

# North American Biospeleology Newsletter

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## Membership Information

For information about the Biology Section, contact the Executive Secretary. To join the Biology Section, send membership dues to the Treasurer (\$5.00 per year, \$6.00 per year international, checks payable to 'NSS Biology Section'), along with your name, NSS number, address, and a brief personal statement of biospeleological interests. Send news, information, and abstracts to the North American Biospeleology Newsletter (NABN) editor.

## Editor's Comments

Welcome to the 49th volume of the North American Biospeleology Newsletter. Contained in this issue are various bits of news and announcements, information about upcoming and recently past meetings, web site information, and some recent literature on biospeleology. Also included is the current membership list. If you know someone who should be on this list, please have them write the treasurer, enclosing appropriate funds.

As with the preceding two issues of NABN, this newsletter will be posted to the biospeleology web page ([www.utexas.edu/depts/tnhc/.www/biospeleology/](http://www.utexas.edu/depts/tnhc/.www/biospeleology/)) for ease of access. There is a significant change, however, as the issue will be available as a PDF (Portable Document Format) file. This and future issues will be available both electronically and in paper format, and members can choose which format in which they would like to receive their newsletter (send an email to both the editor and treasurer). For archival purposes, some paper copies will continue to be produced and deposited in libraries.

Comments and suggestions from the members of the section are always appreciated, and contributions in the form of short articles, news items, book reviews, meeting announcements, and other biospeleological debris are accepted for publication – just send me an email with the appropriate content!

Cave softly,  
Steve Taylor

## Meeting Minutes

### NSS Biology Section Annual Meeting 24 June 2002 Camden, ME

The meeting was called to order by Megan Porter at 1 pm. About 20 members attended.

#### Leadership Changes

- Megan Porter was selected as the new Executive Secretary
- Steve Taylor will be the new Newsletter Editor
- Dan Fong remains as Treasurer

Newsletter Discussion. A discussion of electronic vs. paper newsletters led to a decision to send members an electronic version, but to make paper copies available to those who could not access or did not want an electronic newsletter. The NABN will probably be sent in a PDF format starting with the next issue. Be sure the treasurer has your current email address (Dan Fong: dfong@american.edu). Send items for NABN to Steve Taylor (stjaylor@inhs.uiuc.edu).

Dues of \$5 were collected from interested attendees.

Affiliations. Kathy Lavoie brought the issue of NSS Affiliates to the membership in her role as the NSS Biology rep to the American Association for the Advancement of Science. She is looking for ways to improve the linkages between the two organizations. In checking both the NSS and AAAS websites, she noted that there is not as much of a presence on the NSS website, and will work with the Geology rep, Dan Chess, to add more information to the NSS website. Other ideas that were supported by the members included more organized symposia on cave topics at the AAAS annual meetings. A suggestion was made to hold a session on the new National Cave and Karst Research Institute (NCKRI). Another possibility suggested by Doug Soroka would be to develop a traveling exhibit of cave science that could be displays at both NSS and AAAS conventions. Please send ideas to lavoiekh@plattsburgh.edu.

NCKRI. Penny Boston, as the NSS liaison to this new national institute, is looking for "big picture inputs" on needs to be addressed by all scientific areas of NSS. She is also leading the new cave and karst program at New Mexico Tech. There is interest in establishing known centers of speleological excellence. NCKRI will be advertising soon for a Director. Please send ideas to her at [pboston@complex.org](mailto:pboston@complex.org).

#### Journal of Karst and Cave Studies.

Louise Hose announced that Jim Pizarowicz has taken all JCKS articles published since 1996 and established a complete text PDF file. Abstracts are done back to the 1970's from the *NSS Bulletin*. To access, go to the NSS website at [www.caves.org](http://www.caves.org), go to Publications, and then JKCS.

On behalf of the Editorial/Advisory Board, the journal is "flush" with articles, although still a little light on biology papers, despite an increase this year. The journal will have to enforce the limit of 15 pages for submissions. Data-intensive material can be placed on the website rather than be included in the journal (to be discussed as a possible policy by the board on Wednesday).

Special Issues. The intention is to continue publishing one Special Issue of the journal per year. If interested

in serving as the Guest Editor, you generally need, according to Beep Hobbs, about a year lead time in order to solicit about ten papers and get them through the review and editorial process. If interested, please contact Louise Hose with ideas ([hose@chapman.edu](mailto:hose@chapman.edu)).

Symposium Announcement from Al Romero. There will be a meeting of the American Society of Ichthyologists and Herpetologists in Manaus, Brasil, in two years. The meeting will include a Symposium on Cave Fish, Amphibians, and Reptiles. Please contact Aldemaro Romero ([Romero@macalester.edu](mailto:Romero@macalester.edu)).

Scheduling Concern. Eugene Vale brought up a concern that there is again a conflict of the Biology meetings with Conservation and Management. It was suggested he contact Carol Vessley about scheduling for next year.

Scholarships, Cave Conservation Foundation. Beep Hobbs announced the availability of fellowships through the CCF. There is \$3000 available for an undergraduate (deadline 1 May), \$5,000 available for a Master's project (deadline 1 July) and \$15,000 available for a PhD candidate (deadline 1 July). Please see the Karst Waters institute home page for additional information ([www.karstwaters.org](http://www.karstwaters.org))

The meeting was closed efficiently by Megan Porter at 1:55 pm.

Respectfully submitted,  
Kathy Lavoie  
[Lavoiekh@plattsburgh.edu](mailto:Lavoiekh@plattsburgh.edu)

## News & Announcements

### **Tumbling Creek Cavesnail Listed as Endangered**

Contacts:

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The Tumbling Creek cavesnail, found only in one southwestern Missouri county, was today added to the Federal list of threatened and endangered species by the U.S. Fish and Wildlife Service. The Service's action, designating the species as endangered, extends the formal protection of the Endangered Species Act to the cavesnail.

The cavesnail was listed under the emergency provisions of the Act in December 2001 after biologists noted a sharp drop in the cavesnail population. The emergency listing remained in effect for 240 days while the Service reviewed public comments and made a final decision about listing the cavesnail. The final rule formally listing the species as

endangered appears in the August 14, 2002, Federal Register.

"The plight of the Tumbling Creek cavesnail is, unfortunately, typical of many cave species," said William Hartwig, Regional Director for the Service's Great Lakes-Big Rivers Region. "They are seldom seen and often forgotten. But they can be barometers of the health of our natural systems, especially when we understand their dependence on clean water, something that is vital to all life."

Tumbling Creek cavesnails live only in an underground stream that flows through Tumbling Creek Cave in southwestern Missouri's Taney County. These cavesnails measure about one tenth of an inch in length, with a white body and pale yellow shell. The species lives beneath rocks in portions of the stream where there is usually little or no silt, and feeds on microscopic organisms in the creek.

The Tumbling Creek cavesnail's population has been monitored for the last six years to get a clear picture of the species' population trends. Surveys conducted over the past one and one-half years have found no snails in the survey area, although a few individuals were discovered upstream from the survey site.

Biologists believe the cavesnail's drastic downturn in population may be due to deteriorating water quality in Tumbling Creek. Water that feeds into Tumbling Creek can be affected by erosion and other activities that occur on the land above -- especially those that increase silt and sediments in the creek, such as removal of streamside vegetation and overgrazing by livestock. Other threats include pollution from accidental chemical spills or dumping trash into sinkholes that are directly connected to underground waterways.

The Service will now focus on protecting the snail and its habitat, while working with partners in other state, federal, and local agencies, universities, and other organizations to develop a recovery strategy for the Tumbling Creek cavesnail. The Service will be responsible for developing a recovery plan, which outlines steps needed to protect the cavesnail, prevent extinction, and recover the species' population. Actions that may help the Tumbling Creek cavesnail include continued monitoring of the remaining population, identification of specific threats to the water quality of Tumbling Creek, and working with landowners to reduce the potential for erosion and pollution of the underground water system.

More information on the Tumbling Creek cavesnail -- including the final rule listing the species as endangered -- along with information on other

endangered species, may be found on the Service's website at <http://midwest.fws.gov>

The U.S. Fish and Wildlife Service is the principal federal agency responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people. The Service manages the 95 million-acre National Wildlife Refuge System which encompasses nearly 540 national wildlife refuges, thousands of small wetlands and other special management areas. It also operates 70 national fish hatcheries, 64 fishery resource offices and 78 ecological services field stations. The agency enforces Federal wildlife laws, administers the Endangered Species Act, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, and helps foreign governments with their conservation efforts. It also oversees the Federal Aid program that distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state fish and wildlife agencies.

For further information about programs and activities of the U.S. Fish and Wildlife Service in the Great Lakes-Big Rivers Region, visit our website at <http://midwest.fws.gov>

-FWS-

## Conference Notes

### WORKSHOP ON MAPPING CAVE RESOURCES May 15-17, 2003

Dear Colleague:

We would like to invite you to a workshop on Mapping Cave Resources to be held near St. Louis, Missouri from May 15 to 17, 2003. In March of 2001, the Karst Waters Institute and the Laboratoire Souterrain du CNRS held a workshop in Moulis, France on developing databases of subterranean fauna and agreed upon a minimum format for the mapping of subterranean biodiversity data. The Moulis workshop attracted nearly 100 participants from 16 countries and resulted in a working group that continues to look at ways of coordinating information on cave fauna. The Missouri workshop continues in this spirit and will be jointly sponsored by the Karst Waters Institute and the Missouri Department of Conservation and held at the Powder Valley Conservation Nature Center in Kirkwood, Missouri.

The explosion in software mapping and data manipulation capacity has made the cataloging and organization of data on cave and karst resources possible in ways that we could only dream of ten years ago. For example, the recent issue of the National Speleological Society's Journal of Cave and

Karst Studies was devoted entirely to GIS and caves. The continuing human assault on the environment has made this work a necessity.

All too often we only see the threat that computers and the internet pose in terms of inappropriate distribution of data about caves and cave locations. Computers can also be important tools for protection of subterranean resources, and this is the theme of the proposed workshop. We want to focus on the following concrete issues:

- How can databases be used to help organize and summarize information about the caves and cave biota?
- How can data on caves and cave biota be mapped in ways that pose no threat to the resources being mapped?
- How can we cooperate on mapping and database projects without compromising sensitive locational and distributional information?
- The creation of a working group to continue cooperation on these issues.

Rather than have formal presentations, we plan on informal presentations on these topics with plenty of time for discussion. The sessions will be organized around the topics listed above. Bill will lead the discussion on databases, do a demonstration of the Missouri Biospeleological Database (MBD) and discuss how caves can be protected in the future by recognizing biodiversity. Dave will lead the discussion on mapping subterranean biodiversity with examples from the eastern U.S. and Slovenia. We hope that you will also contribute, and we would like to know if you would like to give an informal presentation on databases or mapping other types of cave resources. On the third day (Saturday) of the workshop, we will be taking a field trip to nearby cave and karst features.

Registration will be limited to 50-75 people. Karst Waters Institute will handle the registrations while MDC will plan for a meeting room, bus and rooms at a local hotel.

We already have had offers of various illustrated talks, such as using Arcview to make sedimentology and paleontology maps of a large cave, mapping species ranges at small scales (= large areas), mapping cave locations and mapping dye traces. We expect good participation from state cave surveys, cavers, biologists, hydrologists, geologists and others.

The field trip probably will go by bus to Fisher Cave, Meramec State Park. Fisher is an easy walk on hard trails, using headlamps or hand lanterns. It is a good example of a well-decorated Ozark cave with a long management history.

Many details of the workshop remain to be worked out (including costs) but I hope you will mark this on your calendar. We would appreciate it if you would let either one of us know if you are interested.

Sincerely yours,

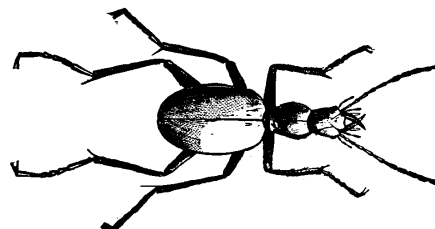
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## Web Sites & Internet Information

Contact the editor to get your web site listed in the next issue of this newsletter.

- Journal of Cave and Karst Studies  
[www.caves.org/pub/journal/](http://www.caves.org/pub/journal/)
- Biospeleology (Bill Elliott)  
[www.utexas.edu/depts/tnhc/www/biospeleology/](http://www.utexas.edu/depts/tnhc/www/biospeleology/)
- National Cave and Karst Research Institute  
[www2.nature.nps.gov/nckri/](http://www2.nature.nps.gov/nckri/)
- Karst Waters Institute  
[www.karstwaters.org/index.htm](http://www.karstwaters.org/index.htm)
- Anchialine Caves and Cave Animals (Tom Iliffe)  
[www.cavebiology.com](http://www.cavebiology.com)
- Bat Conservation International  
[www.batcon.org/index.html](http://www.batcon.org/index.html)
- Illinois Natural History Survey Biospeleology (Steve Taylor)  
[www.inhs.uiuc.edu/~sjtaylor/cave/biospeleol.html](http://www.inhs.uiuc.edu/~sjtaylor/cave/biospeleol.html)
- Biospeleology in Canada and on the WWW  
[www.cancaver.ca/bio/](http://www.cancaver.ca/bio/)
- Karst Geomicrobiology (Annette Summers Engel)  
[www.geo.utexas.edu/chemhydro/Annette/karstgeo.htm](http://www.geo.utexas.edu/chemhydro/Annette/karstgeo.htm)
- Lower Kane Cave Macroinvertebrates (Megan Porter)  
[zoology.byu.edu/crandall\\_lab/Meg/kane\\_bio.htm](http://zoology.byu.edu/crandall_lab/Meg/kane_bio.htm)
- Subsurface Life in Mineral Environments (Diana Northup)  
[www.i-pi.com/~diana/slime/](http://www.i-pi.com/~diana/slime/)



## Recent Biospeleological Publications

Most of the following publications come from a quick library search. It is obvious that there is a lot going on, and I know I missed many other publications. Please email me citations of your work (and that of other folks) for the next issue of the NABN. —editor

- Adams, G. L. and J. E. Johnson. 2001. Metabolic rate and natural history of Ozark cavefish, *Amblyopsis rosae*, in Logan Cave, Arkansas. *Environmental Biology of Fishes* 62(1-3):97-105.
- Andrejchuk, V. N. and A. B. Klimchouk. 2001. Geomicrobiology and redox geochemistry of the karstified Miocene gypsum aquifer, western Ukraine: The study from Zoloushka Cave. *Geomicrobiology Journal* 18(3):275-295.
- Armstrong, K. N. 2001. The distribution and roost habitat of the orange leaf-nosed bat, *Rhinonictis aurantius*, in the Pilbara region of Western Australia. *Wildlife Research* 28(1):95-104.
- Barton, H. A., J. R. Spear and N. R. Pace. 2001. Microbial life in the underworld: Biogenicity in secondary mineral formations. *Geomicrobiology Journal* 18(3):359-368.
- Berti, R. and L. Zorn. 2001. Locomotory responses of the cave cyprinid *Phreatichthys andruzzii* to chemical signals from conspecifics and related species: new findings. *Environmental Biology of Fishes* 62(1-3):107-114.
- Berti, R., J. Durand, S. Becchi, R. Brizzi, N. Keller, and G. Ruffat. 2001. Eye degeneration in the blind cave-dwelling fish *Phreatichthys andruzzii*. *Canadian Journal of Zoology* 79(7):1278-1285.
- Borowsky, R. B. and L. Mertz. 2001. Genetic differentiation among populations of the cave fish *Schistura oedipus* (Cypriniformes: Balitoridae). *Environmental Biology of Fishes* 62(1-3):225-231.
- Borowsky, R. L. and C. Vidthayanon. 2001. Nucleotide diversity in populations of balitorid cave fishes from Thailand. *Molecular Ecology* 10(12):2799-2805.
- Borowsky, R. and H. Wilkens. 2002. Mapping a cave fish genome: Polygenic systems and regressive evolution. *Journal of Heredity* 93(1):19-21.
- Boston, P. J., Spilde, M. N., Northup, D. E., Melim, L. A., Soroka, D. S., Kleina, L. G., Lavoie, K. H., Hose, L. D., Mallory, L. M., Dahm, C. N., Crossey, L. J., and Schelble, R. T. 2001. Cave biosignature suites: Microbes, minerals and Mars. *Astrobiology Journal* 1(1):25-55.
- Boudriot, F. and K. Reutter. 2001. Ultrastructure of the taste buds in the blind cave fish *Astyanax jordani* ("Anoptichthys") and the sighted river fish *Astyanax mexicanus* (Teleostei, Characidae). *Journal of Comparative Neurology* 434(4):428-444.
- Brack, V. and J. O. Whitaker. 2001. Foods of the northern myotis, *Myotis septentrionalis*, from Missouri and Indiana, with notes on foraging. *Acta Chiropterologica* 3(2):203-210.
- Broadley, R. A. and I. A. N. Stringer. 2001. Prey attraction by larvae of the New Zealand glowworm, *Arachnocampa luminosa* (Diptera: Mycetophilidae). *Invertebrate Biology* 120(2):170-177.
- Broders, H. G., D. F. McAlpine, and G. J. Forbes. 2001. Status of the eastern pipistrelle (*Pipistrellus subflavus*) (Chiroptera: Vespertilionidae) in New Brunswick. *Northeastern Naturalist* 8(3):331-336.
- Brown, J. Z. and J. E. Johnson. 2001. Population biology and growth of Ozark cavefish in Logan Cave National Wildlife Refuge, Arkansas. *Environmental Biology of Fishes* 62(1-3):161-169.
- Brunet, A. K. and R. A. Medellin. 2001. The species-area relationship in bat assemblages of tropical caves. *Journal of Mammalogy* 82(4):1114-1122.
- Bulog, B., K. Mihajil, Z. Jeran, and M. J. Toman. 2002. Trace element concentrations in the tissues of *Proteus anguinus* (Amphibia, Caudata) and the surrounding environment. *Water, Air, & Soil Pollution* 136(1-4):147-163.
- Burr, B. M., G. L. Adams, J. K. Krejca and R. J. Paul, and M. L. Warren. 2001. Troglomorphic sculpins of the *Cottus carolinae* species group in Perry County, Missouri: Distribution, external morphology, and conservation status. *Environmental Biology of Fishes* 62(1-3):279-296.
- Caccone, A. and V. Sbordoni. 2001. Molecular biogeography of cave life: A study using mitochondrial DNA from Bathysciine beetles. *Evolution* 55(1):122-130.
- Camassa, M. M. 2001. Responses to light in epigeal and hypogean populations of *Gambusia affinis* (Cyprinodontiformes : Poeciliidae). *Environmental Biology of Fishes* 62(1-3):115-118.
- Canaveras, J. C., S. Sanchez-Moral, V. Soler, and C. Saiz-Jimenez. 2001. Microorganisms and microbially induced fabrics in cave walls. *Geomicrobiology Journal* 18(3):223-240.
- Carey, P. G., A. J. Sargent, A. M. Taberner, G. Ramon, and G. Moya. 2001. Ecology of cavernicolous ciliates from the anchihaline lagoons of Mallorca. *Hydrobiologia* 448(1-3):193-201.
- Christian, E. 2002. Distribution patterns of cavernicolous Collembola in Austria. *Pedobiologia* 46(3-4):261-266.
- Christman, M. C. and D. C. Culver. 2001. The relationship between cave biodiversity and available habitat. *Journal of Biogeography* 28(3):367-380.
- Clark, B. S., B. K. Clark, and D. M. Leslie. 2002. Seasonal variation in activity patterns of the endangered Ozark big-eared bat (*Corynorhinus townsendii ingens*). *Journal of Mammalogy* 83(2):590-598.
- Contos, A. K., J. M. James, B. Heywood, K. Pitt, and P. Rogers. 2001. Morphoanalysis of bacterially precipitated subaqueous calcium carbonate from Weebubbe Cave, Australia. *Geomicrobiology Journal* 18(3):331-343.
- Cooper, R. L., H. Li, L. Y. Long, J. L. Cole, and H. L. Hopper. 2001. Anatomical comparisons of neural systems in sighted epigeal and troglitic crayfish species. *Journal of Crustacean Biology* 21(2):360-374.
- Doran, N. E., A. M. M. Richardson, and R. Swain. 2001. The reproductive behaviour of the Tasmanian cave spider *Hickmania troglodytes* (Araneae : Austrochilidae). *Journal of Zoology* 253(Part 3):405-418.
- Dowling, T. E., D. P. Martasian, and W. R. Jeffery. 2002. Evidence for multiple genetic forms with similar eyeless phenotypes in the blind cavefish, *Astyanax mexicanus*. *Molecular Biology & Evolution* 19(4):446-455.
- Engel, A. S., M. L. Porter, B. K. Kinkle, and T. C. Kane. 2001. Ecological assessment and geological significance of microbial communities from Cesspool Cave, Virginia. *Geomicrobiology Journal* 18(3):259-274.

- Englisch U., and S. Koenemann S. 2001. Preliminary phylogenetic analysis of selected subterranean amphipod crustaceans, using small subunit rDNA gene sequences. *Organisms Diversity & Evolution* 1(2):139-145, 2001.
- Erkens, K., M. Lademann, K. Tintelnot, M. Lafrenz, U. Kaben, and E. C. Reisinger. 2002. Histoplasmosis in a group of bat researchers returning from Cuba [German]. *Deutsche Medizinische Wochenschrift* 127(1-2):21-25.
- Espinasa, L. and R. B. Borowsky. 2001. Origins and relationship of cave populations of the blind Mexican tetra, *Astyanax fasciatus*, in the Sierra de El Abra. *Environmental Biology of Fishes* 62(1-3):233-237
- Espinasa, L., P. Rivas-Manzano, and H. E. Perez. 2001. A new blind cave fish population of genus *Astyanax*: Geography, morphology and behavior. *Environmental Biology of Fishes* 62(1-3):339-344.
- Fosshagen, A., G. A. Boxshall, and T. M. Iliffe. 2001. The Epacteriscidae, a cave-living family of calanoid copepods. *Sarsia* 86(4-5):245-318.
- Furman, A. and A. Ozgul. 2002. Distribution of cave-dwelling bats and conservation status of underground habitats in the Istanbul area. *Ecological Research* 17(1):69-77.
- Gaisler, J. and J. Chytil. 2002. Mark-recapture results and changes in bat abundance at the cave of Na Turoidu, Czech Republic. *Folia Zoologica* 51(1):1-10.
- Groth, I., P. Schumann, L. Laiz, S. Sanchez-Moral, J.C. Canaveras, and C. Saiz-Jimenez. 2001. Geomicrobiological study of the Grotta dei Cervi, Porto Badisco, Italy. *Geomicrobiology Journal*. 18(3):241-258.
- Groth, I, P. Schumann, B. Schutze, K. Augsten, and E. Stackebrandt. 2002. *Knoellia sinensis* gen. nov., sp nov and *Knoellia subterranea* sp nov., two novel actinobacteria isolated from a cave. *International Journal of Systematic & Evolutionary Microbiology* 52(Part 1):77-84.
- Hendrickson, D. A., J. K. Krejca, and J. M. R. Martinez. 2001. Mexican blindcats genus *Prietella* (Siluriformes : Ictaluridae): An overview of recent explorations. *Environmental Biology of Fishes* 62(1-3):315-337.
- Hervant, F., J. Mathieu, and J. Durand. 2001. Behavioural, physiological and metabolic responses to long-term starvation and refeeding in a blind cave-dwelling (*Proteus anguinus*) and a surface-dwelling (*Euproctus asper*) salamander. *Journal of Experimental Biology* 204(2):269-281.
- Hobbs, H. H. 2001. A new cave crayfish of the genus *Orconectes*, subgenus *Orconectes*, from southcentral Missouri, USA, with a key to the stygobitic species of the genus (Decapoda, Cambaridae). *Crustaceana* 74(Part 7):635-646.
- Holmes, A. J., N. A. Tujula, M. Holley, A. Contos, J. M. James, P. Rogers, and M R. Gillings. 2001. Phylogenetic structure of unusual aquatic microbial formations in Nullarbor caves, Australia. *Environmental Microbiology* 3(4):256-264.
- Hsu, M. J. and G. Agoramoorthy. 2001. Occurrence and diversity of thermophilous soil microfungi in forest and cave ecosystems of Taiwan. *Fungal Diversity* 7:27-33.
- Hsu, M. J., Chih-Yuan Huang and Govindasamy Agoramoorthy. 2001. A preliminary study of fauna in caves around Kenting, Southern Taiwan. *Journal of the National Taiwan Museum* 54(1):19-27.
- Humphreys, W. F. 2001. *Milyeringa veritas* (Eleotridae), a remarkably versatile cave fish from the arid tropics of northwestern Australia. *Environmental Biology of Fishes* 62(1-3):297-313.
- Jaume, D. 2001. A new atlantassellid isopod (Asellota : Aselloidea) from the flooded coastal karst of the Dominican Republic (Hispaniola): Evidence for an exopod on a thoracic limb and biogeographical implications. *Journal of Zoology* 255(Part 2):221-233.
- Jaume, D. and W. F. Humphreys. 2001. A new genus of epacteriscid calanoid copepod from an anchialine sinkhole on northwestern Australia. *Journal of Crustacean Biology* 21(1):157-169.
- Jeffery, W. R. 2001. Cavefish as a model system in evolutionary developmental biology [Review]. *Developmental Biology* 231(1):1-12.
- Jones, B. 2001. Microbial activity in caves: A geological perspective. *Geomicrobiology Journal* 18(3):345-357.
- Kellie, S., J. Greer, and R. L. Cooper. 2001. Alterations in habituation of the tail flip response in epigeal and troglobitic crayfish. *Journal of Experimental Zoology* 290(2):163-176.
- Ketmaier, V., R. Argano, M. Cobolli, E. De Mathaeis, and G. Messana. 2001. A systematic and biogeographical study of epi- and hypogean populations of the *Proasellus* species group from Sardinia, central Italy and Jordan: allozyme insights. *Journal of Zoological Systematics & Evolutionary Research* 39(1-2):53-61.
- Koenemann, Stefan and John R. Holsinger. 2001. Systematics of the North American subterranean amphipod genus *Bactrurus* (Crangonyctidae). *Beaufortia/Bulletin Zoological Museum University of Amsterdam* 51(1):1-56.
- Kornicker, L. S. and J. Yager. 2002. Description of *Spelaeoecia saturno*, a new species from an anchialine cave in Cuba, (Crustacea : Ostracoda : Myodocopa : Halocyprididae). *Proceedings of the Biological Society of Washington* 115(1):153-170.
- Koteja, P., M. Jurczynszyn and B. W. Woloszyn. 2001. Energy balance of hibernating mouse-eared bat *Myotis myotis*: a study with a TOBEC instrument. *Acta Theriologica* 46(1):1-12.
- Krajick, K. 2001. Ecology: Cave biologists unearth buried treasure. *Science* 293(5539):2378-2381.
- Kuhajda, B. R. and R. L. Mayden. 2001. Status of the federally endangered Alabama cavefish, *Speoplatyrhinus poulsoni* (Amblyopsidae), in Key Cave and surrounding caves, Alabama. *Environmental Biology of Fishes* 62(1-3):215-222
- Lacki, M. J. and K. M. Ladeur. 2001. Seasonal use of lepidopteran prey by Rafinesque's big-eared bats (*Corynorhinus rafinesquii*). *American Midland Naturalist* 145(1):213-217.
- Lee, Y. F. and Y. M. Kuo. 2001. Predation on Mexican free-tailed bats by Peregrine Falcons and Red-tailed Hawks. *Journal of Raptor Research* 35(2):115-123.
- Lee, Y. F. and G. F. McCracken. 2001. Timing and variation in the emergence and return of Mexican free-tailed bats, *Tadarida brasiliensis mexicana*. *Zoological Studies* 40(4):309-316.
- Li, H., L. Listerman, D. Doshi, and R. L. Cooper. 2000. Use of heart rate to measure intrinsic state of blind cave crayfish during social interactions. *Comparative Biochemistry and Physiology* A127:55-70.
- Li, H. and R. L. Cooper. 2001. Spatial familiarity in the blind cave crayfish, *Orconectes australis packardii*. *Crustaceana* 74(Part 5):417-433.

- Li, H. and R. L. Cooper. 2002. The effect of ambient light on blind cave crayfish: Social interactions. *Journal of Crustacean Biology* 22(2):449-458.
- Magniez, G. J. 2001. New data on *Stenasellus strinatii* (Crustacea, Isopoda, Asellota, Stenasellidae), stygobiont from Sumatra (Indonesia) [French]. *Revue Suisse de Zoologie* 108(3):551-557.
- Mahnert, V. 2001. Cave-dwelling pseudoscorpions (Arachnida, Pseudoscorpiones) from Brazil. *Revue Suisse de Zoologie* 108(1):95-148.
- Mahunka, S. 2001. New and interesting mites from the Geneva Museum, 49. Cave-dwelling oribatid mites from Greece (Acari: Oribatida). *Revue Suisse de Zoologie* 108(1):165-188.
- Marques, A. C. and P. Gnaspini. 2001. The problem of characters susceptible to parallel evolution in phylogenetic reconstructions: Suggestion of a practical method and its application to cave animals. *Cladistics* 17(4):371-381.
- Melim, L. A., K. M. Shingman, P. J. Boston, D. E. Northup, M. N. Spilde, and J. M. Queen. 2001. Evidence for microbial involvement in pool finger precipitation, Hidden Cave, New Mexico. *Geomicrobiology Journal* 18(3):311-329.
- Montgomery, J. C., S. Coombs, and C. F. Baker. 2001. The mechanosensory lateral line system of the hypogean form of *Astyanax fasciatus*. *Environmental Biology of Fishes* 62(1-3):87-96.
- Muchmore, W. B. 2001. An unusual new species of *Mundochthonius* from a cave in Colorado, with comments on *Mundochthonius montanus* (Pseudoscorpiones, Chthoniidae). *Journal of Arachnology* 29(2):135-140.
- Nardi, Gianluca, Claudio Di Russo, and Leonardo Latella. 2002. Populations of *Nepa cinerea* (Heteroptera: Nepidae) from hypogean sulfurous water in the Lepini Mts. (Latium, Central Italy). *Entomological News* 113(2):125-130.
- Northup, D. E. and Lavoie, K. H. 2001. Geomicrobiology of caves: A review. *Geomicrobiology Journal* 18(3):199-222.
- Pati, A. K. 2001. Temporal organization in locomotor activity of the hypogean loach, *Nemacheilus evezardi*, and its epigeal ancestor. *Environmental Biology of Fishes* 62(1-3):119-129.
- Parzefall, J. 2001. A review of morphological and behavioural changes in the cave molly, *Poecilia mexicana*, from Tabasco, Mexico. *Environmental Biology of Fishes* 62(1-3):263-275.
- Pesce, G. L. and T. M. Iliffe. 2002. New records of cave-dwelling mysids from the Bahamas and Mexico with description of *Palauymysis bahamensis* n. sp (Crustacea : Mysidacea). *Journal of Natural History* 36(3):265-278.
- Poly, W. J. 2001. Nontroglobitic fishes in Bruffey-Hills Creek Cave, West Virginia, and other caves worldwide. *Environmental Biology of Fishes* 62(1-3):73-83.
- Porter, T. A. and G. S. Wilkinson. 2001. Birth synchrony in greater spear-nosed bats (*Phyllostomus hastatus*). *Journal of Zoology* 253(Part 3):383-390.
- Poulson, T. L. 2001. Morphological and physiological correlates of evolutionary reduction of metabolic rate among amblyopsid cave fishes. *Environmental Biology of Fishes* 62(1-3):239-249.
- Poulson, T. L. 2001. Adaptations of cave fishes with some comparisons to deep-sea fishes. *Environmental Biology of Fishes* 62(1-3):345-364.
- Proudlove, G. S. 2001. The conservation status of hypogean fishes. *Environmental Biology of Fishes* 62(1-3):201-213.
- Provencio, P. P. and V. J. Polyak. 2001. Iron oxide-rich filaments: Possible fossil bacteria in Lechuguilla Cave, New Mexico. *Geomicrobiology Journal* 18(3):297-309.
- Ramirez-Pulido, J., C. Galindo-Galindo, A. Castro-Campillo, A. Salame-Mendez, and M. A. Armella. 2001. Colony size fluctuation of *Anoura geoffroyi* (Chiroptera : Phyllostomidae) and temperature characterization in a Mexican cave. *Southwestern Naturalist* 46(3):358-362.
- Reeves, W. K. 2001. Invertebrate and slime mold cavernicoles of Santee Cave, South Carolina, USA. *Proceedings of the Academy of Natural Sciences of Philadelphia* 151:81-85.
- Reeves, W. K. 2001. Bionomics of *Cimex adjunctus* (Heteroptera : Cimicidae) in a maternity cave of *Myotis austroriparius* (Chiroptera : Vespertilionidae) (South Carolina, USA). *Journal of Entomological Science* 36(1):74-77.
- Reeves, W. K. and J. W. McCreddie. 2001. Population ecology of cavernicoles associated with carrion in caves of Georgia, USA. *Journal of Entomological Science* 36(3):305-311.
- Repass, J. J. and G. M. Watson. 2001. Anemone repair proteins as a potential therapeutic agent for vertebrate hair cells: Facilitated recovery of the lateral line of blind cave fish. *Hearing Research* 154(1-2):98-107.
- Rodriguez-Duran, A. and R. Vazquez. 2001. The bat *Artibeus jamaicensis* in Puerto Rico (West Indies): Seasonality of diet, activity, and effect of a hurricane. *Acta Chiropterologica* 3(1):53-61.
- Rogowitz, G. L., C. L. Candelaria, L. E. Denizard, and L. J. Melendez. 2001. Seasonal reproduction of a neotropical frog, the cave coqui (*Eleutherodactylus cooki*). *Copeia* (2):542-547.
- Romero, A. and K. M. Paulson. 2001. It's a wonderful hypogean life: A guide to the troglomorphic fishes of the world. *Environmental Biology of Fishes* 62(1-3):13-41.
- Ruffo, S. and R. Vonk. 2001. *Ingolfiella beatricis*, new species (Amphipoda : Ingolfiellidae) from subterranean waters of Slovenia. *Journal of Crustacean Biology* 21(2):484-491.
- Sanchez, M., J. Alcocer, E. Escobar and A. Lugo. 2002. Phytoplankton of cenotes and anchialine caves along a distance gradient from the northeastern coast of Quintana Roo, Yucatan Peninsula. *Hydrobiologia* 467(1-3):79-89.
- Sankaran, R. 2001. The status and conservation of the Edible-nest Swiftlet (*Collocalia fuciphaga*) in the Andaman and Nicobar Islands. *Biological Conservation* 97(3):283-294.
- Santos, F. H. and P. Gnaspini. 2002. Notes on the foraging behavior of the Brazilian cave harvestman *Goniosoma spelaum* (Opiliones, Gonyleptidae). *Journal of Arachnology* 30(1):177-180.
- Schrader, S., G. Horseman, and A. Cokl. 2002. Directional sensitivity of wind-sensitive giant interneurons in the cave cricket *Troglophilus neglectus*. *Journal of Experimental Zoology* 292(1):73-81.
- Simon, K. S. and E. F. Benfield. 2001. Leaf and wood breakdown in cave streams. *Journal of the North American Benthological Society* 20(4):550-563.
- Sket, B., P. Dovc, B. Jalzic, M. Kerovec, M. Kucinic, and P. Trontelj. 2001. A cave leech (Hirudinea, Erpobdellidae) from Croatia with unique morphological features. *Zoologica Scripta* 30(3):223-229.

Slaney, D. P. 2001. New species of Australian cockroaches in the genus *Paratemnopteryx* Saussure (Blattaria, Blattellidae, Blattellinae), and a discussion of some behavioural observations with respect to the evolution and ecology of cave life. *Journal of Natural History* 35(7):1001-1012.

Stepien, C. A., B. Morton, K. A. Dabrowska, R. A. Guarnera, T. Radja, and B. Radja. 2001. Genetic diversity and evolutionary relationships of the troglodytic 'living fossil' *Congerius kusceri* (Bivalvia : Dreissenidae). *Molecular Ecology* 10(8):1873-1879.

Strickler, A. G., Y. Yamamoto, and W. R. Jeffery. 2001. Early and late changes in Pax6 expression accompany eye degeneration during cavefish development. *Development Genes & Evolution* 211(3):138-144.

Strickler, A. G., K. Famuditi, and W. R. Jeffery. 2002. Retinal homeobox genes and the role of cell proliferation in cavefish eye degeneration. *International Journal of Developmental Biology* 46(3):285-294.

Tinaut, A. and F. Lopez. 2001. Ants and caves: Sociability and ecological constraints (Hymenoptera, Formicidae). *Sociobiology* 37(3B):651-659.

Trajano, E. 2001. Habitat and population data of troglobitic armored cave catfish, *Ancistrus cryptophthalmus* Reis, 1987, from central Brazil (Siluriformes : Loricariidae). *Environmental Biology of Fishes* 62(1-3):195-200.

Trajano, E., N. Mugue, J. Krejca, C. Vidthayanon, D. Smart, and R. Borowsky. 2002. Habitat, distribution, ecology, and behavior of cave balitorids from Thailand (Teleostei: Cypriniformes). *Ichthyological Exploration of Freshwaters* 13(2):169-184.

van Beynen, P. E., H. P. Schwarcz, D. C. Ford and G. T. Timmins. 2002. Organic substances in cave drip waters: Studies from Marengo Cave, Indiana. *Canadian Journal of Earth Sciences* 39(2):279-284.

Wilkins, H. 2001. Convergent adaptations to cave life in the *Rhamdia laticauda* catfish group (Pimelodidae, teleostei). *Environmental Biology of Fishes* 62(1-3):251-261.

Yamamoto, Y. and W. R. Jeffery. 2001. Central role for the lens in cave fish eye degeneration (vol 289, pg 631, 2000). [Correction, Addition] *Science* 291(5513):2551.

Young, R. A. 2001. The eastern horseshoe bat, *Rhinolophus megaphyllus*, in south-east Queensland, Australia: Colony demography and dynamics, activity levels, seasonal weight changes, and capture-recapture analyses. *Wildlife Research* 28(4):425-434.

protein and associated receptors responsible for the detection of light, making vision possible. Additionally, the wavelength of light that visual pigments can detect differs between species. In this study, the wavelength of absorption and evolution of the visual pigment gene (opsin) will be investigated in three genera of mysid shrimp containing cave-adapted species: *Antronymis*, *Mysidium*, and *Troglomysis*. Because the cave-adapted species in each genus are from independent cave invasions, these genera provide independent replicates of the evolutionary experiment of eye loss. In terms of visual pigments, these cave-adapted species offer the opportunity to investigate the effect of the loss of functional constraint (i.e., no light) on the evolution of a gene. Because these genera also contain species found in surface environments, direct comparisons of the visual pigment gene between ancestral (eyed) and derived (cave-adapted eye loss) states can be made.

The objectives of this research include establishing the evolutionary relationships between the cave and surface species being investigated and evaluating the relationship among environment (light or lack thereof), the evolution of the opsin gene, and the wavelengths of light each species is capable of detecting. Visual pigments are proteins that belong to a large family of receptors that have been identified as critical in cellular communication systems, including the detection of hormones, neurotransmitters, odorants, and photons. Due to the exaggeration of non-light requiring modes of perception in cave organisms, this class of receptors has the potential to be a profitable area of research for biospeleologists. However, very little is understood about these cellular communication systems in cave organisms, particularly subterranean invertebrates. This study will elucidate the evolutionary processes of visual pigments in a group of cave invertebrates and their surface relatives. By elucidating the mechanisms controlling the tuning of visual pigments to different wavelengths in mysid shrimp, this study will provide a framework for testing opsin evolution in other organisms.

## Articles

### CAVE ORGANISMS AND THE EVOLUTION OF VISUAL PIGMENTS: MYSID SHRIMP AS MODEL ORGANISMS\*

Megan Porter

Brigham Young University

(\*A summary of a proposal to CRF that resulted in Megan Porter receiving the Cave Conservancy Graduate Fellowship – editor)

While biospeleologists have long speculated on the regressive evolution of eye loss in highly adapted cave organisms, only recently have cavernicoles played a prominent role in the investigation of visual pigment evolution. Visual pigments consist of the

### NCKRI: A NEW FRAMEWORK FOR SPELEOLOGICAL PROGRESS

Penny Boston  
University of New Mexico

Our brand new century has provided the motivation for many new beginnings and projects. With the inception of the new National Cave and Karst Research Institute (NCKRI), we hope that it will also herald a flowering of all aspects of speleological research. The NCKRI was mandated by Act of Congress in October, 1998 (National Cave and Karst Research Institute Act of 1998).

The Institute has an explicitly stated mission:  
*The National Cave and Karst Research Institute furthers the science of speleology by facilitating research, enhancing public education, and promoting environmentally sound cave and karst management.*

While the official mission statement provides a broad framework for the Institute to achieve its congressionally defined goals, a specific detailed set of goals and activities has emerged. The Institute aspires to:

- Further the science of speleology through coordination and facilitation of research.
- Provide a point-of-contact for dealing with cave and karst issues by providing analysis and synthesis of speleological information and serving as a repository of information.
- Foster partnerships and cooperation in cave and karst research, education, and management programs.
- Promote and conduct cave and karst educational programs.
- Promote national and international cooperation in protecting the environment for the benefit of caves and karst landforms and systems.
- Develop and promote environmentally sound and sustainable cave and karst management practices, and provide information for applying these practices.

The precise manner in which the NCKRI hopes to accomplish the goals listed above is under active development. A working group composed of representatives from relevant federal agencies and other invitees meets regularly to advance the organization and development of NCKRI. The National Park Service is the lead agency for establishing and operating the Institute.

The initial phase of Institute development is nearing its end. This Interim Phase began in August of 1999 and really began to make progress with the tenure of Interim Director, Zeldia Chapman Bailey (on loan from her regular USGS duties), who assumed the position in July of 2000. The search for a permanent director is ongoing and will see assumption of directorial duties in the fall of 2002. The following year, 2003, will be devoted to transition from Interim Director to permanent Director, staff recruitment and initial operational setup. The institute hopes to be fully operational at a basic level by 2004. It plans to initiate a grant program by at least 2006 (or sooner) dependent upon the provision of adequate funding.

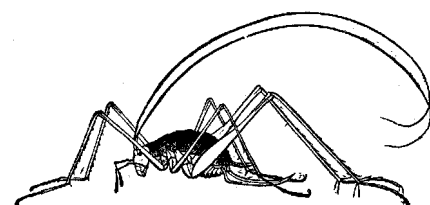
There are some features of the way that the legislation was written that are making NCKRI's organization challenging. Primary stipulations of the Act include a requirement that the Institute be located in the vicinity of Carlsbad Caverns National Park, New Mexico, but not within the boundaries of the Park;

and, that only such Federal funds may be spent that are matched by an equal amount of non-Federal funds. This latter restriction is at least unusual and possibly unique for national research institutes. It means that a great deal of the success of NCKRI will ultimately rest on its ability to attract non-governmental funding from foundations, industry, and possibly private donors. While this is a difficult condition to meet in some ways, it does provide the benefit of assuring that NCKRI must be continually responsive not only to federal governmental concerns and interests but to those of the larger public, caving community, and environmental organizations.

As another ingredient in the mixture of interests and concerns that NCKRI hopes to address, partnerships with a variety of organizations are being created. These range from agreements with educational organizations (e.g. New Mexico Tech. and U. Kentucky) to cave interest and advocacy organizations (e.g. NSS and ACCA), to special technical organizations (e.g., the Karst Waters Inst.). These partnerships are resulting in a spectrum of special projects from book sponsorships to research efforts and other activities.

Within the federal framework, NCKRI is partnered with USGS to provide a digital karst map database of unprecedented breadth, depth, and scientific detail. USGS is working closely with the State Geologists of the majority of states to smoothly integrate this work with ongoing state efforts and expertise. The purpose of this mapping effort is to provide a solid foundation of cartographic and geological information that is sufficiently flexible to be updated frequently and also to be integratable with databases in other fields, e.g. hydrology, mineralogy, and biospeleology. This mapping project DOES NOT mean that sensitive cave location information will be accessible to the public.

While the National Cave and Karst Research Institute is still in its infancy, it promises to provide cave and karst science with a federal umbrella of high visibility. Raising the perception of speleology as a legitimate scientific enterprise within the scope of mainstream science is it's crucial goal. Importantly, it will also promote activities and public awareness of caves and karst terrains as valuable and protection-worthy national resources. Along with the activities of the NSS and other caving organizations, NCKRI hopes to make the 21<sup>st</sup> Century one of unprecedented progress in the understanding of caves and karst terrain.



# NSS Biology Section Membership List

(August, 2002)

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