary
Orkin

David Scanlon - Treasurer
Great Smoky Mountains Association

Staff

Jeanie Hilten, DLIA Administrative Officer

Master's Degree graduate research assistantships are available for our Tree Canopy Biodiversity research in Great Smoky Mountains National Park. If interested, please immediately contact Harold W. Keller, Department of Biology, Central Missouri State University: e-mail address: Keller@cmsu1.cmsu.edu or telephone 660-543-4823.

Trechus Beetles in the Smokies: Islands in the Sky

Thomas C. Barr

When groups of small, wingless animals are confined to high elevations in the Smokies and other high mountains of the Unaka chain, exchange of genes becomes limited or shut off, leading to isolated populations on different mountain peaks. If you take a topographic map and draw red lines along the 4000-ft. contour, you will have a number of isolated enclosures resembling islands and archipelagoes. Such are the discontinuous habitats of altitudinally restricted species. One of the more intensely varied groups of these isolated animals in the southern Appalachians is the ground beetle genus *Trechus* (family Carabidae). At least 14 species occur within Great Smoky Mountains National Park (GSMNP), and there are now about 60 taxa (species and subspecies, many still undescribed) of these little predators known from the southern Appalachians. In contrast to this burst of diversity in the Unaka mountains, another dozen species of *Trechus* are found elsewhere in the United States and Canada, and about a half dozen more are limited to the high mountains of central Mexico.

Trechus beetles are small, shiny black, rather robust, and convex with conspicuously round-oval elytra; they range in total length from about 2.5 to 5.5 mm. To collect them, forest floor litter is scooped up and rocked back and forth in a sifter until small arthropods fall through the holes and into a tray. A plastic sifter is light and easily carried for use in the field, where processed litter is discarded.

During the past two years, Chris Carlton, from Louisiana State University, has collected hundreds of *Trechus* from GSMNP, and Igor Sokolov, of the Russian Institute for Plant Protection in St. Petersburg, has identified them. In addition to five previously identified species, a sixth species has been found that is new to science and will be named to honor the late Don DeFoe, long time Museum Curator and naturalist for GSMNP.

South and west of the Asheville basin, almost all *Trechus* species belong to the endemic subgenus *Microtrechus*, which includes all 14 species in the Smokies. The subgenus *Trechus* is Holarctic in distribution and a majority of species found east and north of the Asheville basin belong to this subgenus. As more and more Unaka species became known, it was apparent that the bigger mountain ranges had more endemic *Trechus* species than smaller ones. The Smokies, being the largest range, has 14 species, while the smaller adjacent Plott Balsams and Nantahalas have only five species each, the Great Balsams and Pisgah Ledge have six, and so on. The most likely interpretation is that greater area of suitable habitat provides more opportunities for niche divergence and species packing among closely related taxa. Movement of ancestral species between ranges pre-

sumably occurred during glacial maxima in Pleistocene time, when gaps between ranges at 3500 ft. or less were much colder than today. The "sky islands" become much larger, and some of them join together. The effect on distribution can be simulated by now drawing our red lines along, say, the 3500-ft. contour.

What, exactly, are the differences between *Trechus* species that coexist in the Smokies or other high ranges? Eight of the 14 known species in the Smokies inhabit the central uplands around and between summits of Clingmans Dome, Mt. LeConte, and Mt. Kephart, while the remaining six are found only in the eastern or western ends of the Park or in caves and sinkholes in Tuckaleechee Cove. *Trechus* species are basically denizens of the forest floor duff, and the larger the species, the deeper they occur down in the mixture of conifer needles and silt. The smallest species—those of the *vandykei* group, such as *T. bowlingi* (a Smokies endemic)—inhabit the superficial layers; the largest species, such as *T. novaculosus* (Smokies) or *T. rosenbergi* (Plott Balsams), are found several inches down into the conifer needle duff or among loosely stacked rocks in springs; species of intermediate size most often are found at the middle depths. The food available in these microhabitats are primarily small invertebrates, but which items from this banquet the *Trechus* actually capture and eat is a rich area for investigation.

As with all other holometabolous insects, what happens during the larval stage is a critical component of a trechine's niche. Larvae are rather scarce and seasonal, but they can be sought in the duff layers where the adult beetles occur. They apparently peak in the Smokies and adjacent mountains sometime in late July. Do these beetles hibernate? Probably. I've collected *Trechus* in March in the Great Balsams near the Devils Courthouse, when the moss carpets were encrusted with ice and the beetles' tarsi were frozen to the rocks. Likewise, Chris Carlton and Adriane Mayor sifted litter beneath a 4-inch snowfall during December 2003 at Rainbow Falls and recovered good numbers of *Trechus* from the thawed but soggy sample.

With the taxonomy of *Trechus* in the Smokies and other Unaka mountain ranges approaching the stage where almost all the species have been discovered and described, the way is open for research into niche components of coexisting species.

Thomas C. Barr
tcbarr@comcast.net

■ Tom Barr is professor emeritus of Biological Sciences at the University of Kentucky, Lexington; he currently lives in Nashville. He first began studying the *Trechus* of the southern Appalachians in 1958.



Chris Carlton

An undescribed species of *Trechus* from the Smokies crest east of Newfound Gap superficially resembles most of the 13 other species found in the Park.

**Franciel Azpurua-Linares and Joseph Henderson, SAIN/NBII**

NBII-SAIN and ATBI: Moving Towards Dynamic Information: The NBII Southern Appalachian Information Node is supporting DLIA and the All Taxa Biodiversity Inventory by providing web design, development, and maintenance. We are currently working on enhancing the information structure of the pages in preparation for the web-enabled database that will power dynamic web pages.

Paul J. Bartels, Warren Wilson College and Diane Nelson, East Tennessee State University

Phylum Tardigrada Update: All 19 ATBI plots have been sampled, and our current list includes 47 species. Forty-four are new Park records and eight are new to science. Recent taxonomic work with *Isohypsibius* revealed five new species, suggesting that species richness estimates are likely to be gross underestimates with additional taxonomic revisions.

Victoria Moseley Bayless, Louisiana State Arthropod Museum

Evaluation of the 2003 Beetle Blitz: Replies from evaluations sent to the participating researchers were presented along with an analysis of how the Blitz ties in with the overall goals of the ATBI Beetle Twig. Actual results will be compared with expected results. Thoughts on future Beetle Blitzes will also be presented.

Ernest Bernard, University of Tennessee

Poster: *Biodiversity of Millipedes—Inside and Out:* DLIA Board member and long time participant in the ATBI, Ernie's photos taken through the microscope are part of the *Documenting Life Exhibit*.

Kurt Butefish, Coordinator, Tennessee Geographic Alliance and Martin Lafrenz, University of Tennessee

Presentation and Poster: *Building a Toolkit of Skills Project:* During the 2002-2004 academic years, the Tennessee Geographic Alliance received grants from the National Geographic Society Education Foundation to involve students participating in the University of Tennessee Math and Science Regional Center's Upward Bound program in the ATBI. As part of the program, students conducted surveys of ferns, snails, and salamanders. They developed research projects around the surveys and also participated in a juried poster session. This poster, presented by one of the student mentors, presents their research methods and finding.

Chris Carlton, Louisiana State University

Year Three of the Coleoptera Twig: Current Status and Noteworthy Additions: The status of the Coleoptera faunal inventory of GSMNP was updated with emphasis on progress in delivering sorted beetles to cooperators for species determinations. Species additions for 2003 were summarized. Currently 1487 species are documented and two new families, Salpingidae and Cerophytidae, were added this year. Expectations of numerous new taxa from certain families and status of relevant publications were also summarized.

Ben Cash, Maryville College

Poster and Presentation: *Reptiles of Great Smoky Mountains National Park*

Patricia B. Cox, University of Tennessee/ TVA

Update on the Fern Mapping Project: We have finished three field seasons of mapping ferns in the Park. This project was the first to test the trail

survey protocols and with the help of volunteers has been very successful. To date, 33 trails in 11 areas of the Park covering over 100 miles have been mapped. Park Service interns have entered all the data and some preliminary results will be reported.

Poster: *ATBI Fern Forays: An Example of Partnerships in Biodiversity Research*

Shelaine Curd-Hetrick, SAIN/NBII

NBII-SAIN: Overview of Contributions to DLIA and ATBI: The National Biological Information Infrastructure-Southern Appalachian Information Node is assisting Great Smoky Mountains National Park (GRSM) and Discover Life in America (DLIA) on the ATBI project with policy and procedure development designed to increase dissemination of information related to the GRSM species through systems support.

Paul G. Davison, University of North Alabama

Exhibit: *A Micro-Aquarium to Discover Life*

Ed DeWalt, Illinois Natural History Survey

A Preliminary Report on the Summer Emerging Mayflies, Stoneflies, and Caddisflies of Southwestern Streams of Great Smoky Mountains National Park: May and June, 2003 collections of mayflies, stoneflies, and caddisflies (EPT taxa) in southwestern and southern drainages from Tennessee and North Carolina were discussed. Results concentrated on EPT taxa taken from the two more remote, unsampled drainages — Shop Creek and Tabcat Creek in the SW end of Great Smoky Mountains National Park (in TN), and on mayflies across all drainages sampled. A total of 12 sites was collected on up to four occasions, with an average of two visits per site. Other streams sampled included seeps of Cattail Branch, Twentymile Creek, John's Cove, Proctor Branch, Hammer Branch, Deep Creek, Eagle Creek, Ekaneetlee Creek, Hazel Creek, and Gunna Creek.

Dennis Drehmel, North Carolina State University

Biodiversity of the Boletes: Boletes are soft mushrooms that have tubes, not gills, to drop spores. Biodiversity is evaluated on the basis of evolution as measured by changes in DNA. Groups within the boletes are compared for biodiversity and boletes as a group are compared to Amanitas (deadly gilled mushrooms) for biodiversity. The biodiversity of eastern boletes is also compared to total biodiversity of boletes.

Judy Dulin, Parks As Classrooms Project Coordinator, Pi Beta Phi Elementary

Parks as Classrooms: Elementary and Middle School Introductions to the ATBI: Over the last couple of years, the education division of Great Smoky Mountains National Park has field tested new techniques and activities for introducing elementary and middle school students such as those from Pi Beta Phi (PBP) to concepts and research related to the ATBI. Student interest and enthusiasm has proved to be high as well as assessment results from their participation. In addition, PBP students and teachers have enjoyed a number of benefits from their participation including increased recognition and awards for students, staff, and the school.

Andrew Dye, University of Tennessee

Developing a Habitat Suitability Model through the Use of GIS: An overview of how to use GIS to analyze environmental factors such as vegetation, geology, slope, aspect, etc. to produce a habitat suitability map. This tool can allow researchers to optimize their time and more efficiently sample the Park.



Abstracts of Presentations and Posters



Colin Favret, Illinois Natural History Survey

A Preliminary survey of the Aphids of the Park: Unsurprisingly, the aphid fauna of the Park is diverse and we have only just started cataloging and understanding it. Aphids were hand-collected, along with a clipping of the host plant, or collected by sweep net or "bug-vac." Most hand-collected aphid colonies were photographed *in situ*. Some of the special findings were described, and a comparison was made between what was collected, and what is yet likely to be found in the Park.

Jeanie Hilten, Discover Life in America

Volunteer Action, 2003: Volunteers with DLIA, including citizen scientists, teachers, students, and researchers, contributed well over 6,000 hours on ATBI projects. One hundred new volunteers participated in orientation and training programs in the spring, joining seasoned ATBI veterans in the "corps of discovery". They all provided able assistance with trail surveys, Bio-Quests, special events, photography, art, office jobs, lab and other technical work, and specific requests from Park staff and scientists.
Poster: *Discover Life in America*

Anthony Khiel, USDA-Natural Resource Conservation Service (NRCS)

Presentation and Poster: *Soils and Geomorphology of Cades Cove*

Jim Lowe, and other volunteers with Discover Life in America

Volunteer Perspectives

Rex Lowe, Bowling Green State University and Jeff Johansen, John Carroll University

New Algal Discoveries and the "Three-Year Plan" to Find the Rest

Marguerite Madden, Center for Remote Sensing and Mapping Science, University of Georgia

Vegetation Databases for Great Smoky Mountains National Park: Vegetation databases, including overstory, understory, and fire fuel model maps, are complete for Great Smoky Mountains National Park. An overview of procedures used to create the databases was presented, along with examples of analyses such as assessing environmental factors associated with vegetation distributions and fire ignition risk modeling.

Paul Marcum, Illinois Natural History Survey

Vascular Plant Inventories in Great Smoky Mountains National Park, 1999-2003: From 1999 to 2003, botanists from the Illinois Natural History Survey conducted vascular plant inventories within Great Smoky Mountains National Park. These inventories, done on a watershed basis, discovered a few new species to the Park including *Dirca palustris*, *Euphorbia mercurialina*, *Scutellaria serrata* and others. Probably most important, however, are the numerous rare plant populations that have been found.

John Morse, Clemson University and Discover Life in America Board

The DLIA Grant Program

Seán O'Connell, Western Carolina University

Bacterial Inventory Update with a Focus on Heat-Lovers and the Uncultured: This year's prokaryotic surveys in the Smokies involved summer

researchers and microbiology students in a fall course. Twelve sites were examined and aerobic heterotrophic, thermophilic, and other bacteria were discovered. Ongoing work is identifying these organisms and the list of novel bacterial species in the Park is increasing considerably.

Edward Pivorun, Clemson University

Small Mammal Studies: ATBI Sites: Over 2500 small rodents and insectivores have been trapped since October, 1999. Rodent populations can display dynamic shifts in species composition and biomass. These population changes can occur on a seasonal basis or over a span of years. Highest "species diversity" is associated with habitats above 4,000 feet.

Patrick L. Rakes, Conservation Fisheries, Inc.

ATBI Fish Snorkel Surveys in GSMNP: A brief summary of streams surveyed and fish species observed (photos and underwater video) during snorkel surveys in GSMNP for the Vertebrate Study in 2002 and 2003 was presented.

Susan Sachs, Jonathan Mays, Paul Super, Great Smoky Mountains National Park

Science and Education at Purchase Knob: Several exciting programs have taken place over the past year at the Appalachian Highlands Science Learning Center, resulting in new knowledge and more student involvement in the ATBI. Highlights of the Clemson teacher workshop, Cherokee High School activities, and the Burroughs Wellcome Grant were presented.

Steve Stephenson, University of Arkansas

Eumycetozoans: High Country Quest and Slime Mold Progress: A presentation of the work done at the summer, 2003 High Country Quest as well as further plans for slime mold research and the NSF grant.

Bruce Sutton and Gary Steck, Florida State Collection of Arthropods

Tephritid Flies of Great Smoky Mountains National Park: Regional affinities, habitat requirements, and host plant relationships of the "fruit fly" family in GSMNP, with additional details on the biology of some colorful and unusual species in the Park were discussed.

Mark J. Wetzel, Illinois Natural History Survey and Peggy Morgan, Florida Department of Environmental Protection

The Aquatic Oligochaeta (Annelida, Clitellata) of Great Smoky Mountains National Park, North Carolina and Tennessee, USA: 1999-2003: A summary of work completed through 2003, with emphasis on this year's highlights (collections of aquatic oligochaetes, other aquatic macroinvertebrates, and the monitoring of associated water quality at 25 stream sites, 5 springs, and the Smokemont sewage treatment lagoon, and public outreach/field sessions with Cherokee High School biology classes was presented. Habitats in the Park that will receive our focus during 2004 and 2005 were discussed.

Mark Wotawa, National Park Service

The National Park Service Biodiversity Information System: The National Park Service has developed an information system to store, manage, and disseminate information on the biodiversity of organisms in National Park units. The capabilities to provide lists, maps, documents, and datasets was demonstrated, as well as the capabilities to integrate with other systems to promote science, teaching, and understanding of biodiversity in the National Parks.

Additions to the Lichen Flora of Great Smoky Mountains National Park

Tor Tønsberg



A species of *Leioderma*, which is new to science, found growing on a tulip poplar.

The aim of my ATBI project in Great Smoky Mountains National Park was to add as many species as possible to the Park lichen checklist with emphasis on sterile, corticolous (growing on tree trunks or branches), crustose lichens. Field work was carried out from June 12-22, 2002. About 40 species and 10 genera of lichens were found to be new to the Park. New to North America is *Catillaria croatica* (previously known only from Europe). New to eastern North America are *Gyalideopsis anastomosans*, *Microlychnus* (*Gyalideopsis*) *epicorticis*, *Gyalideopsis piceicola*, *Mycoblastus caesius*, and the genus *Leioderma*. Additionally, about 10 species were found to be new to science.

According to their growth form, lichens are either foliose (leaf-like with an upper side and a lower side separable from the substratum), fruticose (more or less shrub-like), or crustose (crust-like and not separable from the substratum). Many of the crustose species are so small that a hand-lens is necessary to recognize them in the field (e.g., *Gyalideopsis anastomosans*, *Opegrapha corticola*), whereas other species may be conspicuous and also cover extensive patches on tree bark (e.g., *Biatora printzenii*) and rock (e.g., *Psilolechia lucida*). Of the 40 species I found new to the Park, four are foliose (*Heterodermia japonica*, *Leioderma* sp., *Leptogium phyllocarpum*, *Phaeophyscia squarrosa*), whereas the others are crustose.

My project focuses on sterile, crustose lichens, which are adapted to dispersal by vegetative diaspores. Lichens are classified according to their sexual structures (e.g., apothecia), which usually are necessary to elucidate generic affinity when a molecular study is not possible. When apothecia are present, a lichen is said to be fertile; however, some species, such as those in the genus

Lepraria, are always sterile (i.e., apothecia are not known). Fortunately, most *Lepraria* species can be recognized on morphology and chemistry. Many crustose lichens that usually are sterile may occasionally develop apothecia, but among the Park material are several species that I have never found with sexual structures. These species have been sorted out by morphology and chemistry, but a search in the field for specimens with sexual structures is necessary before they can be identified. Many of them probably represent new species.

The genus *Lepraria* is remarkably diverse in the Park. In fact, I have probably never been to an area of comparable size with so many species of *Lepraria*. There are several species new to science in this genus in the Park, but more material from more localities is needed before they can be formally described. Many specimens of *Lepraria* from the Park are currently under molecular study (in cooperation with Stefan Ekman, Bergen).

Some (preliminary) biogeographic considerations: There is a small but distinctive group of species that has only been found at the highest elevations, and several of these were only found on conifers (*Abies fraseri* and *Picea rubens*), whereas *Lecidea roseotincta* was only found on the shrub *Viburnum lantanoides*. Most of the species found new to the Park, however, occurred on deciduous trees at lower elevations. It is interesting to note that outside the Park, species such as *Lecidea roseotincta*, *Microlychnus epicorticis*, and *Mycoblastus caesius* are lowland species in North America, being previously known only from the coastal lowlands of the Pacific northwest, and, for *L. roseotincta* and *M. caesius*, also from Newfoundland Island. Apparently, at low northern latitudes such as the Park (about 35-36°), these species can thrive only at high elevations.

Field work has not been carried out in the eastern part of the Park and in the southern part west of Cherokee. I would very much like to study the lichen flora of these areas also. To solve taxonomic/floristic problems encountered in the material collected in 2002, I also need to go back to some of the 2002 localities. It is expected that the number of known lichen taxa in the Park still can be increased considerably.

Tor Tønsberg
University of Bergen
Bergen, Norway
tor.tonsberg@bot.uib.no

ATBI-DLIA Calendar of Events 2004

Jeanie Hilten

Coming this winter and spring, many programs related to the All Taxa Biodiversity Inventory will be presented by DLIA, the Park, or our Partners. Mark these events on your calendar and stay tuned for more details about our Annual Conference 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" and to sign up for activities, contact **Jeanie Hilten, 865-430-4752 or Jeanie@dlia.org**

Saturday, February 7: Deep Cleaning of ATBI houses. Help spruce up the scientist lodging that DLIA leases from the Park at Cades Cove and/or Cosby. Lots of fun sweeping, dusting, mopping, and vacuuming! Volunteers call Jeanie. Free lunch included.

Saturday, March 20: Volunteer Orientation Day, TN side, 9:00am-4:00pm. A program for new volunteers held at the Sugarlands Training Room, Gatlinburg, TN, and then in the field at Twin Creeks Natural Resources Center. Learn about the ATBI, the "project teams", lab and field methods, backcountry safety, and in general, meet the people involved with the project and see how you can help. Limited space, so register early.

Saturday, April 3: Bio-Quest Training, 9:00am-4:00pm, then evening Soil Critter Crawl. Specialized training for volunteers interested in assisting with 2004 blitzes or bio-quests, intensive collecting efforts that involve researchers and citizen scientists. We'll search for millipedes and other leaf litter creatures. At Sugarlands Training Room and in the field. Contact Jeanie.

Saturday, May 8: Volunteer Orientation Day, NC side, 10:00am-4:00pm. A program for new volunteers held at Haywood Community College, Waynesville, NC. Learn about the ATBI, the "project teams", lab and field methods, backcountry safety, and in general, meet the people involved with the project and see how you can help. Limited space, so register early.

Saturday, May 22: Fern Foray 1, 9:00am-4:00pm. This is the first of the Fern Forays for 2004 and will probably be in the Cades Cove area. Meeting place TBA. These trail surveys are coordinated by Patricia Cox, botanist with TVA's Natural Heritage Program, and DLIA Board member. They are fun and very educational for anyone who loves plants. Be prepared to be out in the field rain or shine, and bring water, lunch, good walking shoes, and rain gear. Participants are encouraged to attend one of the DLIA training sessions beforehand. (See other dates on this calendar.) To sign up, contact Pat Cox at pbcox@tva.gov
Additional Fern Foray Dates:

Saturday, June 12: Fern Foray 2, 9:00am-4:00pm.

Saturday, July 10: Fern Foray 3, 9:00am-4:00pm.

Saturday, August 21: Fern Foray 4, 9:00am-4:00pm.

Monday, July 12 - Saturday, July 17: Fungi Foray, Sugarlands Training Room and elsewhere in the Park. This event will be in conjunction with the Mycological Society meeting and will involve volunteers assisting scientists in the field and lab. The "FungiMap" project will be a part of the work. Only about 2200 fungi have been identified in the Park and it is estimated there may be as many as 20,000 species. Contact Jeanie or Paul Super at Paul_super@nps.gov or 828-926-6251.

Friday, July 16: Slime Mold Workshop, Great Smoky Mountains Institute at Tremont, 9:00am-5:00pm. Steve Stephenson, of the University of Arkansas, will lead this class aimed at citizen scientists. There will be an introductory presentation, field sessions and the opportunity to view and photograph these fascinating organisms through the microscope. Register early. Class size is limited.

Sunday, July 18 - Saturday, July 24: Lepidoptera Quest, Sugarlands Training Room and elsewhere in the Park. This will be the third ATBI moth and butterfly "blitz" in the Smokies. Trained volunteers will assist researchers and there will be educational opportunities for teachers and students. Interested scientists contact Dave Wagner dwagner@uconnvm.uconn.edu.

Saturday, June 19 - Sunday, June 20: Lichen Workshop and Bio-Quest. Class, field and lab activities, and collecting centered at the Great Smoky Mountains Institute at Tremont. Led by Harold Keller, Central Missouri State University and others. Scientists contact Harold Keller at keller@cmsu1.cmsu.edu

Saturday, August 14 - Sunday, August 16: All Taxa Biodiversity Challenge—Mount LeConte Trip with Great Smoky Mountains Institute at Tremont. Learn about and assist with the ATBI while enjoying the awe-inspiring hike to and from the LeConte lodge, spectacular views, hearty meals, and a cozy bed. Visit <http://www.gsmit.org/Programs/leconte.html> or call 865-448-6709 for more information.

Friday, Sept. 17 - Sunday, Sept. 19: High School Science Consortium at Great Smoky Mountains Institute at Tremont. Join other high school teachers and students at Tremont to conduct real research in the national park. Call 865-448-6709 for more information.

“Wilderness Volunteers” Group Helps ATBI for Fourth Year

Jeanie Hilten, DLIA



DLIA

View from Andrews Bald.



DLIA

ATBI volunteers remove ATBI Malaise trap fencing.



DLIA

Frosty morning at Andrews Bald trailhead.

The first trip the Wilderness Volunteers made to the Smokies was in October, 2000. One of the things they helped with was setting up the ATBI plots in Albright Grove and Cades Cove. They returned each year to work on a variety of projects ranging from beetle inventories, to trail surveys of snails, to collecting arthropods from traps. Last year, under the leadership of Joyce Duncan and Discover Life in America’s own Jim Lowe, it was fitting that they helped to take down the ATBI plot fencing at Andrews Bald. They also conducted a fall flower foray as suggested by GSMNP curator Adriean Mayor.

The Wilderness Volunteers is a non-profit organization that draws people from across the country to donate their services to the National Park Service, the National Forest Service, the Bureau of Land Management, and the U.S. Fish and Wildlife Service. Although the group of 12 is only in the Park for one week, they accomplish quite a bit with their energetic efforts. DLIA staff and volunteers give them a full day of orientation and training, to go along with educational materials sent beforehand to each volunteer. With specific projects to accomplish, the group then heads to the field under the guidance of the Wilderness Volunteers’ representative and ATBI folks such as Ian and Stephanie Stocks, Chuck Parker, Paul Super, Jim Lowe, and Jeanie Hilten. The volunteers are eager to be useful, love the beauty of the mountains, and don’t hesitate to hike long distances and do hard work.

This year, they will be in the Park from April 12-18, staying again at the Cosby group campground. Joyce and Jim will be the able leaders, and the chance to be in the Smokies in the spring has been a real draw. The program has been filled for months. We will be working on the schedule of activities soon, and any ATBI scientist who has needs that this group might fulfill should get in touch with Jim Lowe (jhlowejr@hotmail.com or 828-479-9271) or Jeanie Hilten (jeanie@dlia.org or 865-430-4752). See the Wilderness Volunteers website at www.wildernessvolunteers.org.

The value of volunteers participating in the All Taxa Biodiversity Inventory goes far beyond the work that is done, although that is very important. The inspiration, education, and experiences that each person receives are enthusiastically passed along to others, reaching outward and drawing new people into the circle. We are all looking forward to another fine year for volunteers—citizen scientists, teachers, students, researchers—to come together in the excitement of discovery.

www.dlia.org