



NO BONES NEWSLETTER

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Leeches of the Southern Appalachian States and the Great Smoky Mountains National Park

William Moser

The Great Smoky Mountains National Park (GSMNP) is the largest intact ecosystem in the eastern United States (~2,200 sq. km) and one of the most species-rich temperate areas in the world. In the late 1990s, GSMNP officials from Department of Interior's Inventory & Monitoring program and the non-profit organization Discover Life in America (DLIA) teamed up to determine just how many species there are in the GSMNP. This effort is called an All Taxa Biodiversity Inventory (ATBI). This undertaking is the first of its kind in North America.

Moser, Don Klemm (US-EPA, Cincinnati, Ohio), **Bruce Daniels** (OCIO) and Roy Sawyer (Medical Leech Museum, Wales) received funding from DLIA to determine the number of leech species from the GSMNP. They collected in approximately 40 lotic, lentic, and terrestrial localities. Contrary to popular belief, collecting leeches is not just a passive sport. Leeches were readily collected underneath submerged substrata (e.g. logs, sticks, rocks), via dip-net, bait traps or from their hosts. The latitude and longitude of the collecting sites were recorded with a Garmin GPS 12 or Garmin Vista GPS receiver.

From 2000 - 2002, **William**



William Moser, Don Klemm and Bruce Daniels (from left to right) preparing to collect leeches in Great Smoky Mountains National Park. (Photo by Ben Cash)

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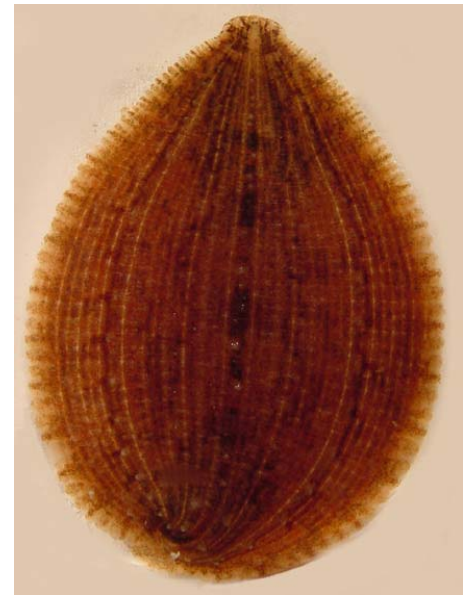
C O V E R S T O R Y C O N T.

There are approximately 600 described leech species world-wide inhabiting freshwater, marine and terrestrial ecosystems from the marine waters of the North Pole to the Antarctic Ocean. In North America, there are approximately 80 species of leeches with an estimated 37 species in the Southern Appalachian (Northern Georgia, North Carolina, South Carolina and Tennessee) montane, piedmont and coastal plain regions. Nine species new to the GSMNP (4 state records for Tennessee) have been

found to date. In the GSMNP, there are leeches that blood-feed on fish (uncommon), frogs, salamanders, and turtles or consume invertebrate body fluids or tissue (including the possibility of 2 terrestrial leech species that eat earthworms and can be found underneath rotten logs). To complement the GSMNP data, collection concentrations will be made next in the piedmont and coastal plain regions.

The main product of our study is an identification guide book of the leeches of the Southern Appalachian states. This guide book will contain an identification key, color photographs of leeches, leech species information pages and a 82 term glossary of leech anatomical terms. A digital key will be included in the guidebook. In the course of our study, we have also collected Glossiphoniid life history data (e.g. distribution, host infestation and brooding/breeding) that will be incorporated into a journal manuscript.

To date, a total of 410 species new to science and 2,955 species new to the GSMNP have been discovered from all ATBI research.



Dorsal surface of *Placobdella multilineata* (Southern Turtle Leech). (Photo by William Moser)

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William Moser and Don Klemm checking for leeches on the undersides of logs. (Photo by Bruce Daniels)

RESEARCH

Copepod Limb Research

Frank Ferrari

Hiroshi Ueda, from Ehime University in Matsuyama, Japan, visited **Frank Ferrari** (10/19-10/31) to work on limb development of centropagoidean copepods, a large superfamily of calanoid copepods. Centropagoideans are familiar calanoids and include species of the freshwater genus *Diatomus*, as well as common estuarine and neritic genera like *Acartia* and *Pseudodiatomus*. The fifth leg of males of species of centropagoideans may form as a chela. Chelae are quite common in some crustacean groups like crabs and shrimps, but chelae are rare among copepods. Thus possession of a chela by some centropagoideans has been suggested as a synapomorphy, a derived morphology of the ancestor shared by some of its descendents, for this superfamily of copepods. During Hiroshi's visit, they studied examples of development of this male fifth leg chela and found that it forms from

different segments in three different groups of species within the centropagoideans. So it is not a synapomorphy of the superfamily, but instead a wonderful case of convergence within the superfamily. We also discovered that development of the female fifth leg reveals two probable interdependent synapomorphies.

Throughout the recent history of calanoid systematics, differences in form of the male fifth leg has been considered sufficient to separate closely related species. Our developmental study suggests that transformations in morphology of the male fifth leg are not useful in diagnosing broader monophyletic lineages. However, in the case of the centropagoidean calanoids, some transformations of the female fifth leg have been conserved and will prove invaluable in diagnosing monophyletic lineages.



Hiroshi Ueda, Ehime University

LIBRARY

**INVERTEBRATE ZOOLOGY
LIBRARIES NEW TITLES**

Aspöck, Horst (editor). **Amöben, Bandwürmer, Zecken: Parasiten und Parasitäre Erkrankungen des Menschen in Mitteleuropa**. Denisia 6. Kataloge des Oberösterreichisches Landesmuseums, Neue Folge Nr. 184. Linz, Austria: Biologiezentrum des Oberösterreichisches Landesmuseum, 2002.

Féral, Jean-Pierre and David, Bruno, editors. **Echinoderm Research 2001: Proceedings of the Sixth European Conference on Echinoderm Research, Banyuls-Sur-Mer, France, 3-7 September, 2001**. Lisse, The Netherlands: A.A. Balkema Publisher, 2003.

Gudo, Michael. **Konstruktion, Evolution und ruffbildendes Potential der rugosen Korallen**. Courier Forschungsinstitut Senckenberg, no. 228. Frankfurt am Main: Senckenberische Naturforschende Gesellschaft, 2001.

Martin, Jocelyne. **Les larves de crustacés décapods des côtes française de la Manche**. Plouzané, France: Ifremer, 2000.

Rolán, E. and Rubio, F. **The Family Tornidae (Gastropoda, Rissooidea) in the East Atlantic**. Reseñas Malacológicas 13: special number of II International Congress of the European Malacological Societies, September 2002. Madrid, Spain: SEM (Sociedad Española Malacología), 2002.

Solis, Rafael Muñoz. **Diccionario Etimológico de Malacología**. Resenas Malacológicas 12: Número especial del II Congreso de las Sociedades Malacológicas Europeas, September, 2002. Madrid, Spain: SEM (Sociedad Española Malacología), 2002.

RESEARCH

Deep Sea Cnidarians from New Caledonia

Alberto Lindner

For three weeks in October and November of 2003 **Alberto Lindner**, NSF PEET student from Duke University, working with **Steve Cairns**, collected deep-sea cnidarians (particularly stylasterid and scleractinian corals) by dredging seamounts off New Caledonia and the northern Norfolk Ridge. This survey was conducted on board the French research vessel "Alis", as part of the "Norfolk 2" expedition led by Bertrand Richer de Forges (Centre IRD de Nouméa) and was aimed at exploring the diversity of benthic marine invertebrates on seamounts southeast of New Caledonia. Eight to ten trawls were made every day, most of the trawls containing abundant benthic Cnidaria. Lindner collected over 3000 cnidarian specimens, one of the largest cnidarian acquisition in the last 30 years. These specimens were collected for both



Steve Cairns and Alberto Lindner unpack material collected from seamounts off New Caledonia. (Photo by Yolanda Villacampa)



Alis R/V

morphological and molecular studies, which are part of the hydrozoan PEET project. The collection contained several new and unusual stylasterids, including one species that has an internal axial support that confers a slight degree of flexibility to the unbranched corallum. This is a unique and fascinating adaptation, unlike any other character in the family Stylasteridae. Lindner will be able to sequence several genes of this and other stylasterid genera in an effort to see exactly where this peculiar genus fits into the evolutionary scheme. Lindner recently visited the Museum to help unpack the large collection and prioritize his research agenda for these specimens.

R E S E A R C H CONT.

Coral Scientist Goes to Great Depths to Make New Discoveries

Steve Cairns

Stephen Cairns, research scientist in the Dept. of Systematic Biology (IZ), participated in a six week oceanographic cruise sponsored by NOAA-OE (Ocean Exploration), the purpose of which was to inventory deep-sea organisms, especially corals, from seamounts in the northwest Hawaiian Islands (Midway to Necker Islands). Specimens were collected using the three-man submersible Pisces V operated by HURL (Hawaii Underseas Research Lab). They were also photographed using a remotely operated vehicle (ROV) capable of descending to 915 m. The sub is rated to 2000 m, each dive lasting about 9 hours.

Cairns' research specialty is octocorals and thus far 49 of the 86 species of octocorals, that are known to occur in the Hawaiian islands have been collected, as well as eight new species. Also, two new genera of black corals and two new species of stylasterids (calcified hybrids) have been collected. But the most gratifying aspect of the cruise for Cairns has been the re-collection of a deep-sea stylasterid that he named in 1978. The original description was based on only four specimens collected off Laysan Island at 700 m and never reported again. It is quite unusual in shape for a coral, resembling a maple seed in size and shape, or, as the ship's crew refers to them, "wing-nuts". Once the

sub crew was made aware of his desire to re-collect this species they made it a special mission to obtain it. But not until they sampled within one mile of the type-locality off northern Laysan did they see additional specimens. The ROV recorded over 5000 specimen photographs and the sub collected 36 specimens, which will make possible a much more extensive analysis of the coral's morphology and molecular phylogeny. The maple seed coral, *Distichopora anceps*, was found to be the predominant benthic organism off northern Laysan but mysteriously does not occur at any other islands or seamounts in the Hawaiian archipelago, even those just a few km away.

IZ Scientists Invited to Participate in Tri-National Gulf Of Mexico Study

Stephen Cairns, Duane Hope, Jon Norenburg, David Pawson, Mary Rice (Emeritus), **Klaus Ruetzler**, and Smithsonian Marine Station postdoctoral fellow, **Richard Hochberg** have been invited to join a project on the Biodiversity of the Gulf of Mexico (GOM) as part of a larger initiative within the recently established Harte Research Institute for Gulf of Mexico Studies (located at Texas A&M, Corpus Christi).

Hope, Hochberg, Norenburg, Rice and Ruetzler attended a State of Knowledge Workshop held in Corpus Christi October 14-15. One of the group's challenges is to update the 1954 U.S. Fishery Bulletin volume entitled *The Gulf of Mexico - Its Origins,*

Waters, and Marine Life. It is anticipated that the original single volume will be expanded to four volumes, as a digest of all current knowledge of the Gulf.

At least one and perhaps two volumes will be devoted exclusively to marine life, including a full and updated account of phylogenetic composition and diversity for all organismal groups in the Gulf. A team of expert systematists will address varied taxonomic groups and intend to do a total inventory, including key references, habitat, distribution, depth, etc., for all species within the Gulf.

Data gathered will become part of a dynamic digital atlas that

will include habitat, distribution and key references for each species, and will be a part of the Census of Marine Life program at the Consortium of Oceanographic Research and Education. It will be the first all-taxa inventory of a large marine ecosystem, and it will be internet accessible

The purpose of this tri-national collaboration, including the U.S., Mexico, and Cuba, is to encourage and enhance the long-term sustainable use and conservation of the Gulf of Mexico.

V I S I T O R S

Rachael King and David Knott, Southeast Regional Taxonomic Center, South Carolina (11/03-11/08) studied amphipod and isopods types in Crustacea collection. **Sponsor: Marilyn Schotte.**

Peter Etnoyer, Marine Biology Conservation Institute, Washington (11/20-11/24) visited to discuss conservation of deep-water corals and the publication of a protocols manual for the collection of deep-sea corals. **Sponsor: Steve Cairns.**

Precious Haile, Magruder High School, Maryland (11/23) studied how a zoologist works. **Sponsor: Jerry Harasewych.**

Eric Lazo-Wasem, Peabody Museum of Natural History, Yale University, Connecticut (11/26) consultation about Verrill coral collection and gift of New England deep-water invertebrate collection. **Sponsor: Steve Cairns.**

Alberto Lindner, Duke University, North Carolina (12/08-12/10) worked on PhD dissertation, and curated recently collected corals from New Caledonia. **Sponsor: Steve Cairns.**

Tom Goreau, Cambridge, Massachusetts (12/12) consulted on possible gift of a large, Jamaican coral collection made in the 1960-1970's. **Sponsors: Steve Cairns and Ted Bayer.**

Scott Carpenter, The University of Iowa, Iowa (12/15-12/17) studied Unionidae clams from the Shimek Collection. **Sponsor: Bob Hershler.**

Norella Cruz, INVEMAR, Sta. Marta, Columbia (01/05-02/05) will study Decapod Crustaceans from Pacific coast of Columbia. **Sponsor: Rafael Lemaitre.**

H O L I D A Y P H O T O S

IZ staff enjoying 2003 Holiday Party.



Happy Holidays from the newsletter staff (*bottom right photo*).



P U B L I C A T I O N S

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Ivanenko, V.N. & F.D. Ferrari, 2003. Redescription of adults and description of copepodid development of *Dermatomyson nigripes* (Brady & Robertson, 1876) and *Asterocheres lilljeborgi* Boeck, 1859 (Copepoda: Siphonostomatoida: Asterocheridae). Proceedings of the Biological Society of Washington 116(3):661-691.

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Petit, R.E. & M.G. Harasewych, 2002. A new *Trigonostoma* from Mozambique. The Nautilus 116(4): 129-131.