



NEWSLETTER OF THE AMERICAN MALACOLOGICAL SOCIETY



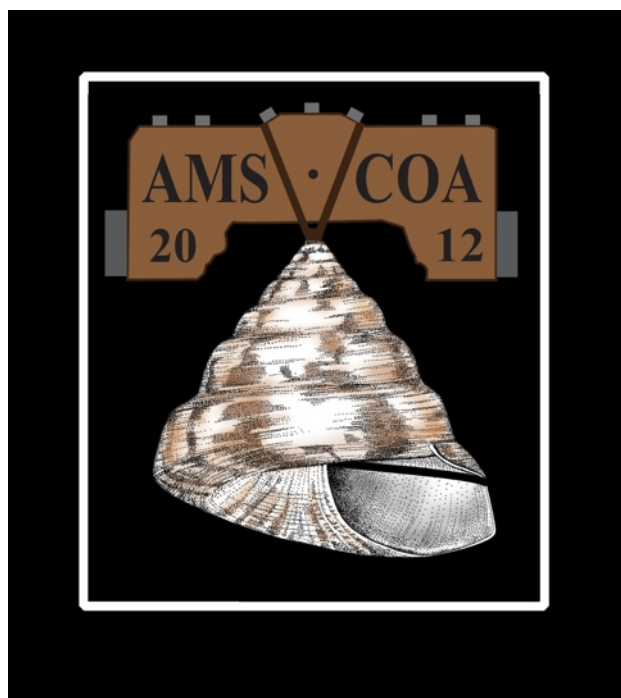
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ANNOUNCEMENTS



**AMS 2012 – PHILADELPHIA, PENNSYLVANIA
JUNE 16-21, 2012**

**Celebrating 200 Years of Molluscan Studies in
America**

Submitted by Gary Rosenberg, president AMS

The 2012 AMS annual meeting, June 16 to 21, will celebrate 200 years of molluscan studies in the Americas. The meeting coincides with the bicentennial festivities at the Academy of Natural Sciences of Philadelphia, the birthplace of malacology and conchology in the United States. The venue is the Crowne Plaza Hotel Philadelphia-Cherry Hill. The Conchologists of America will meet at the same venue, June 19 to 24. Some joint sessions and a joint banquet with COA are planned, with Dr. Baldomero “Toto” Olivera as the banquet

speaker.

The AMS meeting will include a keynote symposium on molluscan diversity, organized by Dr. Philippe Bouchet, and sessions on history of malacology in America, land and freshwater mollusks, and cephalopods. The COA meeting will include talks by former winners of COA Grants to Malacology, organized by Dr. Ellen Strong and Dr. José Leal. If you are interested in organizing a workshop or theme session at the meeting, please contact Gary Rosenberg, rosenberg@ansp.org.

Tentative schedule for the meeting:

June 16: Welcome Party in the evening

June 17-20: Scientific sessions

June 18: AMS auction and reprint sale

June 19: Reception at Academy of Natural Sciences

June 20: Banquet at hotel

June 21: Talks by winners of COA grants to Malacology

June 22-24: Continue with the Conchologists of America

Registration and abstract forms will be available in December on the AMS website. There will be a discounted registration package for those who attend both AMS and COA. Use [this link](#) to book a room at the hotel, registration code MOL, or call 1-877-898-1090 and mention AMS/COA. The group rate is \$119/night plus tax, valid until one month before the start date of the meeting. The hotel has free parking and WiFi for registered guests.



OTHER UPCOMING MEETINGS

**Florida United Malacologists (FUM)****3rd Meeting**

**The Bailey-Matthews Shell Museum (BMSM)
Sanibel Island, FL**

February 11, 2012

Contributed by José H. Leal

The third meeting of Florida United Malacologists (FUM) will take place on Saturday, February 11, 2012, at The Bailey-Matthews Shell Museum (BMSM) on Sanibel Island, Florida. The one-day gathering is designed to enhance communication among professional, amateur, and student malacologists, with topics including, but not limited to biology, ecology, paleontology, archaeology, and conservation.

FUM follows the pattern established by similar informal gatherings such as BAM (Bay Area Malacologists), SCUM (Southern California United Malacologists), MAM (Mid-Atlantic Malacologists), and OVUM (Ohio (River) Valley United Malacologists). There is no formal membership and there are no dues, officers, nor publications. However, presenters are required to submit a brief abstract limited to 150 words or less. Abstracts will be posted on the Museum web site. The gathering will be free to presenters and Museum members. Non-members will be asked to donate the Museum admission fee of \$9.

Participants are strongly encouraged to ask questions and discuss data, compare notes on methods and problems, and get acquainted with presenters and members of the audience. Presentations, limited to 15 minutes plus 5 minutes for questions, will be informal and will cover current research and collection efforts and issues. The Museum will provide projection equipment for

PowerPoint programs, brief videos, and slides.

Due to staffing limitations, use of the library and research area and collection visits will be limited to two days prior to the gathering, Thursday, February 9, and Friday, February 10. Museum parking is free. Box lunches and dinner at a local restaurant (to be arranged) will be available at cost to participants and presenters. An event reservation form for presenters and participants will be posted soon on the Museum web site (www.shellmuseum.org). Seating is limited, so please return the reservation form prior to November 30, 2011.

Please send inquiries, reservations, and presentation topic submissions to José H. Leal, Museum Director/Curator at jleal@shellmuseum.org. The deadline for submission of topics and abstracts is December 15, 2011. The FUM program including abstracts, times, and sequence of presentations will be posted on the Museum web site, www.shellmuseum.org, shortly after the topic submission deadline.

Kind regards to all,

José H. Leal
Director/Curator
The Bailey-Matthews Shell Museum

**SCUM 16th Meeting**

Cabrillo Marine Aquarium, San Pedro, CA

January 21st, 2012

Contributed by Lindsey Groves

The 16th gathering of SCUM [Southern California Unified Malacologists] will be held on Saturday, January 21st, 2012 at the Cabrillo Marine Aquarium, San Pedro, California from 9 AM to 4 PM. SCUM is an informal association of professional, amateur, and student malacologists and paleontologists in southern California, who are active or interested in research on mollusks. The purpose of the annual gathering is to facilitate contact and keep one another informed of research activities and opportunities. There are no dues, officers, or publications. All persons interested in Recent and/or fossil mollusks are invited to attend. Presentations and discussions are encouraged but should be informal and briefly cover current research interests. For additional details please contact SCUM XVI host John Ljubenkov at ljubenkov@invertebratetaxonomy.com. We hope to see you there.





**International Meeting on Biology and
Conservation of Freshwater Bivalves**

Bragança, Portugal

4-7 September 2012

Contributed by Manuel Lopes-Lima

The Meeting will be held on the IPB auditorium at Bragança, Portugal. Updated information, including registration, the composition of the scientific and organizing committees is available at <http://esa.ipb.pt/bivalves>.

The Venue: Freshwater bivalves are a very important part of biodiversity, increasingly recognized as having key roles in the ecosystems they inhabit. Their global decline has been causing increasing concern. Although in recent decades there has been an increasing number of studies on the ecology and conservation of these animals, the integration of knowledge acquired by different research groups becomes urgent. This approach, in a comprehensive and integrative manner will also help policy makers to establish guidelines, which can then be applied in conservation management of these animals and their natural habitats.

It is under this perspective that we want to introduce the present event that will bring together international experts in biology and conservation of freshwater bivalves that through a cycle of conferences and debates, will be able to create a network of knowledge with the final goal of develop collaborative projects and eventually global directives for the protection and conservation of this important faunistic group.

So, we are inviting you to submit an abstract to the International Meeting on Biology and Conservation of Freshwater Bivalves. There will be several thematic symposia and poster sessions, covering the following subjects:

- Biology and ecology
- Conservation & threats to species and ecosystems
- Invasive species
- Phylogeny and phylogeography
- Systematics and taxonomy
- Physiology and reproduction
- Freshwater bivalves and ecosystem functioning

Deadlines:

- Early registration: 30 April
- Late registration: 31 July
- Abstract submission: 30 April



**National Shellfisheries Association 104th Annual
Meeting**

Renaissance Hotel, Seattle, WA

March 25-29, 2012

Contributed by Sandy Shumway

Meeting website: www.shellfish.org

Contact: Sandy Shumway

E-mail: sandra.shumway@uconn.edu



OTHER ANNOUNCEMENTS

Gilbert D. Harris Award

November 1, 2010, GSA Denver. John Pojeta, Jr. was presented with The Gilbert D. Harris Award for Excellence in Systematic Paleontology by the Paleontological Research Institution.



**NSF-funded Laboratory Renovation at the
Paleontological Research Institution**

Contributed by Paula Mikkelsen

Associate Director for Science

E-mail: pmm37@cornell.edu

Paleontological Research Institution (PRI) is pleased to announce completion of an NSF-funded laboratory renovation. The four new laboratories - BioLab, PaleoLab, WetLab, and PrepLab - substantially increase PRI's ability to support research by its staff and affiliated Cornell University students, as well as to host visitors working on material in our research collections. Please see <http://www.museumoftheearth.org/research.php> for more information about our research staff and programs, including our annual Summer Symposium and our annual Awards (especially our Student Award in Systematic Paleontology and the John W. Wells Grants-in-Aid of Research Program). More information about our research collections is available at <http://www.museumoftheearth.org/collections/index.php>.



News from the Malacology Section, Natural History Museum of Los Angeles County

Contributed by James H. McLean¹ and Lindsey Groves²

1. Emeritus Curator of Mollusks, Natural History Museum of Los Angeles County
2. Collection Manager, Natural History Museum of Los Angeles County

We remain optimistic that our museum administration will eventually reinstate a curatorship; in the interim, the collection remains open to visitors and loan services.

McLean reports that sufficient outside funding has been received to enable him to finish the illustrations for his monographic revision of living and fossil Liotiidae and Areneidae, which together comprise a new vetigastropod superfamily Liotioidea. Once that is accepted for publication, work will resume on the first of two books on the shelled benthic gastropods of the northeastern Pacific, for which the illustrations are nearly complete for both the southern book treating the species of British Columbia to Baja California, and the northern book, which will treat the Alaskan and north Pacific species.



Scanned Copy of Lamarck's "Liste des objets"

Contributed by Richard E. Petit

In 1816 Lamarck wrote a 16 page "Liste des objets" providing names for shells figured on Plates 391-488 of the Encyclopédie Methodique. Possibly due to its separate pagination this list is not present in many otherwise complete copies of the Encyclopédie. A good copy of Lamarck's paper has been scanned and saved in pdf. It is available without charge.

If you would like to receive a copy, just send an email to r.e.petit@att.net with Lamarck in the subject line. As the paper was scanned, even compressed (but print quality) the file is 1,532KB.



The Freshwater Gastropods of Tennessee

Contributed by Robert T. Dillon, Jr.

The FWGNA project is pleased to announce the launch of our new web-based resource, "The Freshwater Gastropods of Tennessee," by R. T. Dillon and Martin Kohl. This brings to five the number of states currently covered by the project.

Our study area extends over the eastern third of the state at the present time, treating the freshwater snails of the Tennessee River and its tributaries upstream from the Alabama line just south of Chattanooga. The area also includes 8 counties in southwest Virginia, 15 counties in western North Carolina, and 7 counties in north Georgia, for a catchment of approximately 57,000 km².

A total of 38 freshwater gastropod species are documented from 766 sample sites, with distribution maps, taxonomic notes, a dichotomous key, a photo gallery, and conservation recommendations. Here's the direct link:

<http://www.fwgna.org/FWGTN/>

Our appreciation is due to the Virginia Department of Game & Inland Fisheries for support of this work, as well as to the Office of Inventory and Monitoring at the Great Smoky Mountains National Park.



MEMBERS CONTRIBUTIONS

Report on the 77th Meeting of the American Malacological Society, 23-28 July 2011

Submitted by Charles Sturm, President AMS 2010-2011.

The 77th Meeting of the American Malacological Society has come and gone. The meeting was held on the campus of Duquesne University, which is located on the outskirts of downtown Pittsburgh, PA. The meeting, which had 90 attendees, ran from 23 -28 July. Attendees came from across the United States and from four European countries: Austria, Germany, Great Britain, and Norway. The meeting was dedicated to the memory of Juan Jose Parodiz who would have turned 100 years of age this year. Parodiz was a former president of AMS and curator/curator emeritus at the Carnegie Museum from 1952-2007. In all, 67 papers and eight posters were presented.

Registration was handled by Pat Sturm, Mary Lou Pojeta, Louise Corpora, Anita and Jerry Graff. These individuals, none were members of AMS, volunteered to run the registration desk and answer numerous questions that came up. The meeting began on Saturday evening with the Presidential Reception held at the Pittsburgh Downtown Marriott, a few block from Duquesne University. The setting was relaxed and allowed folks to renew acquaintances and make new friends. At the conclusion of the reception some turned in in

preparation of the next day's scientific program while others took advantage of Pittsburgh's night life.

The Keynote Symposium, held on Sunday July 24th, was organized by Tim Pearce. It was titled *Mollusks: The great unanswered questions*. In this symposium, speakers reviewed what we know about the various classes of mollusks and areas that appear ripe for future research activity. The symposium was held in honor of the late James Lee, a supporter of malacology at the Carnegie Museum. The symposium was sponsored by funds from AMS and Dolores Lee, Jim's widow.

Elizabeth Davis-Berg and Amy Wethington organized the morning symposium on Monday, July 25th. The symposium titled *Gastropoda: Biology, Behavior, and Ecology*, covered a wide range of topics. In the afternoon, there was an open session with papers dealing with various topics in cephalopod and gastropod biology.

In the evening, we again walked to the Marriott for the always enjoyable AMS Auction. Books, journals, reprints, clothing, etc. were donated by many people, some who were not able to attend the meeting. The meeting space and refreshments were arranged by Pat Sturm and the financial details of the auction were handled by Paula Mikkelsen, Mary Lou Pojeta, and Dawn Dittman. The auction was run by Tim Pearce, Amanda Zimmerman, Marla Coppolino, and myself (as auctioneer). The auction netted just over \$2000 for the student fund. An enjoyable evening was had by all who attended.

Tuesday began with the symposium *Cretaceous and Cenozoic Molluscan Paleontology* organized by John Pojeta. The afternoon symposium, *History of Malacology*, was arranged by Jay Cordeiro. Both symposia addressed areas not often dealt with at AMS meetings. In the evening the Publication Workshop was held. After the formal presentations concluded, there was lively discussion between speakers and the audience.

The *Gastropoda: Biology, Behavior, and Ecology* Symposium concluded on the morning of July 27th. Posters were set up this morning and authors were available in the afternoon to discuss their research. At the conclusion of the poster session, the annual business meeting of AMS was held. At the meeting Gary Rosenberg was elected president, Peter Marko president-elect, and Paul Valentich-Scott vice-president.

The Annual Banquet was organized by Pat Sturm. We met on the Duquesne Campus and a bus took us to the Rivers Casino. Here we enjoyed buffet style

dinner. The dinner came to an abrupt end when the fire alarms sounded and we evacuated the building. Luckily, we exited the building by a pier where a ship from the Gateway Clipper Fleet was waiting for us. We boarded the ship and spent the next hour cruising the Allegheny, Monongahela, and Ohio Rivers. The boat docked and we again boarded the bus, this time to return to our lodging.

On July 28th field trips and workshops were held. Art Bogan ran a workshop on identifying unionids. Tim Pearce ran a field trip to Powdermill Nature Preserve for folks who wanted to study terrestrial gastropods. Powdermill, located in the Laurel Highland, is the biological research station of the Carnegie Museum. Lastly, the resources of the Section of Mollusks were available to visitors. Paul Robb and Tim Dolan were on hand to help visitors negotiate the collection and library in the Section of Mollusks.

In all, 90 individuals attended all or part of the meeting. The meeting realized excess revenue which will be utilized to pay the student awards. By utilizing these funds, the principle of the student fund endowment and the Constance Boone Endowment can reinvest all of their dividends so as to allow for greater growth. The rest of the excess revenue will be sent to AMS to help cover costs of publishing the papers from the *Mollusks: The great unanswered question* symposium and for general expenses.

The Constance Boone Student Award was won by Serena Ciparis and best student poster by John Pfeiffer. The student awards committee consisted of Megan Paustian, Tim Pearce, and Robert Prezant.

When I agreed to run for vice-president I did so with apprehension. By trade I am a physician not a malacologist. My activities in malacology are more one of a hobby than a profession. Why I was asked to run the organization is a mystery to me and now part of our history. From calls and letters that I received in the weeks following the meeting, it appears to have been successful. While there were a few minor snafus, and I take sole responsibility for them, the success of the meeting cannot rest solely upon my shoulders. It is to be shared by the individual mentioned above and by those who responded to my many e-mails and phone calls for advice: Frank "Andy" Anderson, Robert Dillon, Doug Eernisse, Paula Mikkelsen, Timothy A. Pearce, and Robert Prezant.

Amanda Zimmerman, Amanda Lawless, Marla Coppolino, and Pat Sturm did much of the yeoman's work of the meeting: the web page, art

work, the program, registration details, etc. Financial details were handled by Louise Corpora and Dawn Dittman. These individuals all deserve credit for the success of the meeting.

Addition funds for the meeting were provided by Oxford University Press, Mal de Mer Shell Books, and the Pennsylvania Natural Heritage Program of the Western Pennsylvania Conservancy. Lastly, my employer the Forbes Family Medicine Residency Program allowed me to use computer and office resources and freed up time for me to work on details of the meeting.



**Report from 2nd International Congress on
Invertebrate Morphology-Harvard University**

Cambridge, MA

20 June - 23 June 2011

Contributed by Ignacio Leyva Valencia

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23096, Mexico. E-mail: ileyva@cibnor.mx

Ignacio Leyva is currently a doctoral student in CIBNOR his doctoral dissertation involves using geometric morphometrics and molecular phylogenetics to study geoduck clams (species).

The 2nd International Congress on Invertebrate Morphology was held in the University of Harvard, Massachusetts on 20-24 Jun 2011. A total of 137 contributed talks and 63 posters were presented during this meeting for members of the International Society for Invertebrate Morphology and other societies interested in the morphology and evolution of invertebrate animals.

In Molluscs morphology there were a total of 9 contributed talks and 4 posters presented. Less than 10% of the works presented in this conference were of molluscs, however few they provided some very useful and new developments in this small but growing field of mollusc morphology.

Dr. Roger Croll from Dalhousie University, Canada, presented a paper titled Neural Development in Molluscs which discussed the challenges facing molluscan neural development. He provided a new perspective of the larvae stage as being complicated in its own right and worthy of detailed study, and that it should not be simply thought of as a transition stage as designated in many earlier studies. He then went on to discuss some of the challenges for further research in studying neural development in Mollusca.

Dr. Jonathan Q. Henry presented “A Twist of Fates: Cell Lineage and Specification of Organizer in the slippersnail *Crepidula*.” This talk described in the gastropod mollusc *Crepidula fornicata* the cell and molecular mechanisms involved in controlling D quadrant specification and organizer activity. He described the specific signal transduction pathways and the cell lineage fate map of the mesentoblast. The results have probable implications regarding mesodermal cell fates and their evolutionary origins.

Taxonomical identification in gastropods is often based on a single or a small number of morphological characters and has caused controversial debates regarding phylogenetic affinities. To aid in identification, the paper titled Sneaking into the meiofaunal world – Evolution and adaptations in microslugs (Heterobranchia, Gastropoda) studied the morphological descriptions of main meiofaunal groups using a new more modern methodology of 3D microanatomy, instead of the standard light microscopy methodology.

Very little is known about the digestive systems in the many different species of Mollusca. The paper Comparative study of some digestive system organs in Cephalaspideans (Mollusca, Euophistobranchia) investigated food type and morphofunctional features of the digestive system in herbivore *Bulla striata* and two carnivorous species, *Philinopsis depicta* and *Aglaja tricolorata*. They found that in the carnivorous species salivary glands secretion was richer in proteins, while in *B. striata* polysaccharides are more dominant. Authors indicated that they will carry out further research to determine whether this is consistent in other Mollusca species.

The paper Ontogenic Evidence for the Re-volution of planktotrophy in the gastropod species *Bostrycapulus calyptraeformis* and *Crepidatella fecunda* (Caenogastropoda: Calyptraeidae) discussed whether ontogenic evidence is biased toward direct development or whether it is independent and has little phylogenetic constraint. The author indicated that in the species *B. calyptraeformis* and *C. fecunda* larvae have greater mass at hatching, and also that during the intracapsular period embryos show a greater rate of increase in mass with respect to size than larvae of other planktotrophs. The paper indicated that a functional cluster formed distinct groupings from other planktotrophs when data was combined with mass, velar parameters and ciliary speed.

There are limited number of works regarding Gastropods and their evolutionary development. Dr. Louise Page from University of Victoria, Canada

contribution to bridge this gap is her paper titled Modularity during foregut development of a cone snail. In it she describes gastropod foregut development of the cone snail, *Conus lividus*. Previous results suggested that foregut consists of dorsal and ventral developmental modules having distinct morphologically and functionally. Her results studying larval and metamorphic development of these organisms apparently were consistent with the hypothesis of dorsal and ventral modules for the development. Her results provide further insight into how the extraordinary venom gland of the cone snail is generated during development.

An interesting study about morphology of aplacophoran molluscs using micro-computed tomography (μ CT) was presented by Emanuel Redl from University of Vienna, Austria. His paper was titled Studying Aplacophoran Molluscs using Micor-CT in it he recommended this non-invasive method as a complement to or even a substitute for traditional methods for analyzing nervous system structures in molluscs, i. e. Solenogasters and Caudofoveata.

Chitons of the family Leptochitonidae live in the deep sea worldwide and are small and rather plane-looking making them notoriously difficult to identify. Also, since historical specimens are limited due to the obvious difficulty of specimen capture in the deep sea morphological descriptions of different species are dubious, to say the least. In the paper Microanatomical Characters to Resolve Taxonomic Confusion in Deep-Sea Chitons (Mollusca: Polyplacophora) Dr. Julia D. Sigwart proposes a new quantitative approach to help clarify species descriptions by providing a morphological framework in order to support robust phylogenetical taxonomy of this family. The new method she used involved using multiple sets of microanatomical characters from SEM images for morphological diagnostic in lepidopleuran chitons in order to support a revised taxonomy. She carried out SEM imaging on 85 of the approximately 130 known species in Leptochitonidae using two new sets of character data. Her results provide a new methodology which can be useful for identifying this difficult Mollusca family.

Within Mollusca phylum representative organisms can be found living in the sandy bottom, however only a few gastropod taxa and the aplacophoran solenogasters have evolved to living "within" the sediment of aquatic bodies (meiofauna). The paper Meiofauna Solenogasters (MOLLUSCA) and their "Giant" relatives compared the morphological adaptations of meiofauna solenogasters with that of

related taxa that live on top of the sediment surface (epifauna). A meiofaunal ancestor to the clade is discussed based on a number of characters.

General structural morphology of gastropod jaws is well studied; however, the type of jaw growth for Gastropoda is unknown. The paper "Ultrastructure of jaws in Gastropods - Do the jaws of Molluscs and Polychaeta have similar structure?" helps elucidate jaw growth by studying the ultrastructure and general morphology of nine species of Prosobranchia (Patellogastropoda (eight species) and Vetigastropoda (*Puncturella naochina*)) and one species of Opisthobranchia (Gymnosomatidae *Clione limacina*).

There were also four posters on Mollusca exhibited. Poster#44 entitled "New Insights into Early Molluscan Evolution from Ancestral State Reconstruction" involved an interesting attempt to determine the last common ancestor of the extant molluscs by testing the Aculifera hypothesis. This hypothesis states that Neomeniomorpha is the sister taxon of Chaetodermomorpha (Caudofoveata) and that this clade (Aplacophora) is closely related to Polyplacophora (chitons). They carried out ancestral state reconstruction using maximum parsimony to deduce the plesiomorphic states of several characters considered significant to molluscan evolution. The notable result was the Middle Cambrian taxon *Odontogriphus omalus*, considered to be a stem group mollusc, exhibited some character states consistent with their reconstruction, however other characters were ambiguous.

It is known that the ultrastructure morphology of cephalopod spermatozoa can be important characters and can be useful for phylogenetic studies. Poster #45 is a study by M. Rodrigues (Universidad de Vigo, Departamento de Ecología y Biología Animal, Vigo, Spain), A. Roura, A. Guerra (both from Instituto de Investigaciones Marinas (CSIC), Vigo, Spain), and J. S. Troncoso (also from Universidad de Vigo, Departamento de Ecología y Biología Animal, Vigo, Spain) along those lines and was titled "Occurrence of biflagellate spermatozoa in the atlantic bobtail squid *Sepioloidea atlantica* (Cephalopoda: Sepiolidae)." According to the authors it is the first study to describe the sperm ultrastructure of *Sepioloidea atlantica* d'Orbigny (1839-1842), a common sepiolid species of the Northeastern Atlantic. In this study they describe for the first time mature biflagellate spermatozoa within the Cephalopoda family, however they noted that the functional significance of this characteristic is unknown.

Poster#47 was presented by Dr. M. C. Götze from Goethe University, Germany, describing the scallop

eyes using comparative histology analyses. The poster was titled “As far as the eye can see – Comparative histology of eyes in Pectinidae (MOLLUSCA: BIVALVIA).” Several methods were used such as Masson Goldner Trichrom and immunocytochemical staining. Also, the poster presents an interesting discussion attempting to link habitat and lifestyle with the evolution of eyes.

The final Molluscan poster was #48 and was titled “Formation and evolution exoskeletons: An eclectic view from aplacophoran morphology.” Bioproduction of calcareous exoskeletons was analyzed using literature of extant Polyplacophora, Aplacophora, Nautilus, Neopilina, Bivalvia and Gastropoda. Possible evolutionary steps were presented for a nonbiomineralized dorsum to calcareous scleritomes and shells. The key finding presented was the discovery of new characters of phylogenetic importance that lead to the proposition that there are two major molluscan taxa: Aculifera and Conchifera.



Maintenance of *Biomphalaria glabrata* in artificial spring water, deionized water, or conditioned tap water

Contributed by Amanda Balaban and Bernard Fried

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Biomphalaria glabrata is an economically important gastropod that serves as an intermediate host for numerous larval trematodes including *Schistosoma mansoni* and *Echinostoma caproni*. Laboratory maintenance of *B. glabrata* is important for controlled experiments with this snail. To better understand laboratory conditions optimal for the maintenance of *B. glabrata*, we investigated the survival and fecundity of *B. glabrata* maintained in either conditioned tap water (CTW), deionized water (DI), or artificial spring water (ASW). In our laboratory, *B. glabrata* snails are usually maintained in ASW, which contains numerous beneficial chemicals but is labor intensive to prepare. The purpose of this study was to determine the optimal aquarium water for the maintenance of *B. glabrata* in the laboratory.

Glass finger bowls (11.5 cm in diameter) each with approximately 200 ml of CTW, DI, or ASW were used. CTW was prepared by maintaining approximately 500 ml of Easton, PA tap water (Easton Suburban Water Authority; [http://](http://www.eswater.net/report_2010.pdf)

www.eswater.net/report_2010.pdf) in a beaker for at least 5 hrs; air was bubbled into the water to remove chlorine. DI was taken from the same water supply but processed as DI using a conventional laboratory deionizer. ASW was prepared as described in Schneck and Fried (2005). Ten *B. glabrata* snails (9-10 mm in diameter) were placed in each of 3 finger bowls containing the different types of water and fed a 4x4 cm piece of Romaine lettuce every 2 days. Snails were maintained at 25±1°C for 3 weeks. The number of surviving snails, and the number and diameter of egg masses (in mm) were recorded at least twice a week. The egg mass diameter was used as an indicator of the number of eggs produced per egg mass. An egg mass with a diameter of 5.8 mm had about 22 eggs, whereas one with a diameter of 3.7 mm averaged 12 eggs.

Our study indicates that the snails maintained in DI and ASW showed similar percentages in terms of snail survival. Both cultures had relatively low death rates and showed a survival percentage of 90 by day 21, at which time the experiment was terminated (Figure 1). However, there was a significantly higher number of eggs per egg mass produced in the ASW cultures (P=0.016) (Table 1). Snails in CTW showed no sign of feeding, produced copious mucus in the head-foot region and did not lay eggs. All snails in CTW were dead by day 10 after the initiation of the experiment (Figure 1).

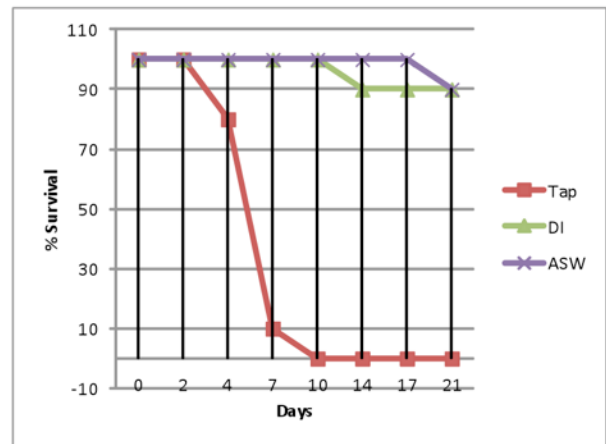


Figure 1. Percent survival from 0 to 21 days of snails cultured in CTW, DI, or ASW; 10 snails used per culture.

Table 1. Number (No.) and mean diameter (in mm) of egg masses in DI and ASW cultures.

Days	DI		ASW	
	No. Masses	Diameter	No. Masses	Diameter
4	2	4.5	3	6.8
7	0		4	5.3
10	3	4.5	7	5.7
14	5	4.3	7	4.9
17	7	4.4	6	5
21	4	4.8	7	5.3

Our results indicate that DI may be a good replacement for ASW to maintain *B. glabrata* in laboratory cultures. Although there may be some detrimental effects on fecundity compared to snails maintained in ASW, we observed good survival and fecundity of *B. glabrata* maintained in DI water. Eggs laid in DI were viable and gave rise to neonates that hatched and developed normally in the laboratory. The snails maintained in ASW produced more egg masses and a greater number of eggs per mass than those maintained in DI. However, this gain in egg production is offset by the effort that it takes to prepare ASW relative to the ease of using DI for the aquarium water needed to maintain the snails. Unknown substances in CTW, in spite of the conditioning to get rid of chlorine, have a negative impact on survival and fecundity of *B. glabrata* in the laboratory and we do not recommend its use for *B. glabrata* cultivation.

Acknowledgements: We are grateful to Dr. Fried A. Lewis, head of the Schistosomiasis Laboratory, Biomedical Research Institute, Rockville, Maryland, for supplying *B. glabrata* snails used in this work through NIH-NIAID contract NO1-AI-55270.

References

Schneck, J.L. and B. Fried. 2005. Growth of *Biomphalaria glabrata* (NMRI strain) and *Helisoma trivolvis* (Colorado strain) under laboratory conditions. American Malacological Bulletin 20: 71-73.



Scientific publications resulting from AMS Student Award

Contributed by José Eduardo A. R. Marian

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Part of the results of my Ph.D. research, which has been supported by an AMS Student Award, was recently published in three scientific articles, whose abstracts are provided below. See also the previous issue of the American Malacological Society Newsletter for another paper resulting from the same support. Other manuscripts are expected to be published in the near future. The author thanks the AMS, including all its councils, committees and members, for granting funding for this research, thus helping to defray several of the costs of this study.

Marian, J.E.A.R. 2011. Spermatophoric reaction reappraised: Novel insights into the functioning of the loliginid spermatophore based on *Doryteuthis plei* (Mollusca: Cephalopoda). Journal of Morphology. doi: 10.1002/jmor.11020

Available at <http://onlinelibrary.wiley.com/doi/10.1002/jmor.11020/abstract> [those without a subscription may request a copy from the author] – SEE THE FREE SUPPLEMENTARY VIDEOS AVAILABLE ONLINE!

Abstract: During copulation, spermatophores produced by male coleoid cephalopods undergo the spermatophoric reaction, a complex process of evagination that culminates in the attachment of the spermatangium (everted spermatophore containing the sperm mass) on the female's body. To better understand this complicated phenomenon, the present study investigated the functional morphology of the spermatophore of the squid *Doryteuthis plei* applying in vitro analysis of the reaction, as well as light and electron microscopy investigation of spermatangia obtained either in vitro, or naturally attached on females. Hitherto unnoticed functional features of the loliginid spermatophore require a reappraisal of some important processes involved in the spermatophoric reaction. The most striking findings concern the attachment mechanism, which is not carried out solely by cement adhesive material, as previously believed, but rather by an autonomous, complex process performed by multiple structures during the spermatophoric reaction. During evagination, the ejaculatory apparatus provides anchorage on the targeted tissue, presumably due to the minute stellate particles present in the exposed spiral filament. Consequently, the ejaculatory apparatus maintains the attachment of the tip of the evaginating spermatophore until the cement body is extruded. Subsequently, the cement body passes through a complex structural rearrangement, which leads to the injection of both its viscid contents and pointed oral region onto the targeted tissue. The inner membrane at the oral region of the cement body contains numerous stellate particles attached at its inner side; eversion of this membrane exposes these sharp structures, which presumably adhere to the tissue and augment attachment. Several naturally attached spermatangia were found with their bases implanted at the deposition sites, and the possible mechanisms of perforation are discussed based on present evidence. The function of the complex squid spermatophore and its spermatophoric reaction is revisited in light of these findings.

Marian, J.E.A.R. and O. Domaneschi. 2011. Unraveling the structure of squids' spermatophores: a combined approach based on *Doryteuthis plei* (Blainville, 1823) (Cephalopoda: Loliginidae). *Acta Zoologica* (Stockholm) 00: 1–27.

Available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1463-6395.2011.00503.x/abstract> [those without a subscription may request a copy from the author] – SEE THE FREE SUPPLEMENTARY MATERIAL AVAILABLE ONLINE!

Abstract: Male coleoid cephalopods produce elaborate spermatophores, which function autonomously outside the male body during copulation, undergoing a complicated process of evagination. In order to contribute to the understanding of this unique structure, this study investigated the morphology of the spermatophore of *Doryteuthis plei* applying several microscopy techniques. A hitherto unreported, much more complex structural arrangement was revealed for the loliginid spermatophore, the most striking findings being: (1) the complex, layered structure of the middle membrane, which bears an additional, chemically distinct segment surrounding part of the cement body; (2) the presence of a space between the inner tunic and middle membrane filled with a fine reticulated material; (3) the presence of stellate particles not only embedded in the spiral filament, but also closely applied to the inner membrane at the level of the cement body; (4) the presence of a pre-oral chamber in the cap region; and (5) the complex organization of the cement body, formed by two distinct layers encompassing contents of different chemical and textural properties. Careful literature reassessment suggests several of these features are common to loliginids, and to some extent to other squids. Their possible functional implications are discussed in light of our knowledge of the spermatophoric reaction mechanics.

Marian, J.E.A.R. (2011) The enigma of the "spermatophoric reaction": brief summary of the knowledge of the structure and functioning of cephalopod spermatophores (Mollusca: Cephalopoda) [Original title: O enigma da "reação espermatofórica": breve síntese do conhecimento sobre a estrutura e o funcionamento dos espermatóforos dos cefalópodes (Mollusca: Cephalopoda)]. *Papéis Avulsos de Zoologia* 51(13): 207–219.

Available at http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0031-1049201100130001 [Free access; article in Portuguese; abstract in English].

Abstract: Coleoid cephalopods (squids, cuttlefishes, and octopods) produce elaborate spermatophores, which are transferred to the female during mating with the aid of a modified appendage called hectocotylus. During transfer, the spermatophores undergo the so-called spermatophoric reaction, i.e., a complex process of evagination of the ejaculatory apparatus that, ultimately, leads to the extrusion of the cement body and sperm mass. The present review summarizes the bulk of our knowledge on the morphology and functioning of this exclusive coleoid character, identifying gaps and defining strategies to stimulate advancements in this area. Few detailed morphological studies regarding this structure have yet been conducted, and much of the knowledge on the coleoid spermatophore was generated by classical studies of the 19th and early 20th centuries. Furthermore, investigations on the functioning of this structure are even rarer, the basic knowledge of the spermatophoric reaction being restricted to 19 species. There seems to be a consensus in the literature that two types of attachment of spermatophores occur in decapodiforms (i.e., squids and sepioids): superficial attachment, and deep (or intradermal) implantation. In superficial attachment, the base of the spermatangia ends up attached on the surface of the female's body, by means of the adhesive contents and, in some cases, attachment structures of the cement body; this type is found in several groups of decapodiforms (e.g., Loliginidae, Ommastrephidae, Sepiidae). In deep implantation, the spermatangia penetrate autonomously the integument, embedding themselves completely into the female tissue; this strategy is common to some oceanic and deep-sea species (e.g., Architeuthidae, Cranchiidae, Octopoteuthidae, Sepiolidae). The mechanism responsible for deep implantation remains unknown. In octopodiforms (octopods), the spermatophore is inserted inside the lumen of the female gonoduct, reaching the oviducal gland, where the spermathecae are located, or the ovarian cavity. Since the extracorporeal functioning of coleoid spermatophores must rely entirely on the intricate structure and organization of the tunics, membranes, and other structures composing the spermatophore, only detailed investigations of these components would provide the basis for comprehending its mechanics. This paper recommends the development of a specific, efficient protocol for whole-mount staining and permanent preparation of coleoid spermatophores, in order to enable expansion of spermatophore morphological descriptions in taxonomic and anatomical studies, and therefore enhance the knowledge of this unique, still enigmatic structure.

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**Report of the 5th Annual Ohio River Valley
Unified Malacologist Meeting (OVUM)**

**Thomas More College Center for Ohio River
Research and Education, California, KY**

October 1, 2011

*Contributed by Meghann Vincie King and Dr.
Timothy Pearce*

In attendance: Charles Acosta, Francisco Borrero, Mariah Clements, Zsuzsanna Cooke, Joe Darpel, John Ferner, Clara Folb, John Hageman, Nick King, Meghann Vincie King, Ronald Lange, Olivia Lantry, Steve Lilly, Christopher Lorentz, Christopher Owen, Megan Paustian, Timothy Pearce, Warren Pryor, Lori Schroeder, Jeff Schroeder, Amsula Stone, Alexandria Wright.

The Ohio River Valley Unified Malacologists met for their fifth year at the Thomas More College Center for Ohio River Research and Education (TMC CORRE), also known as the TMC Biological Field Station, located on the Ohio River in California, Kentucky, across the river from Cincinnati. There were 22 total in attendance and nine mollusk presentations given. The meeting began with a welcome and background talk of the field station by Dr. Chris Lorentz, a Thomas More College biology professor and director of the TMC CORRE. Dr. Timothy Pearce then described OVUM and its origin. Several talks regarding snails or slugs included the following: Dr. Pearce talked about whether wetlands are good habitat for land snails, Dr. Francisco Borrero spoke about the ecology of two common species of snails in tropical forest understory habitat in southern Costa Rica, Dr. Megan Paustian discussed invasive terrestrial slugs and their worldwide spread, specifically how it related to her Encyclopedia of Life project, and Jeff and Lori Schroeder presented a video of snail research completed in the Bernheim Research Forest in Clermont, Kentucky. Dr. Charles Acosta brought marine experience to the meeting with his talk on modeling population dynamics of the queen conch *Strombus gigas* under heavy fishing pressure in Belize. The remaining talks related to freshwater mussels including the following: Dr. Warren Pryor presented his studies on temperatures in a mussel habitat located in Crooked Lake, Indiana, Mariah Clements discussed her masters research on the projected effect of photoperiod on the metabolic rate in *Pygandon grandis*, Meghann Vincie King presented her masters research on development of a suitable diet for rearing captive endangered juvenile oyster mussels *Epioblasma capsaeformis* and Nick King displayed and described his photo documentation of a natural fish host infestation by

Epioblasma capsaeformis. After the meeting, five participants took a tour of the mollusk collections at the Cincinnati Museum Center led by Dr. Borrero.

Dr. Warren Pryor expressed his interest in hosting OVUM 2012, hence the meeting will be held next fall at the University of St. Francis in Fort Wayne, Indiana.

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**A new species location record in Sussex County
Delaware**

Contributed by F. Matthew Blaine
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Abstract: There have been few surveys of Niades (Bivalvia: Unionidae) in Sussex County, Delaware. The last major survey which included Sussex County was by Clement L. Counts, III, Thomas S. Handwerker, and Roman V. Jesien. It was published in American Malacological Bulletin, Volume 9 (1) (1991) 27 – 37. In that report several stations in Sussex County, Delaware are cited. I have been monitoring several of the stations over the past few years in an attempt to record all of the Gastropods and Bivalves extant in Sussex County, Delaware. Recently I have found one new species sighting. I found *Anodonta cataracta* Say, 1817 at a new location near Counts, Handwerker, and Jesien's Meadow Branch station #31.



Photo 1. Horseys Pond Dam from pond side N 38°32. 780 , W 075° 34.844.

Description of the study area: Horseys Pond is a 46.3 acre freshwater lake at the head of Meadow Branch. The lake is separated from Meadow Branch by a dam just south of state Route 24 and Laurel, Sussex County, Delaware. Water flowing from the dam enters Meadow Branch and immediately flows underneath Route 24. Meadow Branch empties into the Nanticoke River and eventually into the Chesapeake Bay.



Photo 2. The spillway at Horseys Pond separating the pond from Meadow Branch looking toward the pond.

The lake has a maximum historical depth of 12 feet immediately in front of the dam. It is Delaware's deepest pond. Its mean depth is 5 feet. Meadow Branch was dammed by early settlers to harness waterpower for sawmills and gristmills. Records in 1816 show that a gristmill and sawmill were operating at the dam site and continued there in operation until 1920. In 1959 the pond was emptied while contractors removed brush stumps and trees. Beginning in the early 1980s The State of Delaware Department of Natural Resources has tried to control the non-native invasive plant hydrilla and a filamentous alga *Lyngbya* in the lake. Several methods have been used including draining the lake, herbicide applications, and a mechanical weed harvester.

The exact location of the station where the shells were found is N 38°32.780, W 75°34.844.

Methods: A review of the available literature was conducted. Periodic trips to various stations on Horseys Pond have been conducted over the past years. The Horseys Pond stations include the boat ramp area, state fishing access areas, and the area immediately around the dam. Until recently no shells whatsoever have been seen in the water or on the shoreline at any of these stations. On August 1, 2011 I found one valve of a *Corbicula* on the shore edge close to the dam. On August 12, 2011 I returned with a long handled hand dredge and sampled the fishing area and the dam area. Hurricane Irene had preceded this sampling and the heavy rain associated with the hurricane had caused high volume water flow out of the lake through the dam gates. At the dam sight I collected *Corbicula*, and 7 whole single valves with attached broken opposing valves of *Anodonta cataracta* Say, 1817.

The species was identified as *Anodonta cataracta* Say, 1917 by direct physical comparison with *A. cataracta* specimens in my collection which have

previously been corroborated by Dr. Arthur E. Bogan.



Photo 3 Horseys Pond, Laurel Delaware, Sussex County.

Results: One new species of Niade was found at Horseys Pond, Laurel, Delaware. The new species reported at this location is *A. cataracta*.

The total number of *A. cataracta* collected was seven single valves each with part of the adjoining valve attached.

A number of *Corbicula* were also collected. The total for three collecting trips was eleven articulated valves and three single valves.



Photo 4. The Niades and *Corbicula* collected on 2011 IX 12 by hand dredge. F.M. Blaine.

Acknowledgements: I would like to thank Dr. Arthur E. Bogan for his encouragement over the years and for his support. I would like to thank Dona Blaine for proof reading, being a constant companion, and tolerating my varied interests. I would like to thank Alan Gettleman for continuously stoking my interests in Niades.

Literature Cited:

Counts Et Al 1991. The Naiades (Bivalvia: Unionidea) of the Delmarva Peninsula. American Malacological Bulletin, Vol. 9(1) (1991): p. 27-37.

Hancock, Harold, 1983 The History of Nineteenth Century Laurel. The Laurel Historical Society : p. 167-175

State of Delaware Department of Natural Resources <http://www.fw.delaware.gov/Fisheries/Documents/FWHorseysPond.pdf>

Williams, J.D, Bogan, A.E., and Garner, J.T. 2008 Freshwater Mussels of Alabama and The Mobile Basin in Georgia, Mississippi and Tennessee: p. 633

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AMS 2011 Land Snail Field Trip at Powdermill Nature Reserve

Contributed by Amy Van Devender¹, Timothy A. Pearce², and Wayne Van Devender³

1. 797 Little Laurel Rd. Ext., Boone, NC 28607

2. Carnegie Museum of Natural History, 4400

Forbes Avenue, Pittsburgh, PA 15213

3. Department of Biology, Appalachian State University, Boone, NC 28608

A crew of 17 mollusk enthusiasts (Fig. 1) met for a land snail field trip at Powdermill Nature Reserve on Thursday, 28 July, the day after the close of the 2011 American Malacological Society meeting in Pittsburg. Powdermill Nature Reserve, located in Westmoreland County in the western foothills of the Appalachian Mountains (Lat. 40.16020°N, Long. 79.27180°W), is the field station for the Carnegie Museum of Natural History.



Figure 1. AMS 2011 Land Snail Field Trip participants, left to right, standing: Dan Chang, Beth Davis-Berg, Celia Churchill, Tom Duda, Cindy Bick, Amy Van Devender, Alan Gettleman, David Haskell, Megan Paustian, Donna W. Blaine, F. Matthew Blaine, Scott Martin; not standing: Tim Pearce, Marla Coppelino, Aydin Örsan, Beysun Örsan, and Wayne Van Devender. Photo by Joe Stavish.

Tim Pearce, the trip leader, oriented participants to the site and led a tour of the reserve's new nature center. Armed with site maps, a preliminary list of known species, and a key to the conspicuous (>6mm) species (Pearce and Murphy 2006), we invaded the cool woods in full search mode. The

participants had a great range of land snail knowledge and field experience. We rough sorted the collections over lunch and did a first run of sieving to find smaller species. Soil samples were sieved again later and the snails were identified and then photographed.

Within a few hours we had found 32 species of slugs and snails (Table 1) including four new records for Powdermill Nature Reserve (Figs. 2-5): *Hawaiiia minuscula*, *Strobilops aeneus*, *Vertigo gouldii*, and *Zonitoides nitidus*. More than half of the species found (including all of the new records) were micromollusks, emphasizing the importance of examining minute species. Specimens were identified by A. Van Devender, M.E. Paustian, and T.A. Pearce.

Table 1. Land snails and slugs found at Powdermill Nature Reserve during AMS 2011 field trip.

Agriolimacidae

Deroceras laeve

Arionidae

Arion intermedius

Arion subfuscus

Cionellidae

Cochlicopa morseana

Discidae

Anguispira alternata

Discus catskillensis

Ellobiidae

Carychium exile

Euconulidae

Euconulus polygyratus

Gastrodontidae

Striatura ferrea

Striatura meridionalis

Ventridens intertextus

Ventridens ligera

Zonitoides arboreus

Zonitoides nitidus

Helicodiscidae

Helicodiscus parallelus

Philomycidae

Pallifera cf dorsalis

Philomycus togatus

Polygyridae

Mesodon thyroidus

Neohelix dentifera

Stenotrema hirsutum

Triodopsis tridentata

Xolotrema denotatum

Pristilomatidae

Paravitrea multidentata

Hawaiiia minuscula

Punctidae

Punctum minutissimum

Succineidae

Vertiginidae

Vertigo gouldii

Zonitidae

Glyphyalinia indentata complex

Glyphyalinia rhoadsi

Glyphyalinia wheatleyi

Mesomphix inornatus

Mesomphix perlaevis

Notes on certain species. *Deroceras laeve* was identified by the darker body and lack of a pale pneumostome border. The *Cochlicopa morseana* was 2.4 mm diameter (larger than *C. lubricella*), and the body whorl was taller, with about 2.5 mm from the suture to the upper left “corner” of the aperture (as opposed to ca 2.2 mm in *C. lubrica*). *Zonitoides nitidus* had the dark body, more circular aperture, and shell free of spiral lines as is typical of that species. *Helicodiscus parallelus* had an umbilicus that was deeper and narrower than *H. shimiki*. *Pallifera cf dorsalis* had the red stain anteriorly on the foot sole and a row of darker dots dorsally; uncertainty exists about the difference between *P. dorsalis* and *P. ohioensis*. *Philomycus togatus* had the characteristic orange mucus and folded into a U shape on disturbance. *Hawaiiia minuscula* had a rough surface indicating it was not *Lucilla*, which can otherwise be difficult to separate. *Glyphyalinia wheatleyi* had a diameter of whorl 1.0 of 0.40 mm indicating it was not *Nesovitrea*, which has a larger initial whorl.

Overall, we had a marvelous time finding and identifying the snails and slugs and we thoroughly enjoyed the camaraderie of interacting with fellow malacologists in a relaxed setting.

An independent report on the field trip by Aydin Örstan, with additional photos, can be found at <http://snailstales.blogspot.com/2011/08/field-trip-at-powdermill-nature-reserve.html>.



Figure 2. *Hawaiiia minuscula*, new record for Powdermill Nature Reserve. Photo by Wayne Van Devender.



Figure 3. *Strobilops aeneus*, new record for Powdermill Nature Reserve. Photo by Wayne Van Devender.



Figure 4. *Vertigo gouldii*, new record for Powdermill Nature Reserve. Photo by Wayne Van Devender.



Figure 5. *Zonitoides nitidus*, new record for Powdermill Nature Reserve. Photo by Wayne Van Devender.

We are grateful to M.E. Paustian for verifying the identities of the philomycid slugs and we are grateful to Powdermill Nature Preserve and Carnegie Museum of Natural History for facilitating this opportunity.

Literature Cited

Pearce, T.A. and Murphy, M.S. 2006. Identification guide to conspicuous land snails and slugs of Powdermill Nature Reserve, Westmoreland County, Pennsylvania. Published by Carnegie Museum of Natural History, Section of Mollusks and Powdermill Nature Reserve. 18 pp [unnumbered].



A trip with artisanal fishermen to harvest the Ark clam *Arca zebra* (Bivalvia: Arcidae) in the east coast of Venezuela

Contributed by A.C. Peralta, P. Miloslavich and C. Paz

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Arca zebra, which commonly forms dense beds on rocky bottoms between 1 and 20 meters depth, is distributed along western shores of the Atlantic Ocean from North Carolina and Bermuda to Brazil (Lodeiros et al.1999). A large natural bed of ark

shells occurs in the region of Chacopata on the Araya Península in northeastern Venezuela (Fig. 1). This bed covers an area of 70-80 Km² and has been intensively harvested by local fisherman. About 40,000 tons are harvested per year (Mendoza 1999, Lodeiros et al. 2005).

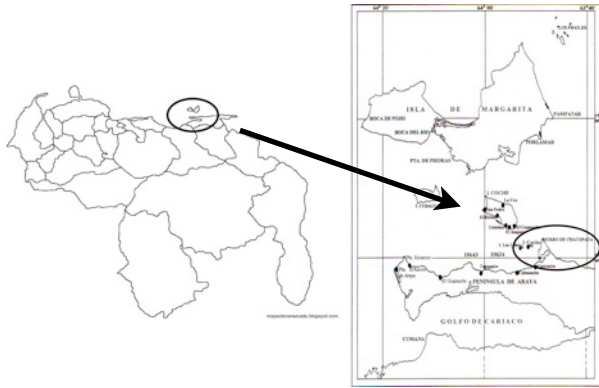


Figure 1. Chacopata, Península de Araya, Venezuela.

The ark shell, *Arca zebra*, is a bivalve mollusk of commercial importance whose fishery has a high socioeconomic impact in the northeastern region, mainly in some fishing communities of the Araya Peninsula (Fig. 2).

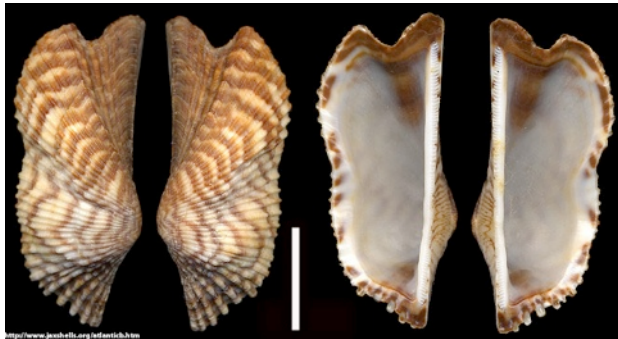


Figure 2. *Arca zebra*. Scale bar = 2cm

This article describes the artisanal activity of collecting arc clams in the region of Chacopata in northeastern Venezuela. During field trips looking for gastropods associated to arc clams beds we had the opportunity to go with the fishermen to harvest *Arca zebra*. The activity consist on 4 or 5 fishermen on a wood boat of about 7 meter long, a trawler 1.5m wide x 1m high with a mesh hole of 8 cm. The fishermen start their harvesting at 11pm and finished at 7am. During the night, harvesting consist in throwing the trawler in the water and drag for about 5 or 7 minutes (15-20 m depth) and bringing up to the boat the mesh full of animals (clams plus other benthic invertebrates like many gastropods species) (Fig. 3). The animals cached are put inside polyethylene bags. Each time the fishermen throw the trawler into the water and harvest the clams they will fill 3 polyethylene bags. A complete work day for one boat will ends when the fishermen filled 300

polyethylene bags, so the fisherman throw the trawler and drags from 11pm to 7am so many times as is needed to fill 300 bags (Fig. 4). The morning after finishing harvesting, the bags are taken to a harbor were people are waiting to cook the clams in a big pool of very hot water. Immediately after the clam are clean off their shells and are ready to been sold to fisher-dealers and markets (Fig. 5).



Figure 3. Fisherman lifting the mesh full of arc clams. Notice the polyethylene bags full of arc clams.



Figure 4. A bunch of *Arca zebra* and other by-catch invertebrates harvested. Fishermen are using a shovel to put them into the polyethylene bags.



Figure 5. Artisanal cleaning of the shells of arc clams.

In Venezuela the arc clams are a food resource for the population, sold as canned conserved food and it's consumed in noodle sauce and like snacks mixed with other kind of seafood. Although there is poor information about de biology and the relationship of these species with the ecosystem and that makes difficult to have an efficient management of this resource. Venezuelan biologists are now trying to focus on the understanding of the *Arca zebra* ecology in order to improve a sustainable use of this food resource.

References:

Lodeiros, C. and J. H. Himmelman. 1999. Reproductive cycle of the bivalve *Lima scabra* (Pterioidea: Limidae) and its association with environmental conditions. *Rev. Biol. Trop.* 3: 411–418.

Lodeiros, C., J. Alio and J. Marcano. 2005. Actividad extractiva de moluscos en Venezuela. In: J.Fernández, M. Rey and A.Guerra, editors. *Memorias, VIII Foro, Recursos Marinos y Acuicultura de las Rías Gallegas.* (In press).

Mendoza, J. 1999. Análisis de la pesca artesanal marítima en Venezuela: situación actual y perspectivas. Instituto Interamericano de Cooperación para la Agricultura, Organización de Estados Americanos, Caracas. 120pp.



U.S. Fish and Wildlife Service Opens 60-day Comment Period on the Proposed Listing of Twenty-six Western U.S. Snails and Slugs.

Contributed by Edward J. Johannes
Deixis Consultants, SeaTac, Washington.

Background: Listing of the Pacific Northwest Northern Spotted Owl (*Strix occidentalis caurina*) in 1990 as Threatened under the Endangered Species Act had provoked an intensive effort to thoroughly assess the biological and economic impacts of the action by the Federal Government (FEMAT, 1993). On April 21, 1993 a Mollusk Viability Panel, consisting of three members (Terrence Frest, Barry Roth and Edward Johannes), convened at the U. S. Forest Service Portland, Oregon office at the behest of the Forest Ecosystem Management Working Group (FEMAT), to evaluate mollusk Species of Special Concern occurring within the range of the Northern Spotted Owl in western Washington, Oregon and California. The working species list of mollusks was derived from an earlier list of 57 taxa compiled by Frest and Johannes (1991), supplemented later from information supplied by Barry Roth (1993) and by Frest and Johannes (1993), the list of mollusk Species of Special Concern increased to 108 taxa.

Table 1: Twenty-six Mollusk Species Proposed for Listing.

Scientific Name in USFWS, 2011	Scientific Name in USDA & USDI, 1994	Common Name
Freshwater Snails		
<i>Colligyrus convexus</i>	<i>Lyogyrus</i> n. sp. 3	canary duskysnail
<i>Fluminicola anserinus</i>	<i>Fluminicola</i> n. sp. 18	Goose Valley pebblesnail
<i>Fluminicola multifarius</i>	<i>Fluminicola</i> n. sp. 15, 16 & 17	Shasta pebblesnail
<i>Fluminicola</i> n. sp. 2	<i>Fluminicola</i> n. sp. 2	tall pebblesnail
¹ <i>Fluminicola</i> n. sp. 3	-	diminutive pebblesnail
² <i>Fluminicola</i> n. sp. 11	-	nerite pebblesnail
<i>Fluminicola potemicus</i>	<i>Fluminicola</i> n. sp. 14	Potem Creek pebblesnail
<i>Fluminicola seminalis</i>	<i>Fluminicola seminalis</i>	nugget pebblesnail
<i>Fluminicola umbilicatus</i>	<i>Fluminicola</i> n. sp. 19 & 20	Hat Creek pebblesnail
<i>Juga</i> n. sp. 2	<i>Juga</i> n. sp. 2	basalt juga
<i>Juga</i> n. sp. 3	<i>Juga</i> n. sp. 3	cinnamon juga
³ <i>Lyogyrus</i> n. sp. 1	<i>Lyogyrus</i> n. sp. 1	Columbia duskysnail
³ <i>Lyogyrus</i> n. sp. 2	<i>Lyogyrus</i> n. sp. 2	masked duskysnail
<i>Vorticifex</i> n. sp. 1	<i>Vorticifex</i> n. sp. 1	knobby rams-horn
Terrestrial Snails		
<i>Cryptomastix devia</i>	<i>Cryptomastix devia</i>	Puget Oregonian
<i>Cryptomastix hendersoni</i>	<i>Cryptomastix hendersoni</i>	Columbia Oregonian
<i>Monadenia fidelis minor</i>	<i>Monadenia fidelis minor</i>	Dalles sideband
<i>Monadenia troglodytes troglodytes</i>	<i>Monadenia troglodytes troglodytes</i>	Shasta sideband
<i>Monadenia troglodytes wintu</i>	<i>Monadenia troglodytes wintu</i>	Wintu sideband
<i>Oreohelix</i> n. sp. 1	<i>Oreohelix</i> n. sp. 1	Chelan mountainsnail
<i>Trilobopsis roperi</i>	<i>Trilobopsis roperi</i>	Shasta chaparral
⁴ <i>Vertigo</i> n. sp. 1	<i>Vertigo</i> n. sp. 1	Hoko vertigo
<i>Vespericola pressleyi</i>	<i>Vespericola pressleyi</i>	Big Bar hesperian
<i>Vespericola shasta</i>	<i>Vespericola shasta</i>	Shasta hesperian
Slugs		
<i>Deroceras hesperium</i>	<i>Deroceras hesperium</i>	Evening fieldslug
<i>Hemphillia burringtoni</i>	<i>Hemphillia burringtoni</i>	Keeled jumping-slug

1=not *Fluminicola* n. sp. 3 (Klamath Rim pebblesnail) as in USDA & USDI (1994).
 2=not *Fluminicola* n. sp. 11 (Fredenburg pebblesnail) as in USDA & USDI (1994).
 3=should be placed under *Colligyrus*.
 4=should be placed under *Nearctula*.

Out of the 108 mollusk taxa listed, a total of 43 mollusks (19 freshwater snails, 7 slugs and 17 land snails) were designated as Record of Decision (ROD) species or Survey and Manage (S/M) species under President Clinton's Northwest Forest Plan (NWFP) by the Federal Government (USDA and USDI, 1994). The S/M program requires pre-disturbance surveys and mitigation, strategic surveys, management, and an annual species review. In 2001 this program underwent modifications, including changes to management standards to several species and the elimination of 1 and addition of 2 S/M mollusk species (USDA and USDI, 2001). The S/M Program has not been managed continuously since 2001 due to a number of lawsuits and a 2007 decision to discontinue the program (USDA, 2007; USDI, 2007). The program has since been reinstated in 2011 as a result of a lawsuit.

Listing Petition: Because of a 2007 decision to discontinue the NWFP S/M Program, five conservation organizations: The Center for Biological Diversity (CBD), Conservation Northwest, the Environmental Protection Information Center, the Klamath-Siskiyou Wildlands Center, and Oregon Wild petitioned U.S. Fish and Wildlife Service (USFWS) on March 13, 2008 to list 32 mollusk species or subspecies as threatened or endangered under the Act. All but 2 petitioned mollusks are S/M species (Table 1). Eight of the 19 undescribed S/M mollusk species have been described (Hershler et al. 2003, 2007). This resulted in 2 petitioned S/M mollusks being combined into a single described species, and 3 additional petitioned S/M species being combined into a single described species (Table 1). To reflect the changes, the petition was amended by CBD on April 13, 2009 to list 29 species or subspecies of mollusks. Fourteen of the petitioned mollusks are freshwater snails and 15 are terrestrial (13 land snails and 2 slugs). They exist primarily in small, isolated populations (14 are known from 10 or fewer sites) in western Washington, Oregon and California.

USFWS Finding on the Petition: USFWS found that the petition presents substantial scientific or commercial information to indicate that listing 26 of the 29 petitioned mollusks as threatened or endangered under the Act may be warranted (USFWS, 2011). Three species on the petition, which USFWS felt did not warrant listing, are *Trilobopsis tehamana* (Tehama chaparral), *Mondenia chaceana* (Siskiyou sideband), and *Pristiloma arcticum crateris* (Crater Lake tightcoil).

USFWS Solicits Comments on Proposed Listing: USFWS is initiating a review of the status of the 26 species or subspecies of mollusks (Table 1). Public comment is being requested on scientific and commercial data and other information on the 26 mollusks during a 60-day comment period. Comments must be received on or before December 5, 2011.

You may submit comments by one of the following methods: Federal eRulemaking Portal: <http://www.regulations.gov>. Search for docket [Docket No. FWS-R8-ES-2011-0076] and then follow the instructions for submitting comments. U.S. mail or hand-delivery: Public Comments Processing, Attn: [Docket No. FWS-R8-ES-2011-0076]; Division of Policy and Directives Management; U.S. Fish and Wildlife Service; 4401 N. Fairfax Drive, MS 2042-PDM; Arlington, VA 22203.

For further information contact:

Listing Coordinator
U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825
Telephone: 916-414-6600
Fax: 916-414-6712

If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at 800-877-8339. Also visit <http://www.fws.gov/sacramento/>.



Figure 1. Photo of *Fluminicola* n. sp. 3 (diminutive pebblesnail) from the Jenny Creek (Klamath River) drainage, Cascade-Siskiyou National Monument, Jackson County, Oregon. Photo taken by T. Frest. © Deixis Consultants.

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Critical Habitat; Proposed Rule Federal Register 76 (193): 61826-61853. Available at <http://www.gpo.gov/fdsys/pkg/FR-2011-10-05/pdf/2011-25538.pdf> (accessed on 15 Oct 2011)

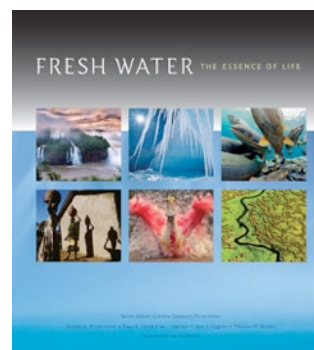


New PUBLICATIONS

Fresh Water: The Essence of Life by Russell A. Mittermeier, Tracy A. Farrell, Ian J. Harrison, Amy J. Upgren, and Thomas M. Brooks (eds.). (2010)

Contributed by Jay Cordeiro

2010. CEMEX Conservation Book Series and iLCP, Arlington, VA. 300 pp., illus. ISBN: 9780984168620. \$58.00. Available in English and Spanish versions.



Conservation International, in association with the International League of Conservation Photographers, CEMEX, NatureServe, Wetlands International, and Ramsar proudly announce the publication of the book *Freshwater: The Essence of Life*. A large-format illustrated book, launched in December, 2010, *Freshwater* is currently available in both English and Spanish editions.

The authors, along with dozens of the world's most accomplished photographers, tell us why Earth's freshwater supplies and systems are in peril. These ecosystems have proved resilient throughout millennia, but in the last few generations humanity has radically destroyed them to the point of alarm.

Freshwater: The Essence of Life includes a wealth of information on the current state of Earth's freshwater ecosystems. As the latest publication in the CEMEX Conservation Book Series and alerts readers to key issues concerning fresh water: its resources, uses and abuses, and future. Individual chapters are co-authored by a variety of professionals in various fields and each page is beautifully illustrated with full color professional photographs by some of the world's most accomplished photographers. Chapters include:

1. A Wealth of Life: Species Diversity in Freshwater Ecosystems
2. Aquatic Ecosystems: Diversity and Dynamism
3. Freshwater Ecosystems Under Threat: The Ultimate Hotspot
4. Protected Areas for Freshwater Ecosystems: Essential but Underrepresented
5. Freshwater Ecosystem Services: Essential for Human Well-Being
6. Fresh Water for the Future: Policy to Secure an Essential Service for All

An appendix of examples of common engagement for conserving the world's wetlands as well as author biographies, references, acknowledgements, and credits are also provided. A significant portion of this work is dedicated to the plight of the world's freshwater mollusks (mussels and snails) and it includes what may very well be the only global assessment of threat and percent imperilment status for all freshwater organisms published to date. Also of interest are a detailed representation of numbers of freshwater species by major taxonomic group and in depth descriptions of major threats to freshwater species and ecosystems. It is the stunning and poignant photographs throughout this book, however, that truly make it worthwhile. Each is executed in superb detail and each makes a much more profound statement as to the beauty and grandeur of the freshwater organisms and ecosystems, and the threats they face across the planet, than the accompanying text alone can provide (my meager contributions notwithstanding).

Price: \$58.00 (includes UPS Ground shipping within the continental United States)

To Order: Fresh Water: The Essence of Life can be purchased directly from Conservation International. Simply print and fill out the order form, and follow the instructions to mail it or fax it to CI.

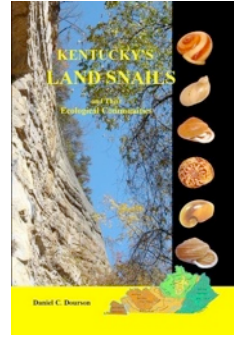
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Kentucky's Land Snails and Their Ecological Communities

Contributed by Dan Dourson



Not since 1962, when John B. Burch published his classic work, "How to Know the Eastern Land Snails", has there been an illustrated manual to assist in identification of Kentucky's land snails. Since that time, many new species have been described, forms have been elevated to species and there have been a number of taxon revisions. Nevertheless, the information has remained largely ambiguous, scattered in obscure publications. Wildlife biologist and malacologist, Dan Dourson, recently completed Kentucky's Land Snails and Their Ecological Communities, in an effort to fill that gap. The author has been studying the land snail fauna throughout much of the region for over 20 years, first as a wildlife biologist with the US Forest Service on the Stanton Ranger District of the Daniel Boone National Forest in Kentucky and more recently as an independent biological consultant working with both state, local and federal agencies like the USFWS, West Virginia Division of Natural Resources, Cherokee National Forest, Nantahala National Forest, The Nature Conservancy, Kentucky State Nature Preserves Commission, Kentucky Department of Fish and Wildlife Services, and the Great Smoky Mountains National Park where he has participated as a member of the mollusca team for the All Taxa Biodiversity Inventory for over ten years. Kentucky's rich and varied land snail fauna with 194 native terrestrial gastropods (10 of which are now considered extinct or extirpated) and an additional 10 exotic species, can be found from the highest elevations of Black Mountain to the depths of state's larger cave systems. With nearly 1400 of photographs and illustrations, it is the first book of its kind in more than 50 years that comprehensively covers Kentucky and much of the fauna that occurs in the bordering states of Ohio, West Virginia, Illinois, Indiana, Virginia and Tennessee (and should be useful in identifying as much as 90-95% of the snail fauna in these regions). This book seeks to move forward in time the works of Pilsbry, Branson, Burch, Hubricht and many others into one easy to use manuscript. An innovative pictorial key to Kentucky's native land snails is included and was designed for both the beginner and advanced malacologist alike. County distribution maps are provided for each species of

snail found in Kentucky as well as species of land snails that have either been extirpated from Kentucky or could likely occur based on records in surrounding states. The book also includes sections how to collect and preserve land snails, shell anatomy and morphology, land snail ecology and earth-friendly methods for dealing with the exotic garden pests.

Dan hopes this book will be interesting and useful to the budding naturalist as well as the well-seasoned biologist and that it helps instill an appreciation for that amazing group of organisms we call the gastropods. The end result of such a venture only time will tell.

The book will be available by mid-September for \$45 plus shipping and handling by contacting Dan or Judy Dourson at jdourson@earthlink.net.



Shellfish Aquaculture and the Environment

Contributed by Sandra Shumway



<http://www.wiley.com/WileyCDA/WileyTitle/productCd-0813814138.html>

An Executive Summary of Shellfish Aquaculture and the Environment is now available free of charge at the following website: <http://seagrant.uconn.edu/publications/aquaculture/execsumm.pdf> (1.86MB).

You may also access the publication using your SmartPhone. Simply scan the QR code below. If you don't have a QR reader/bar code scanner on your phone, you may download one for free at <http://mobiletag.com/en/download.php> (Apple, Windows, Samsung, Android, Blackberry and Ovi products) or at <http://redlaser.com> (Apple and Android products).



MINUTES OF THE ANNUAL BUSINESS MEETING

Presented by Amanda S. Lawless, Secretary

July 27, 2011, Duquesne University, Pittsburgh, PA

The meeting was called to order by President Charles Sturm, Jr. at 2:00 pm.

A motion was made and passed to approve the minutes of the 2010 business meeting.

Executive and Committee Reports were presented:

President's Report: Presented by Charles Sturm. 80 people registered for the AMS meeting representing five different countries. Sixty eight papers were presented, along with nine posters.

President Elect: Presented by Gary Rosenberg. The 2012 AMS Meeting will be from June 16-21, 2012 at the Crowne Plaza Hotel in Cherry Hill, NJ and will have a theme of "Celebrating 200 years of Mollusca in America". The meeting will take place jointly with the Conchologists of America's (COA) annual meeting, held from June 19-24. The keynote symposium will be chaired by Philippe Bouchet on molluscan diversity. Other sessions include: history of malacology and conchology in America, presentations by past student winners of COA grants (chair - Ellen Strong), molluscan natural products, conservation (chair - Jay Corderio), cephalopods (chair - Liz Shea), invasive species (chair - David Robinson). There will also be tutorials on methods and terminology used in malacology, as well as an ethics workshop.

A motion was made and passed to accept the 2012 meeting venue.

Vice President: Presented by Doug Eernisse for Peter Marko. In 2013, AMS will hold a joint meeting with Unitas in the Azores. The meeting will be in July/August at the University of the Azores. There are direct flights to the Azores from the US, Canada, and Europe and accommodations include hostels, hotels and dorm rooms. Peter is currently researching the possibility of obtaining collecting permits.

Treasurer's Report: Presented by Dawn Dittman. Total assets increased in 2010 by \$9,058.86. Operating funds were \$22,944.57 and endowment funds were \$158,760.39, for a total of \$181,694.96. AMS asset allocation was 47.7% bonds and 52.3% stocks.

Audit and Budget Committee Report: Presented by Gary Rosenberg. The committee recommended the 2011-2012 budget be modeled after last year's budget, but with an increase in AMB expenses and a decrease in travel expenses for council members. The BioOne income was not included in last year's budget and could total more than \$8,000, therefore, once the audit is complete the committee recommends increasing the budget to \$40,000 with council's approval. Rebecca Price and Elizabeth Davis-Berg discussed using the extra BioOne money to

increase travel funds for students. There was discussion from the floor.

Motion – A line item will be added to the yearly budget for student travel and support with the amount determined by council to achieve a balanced budget. Motion passed.

Endowment Committee Report: Presented by Jose Leal. AMS investments dividend income from the endowment account with Van Guard was \$4046.19. The committee recommends that asset allocation between stocks and bonds stay as close to 50:50 as possible.

Membership Committee Report: Presented by Colleen Winters. AMS membership is increasing. We are attempting to advertise AMS on other websites. Please 'like' AMS on Facebook. Colleen is stepping down and Elizabeth Davis-Berg will be the new Membership Committee chair.

Editor and Publications Committee Report: Presented by Acting-Editor Colleen Winters. Fabio Moretzsohn has graciously accepted the post of Managing Editor. The AMB's impact factor has almost doubled since 2009. Looking into going back to two issues per year published in January and July. Papers have already been accepted and more are in revision for AMB Vol. 30.

Nominating Committee Report: Presented by Doug Eernisse. Eight positions were open and the following people nominated: President – Gary Rosenberg, President-Elect – Peter Marko, Vice President – Paul Valentich-Scott, Editor – Colleen Winters, Treasurer – Charles Sturm, Jr., Past President (10+ Years) – Carole Hickman, Councilors-at-Large – Doug Eernisse and Nathan Wheelan (student).

No nominations were received from the floor, and the slate was approved by motion.

Secretary's Report: Presented by Amanda Lawless. Continued maintenance and updating of the membership database and working with the new AMS webmaster Marla Coppelino on the maintenance of the AMS website. Please contact Marla if you would like to post an announcement on the AMS website. Compilation and distribution of the 2010 AMS Membership Directory. Assisting newsletter editor Christine Parent with preparation and distribution of the 2010 fall and 2011 spring newsletters.

Conservation Committee Report: Presented by Jay Cordeiro. American Fisheries Society Endangered Species Committees are in the process of completing final drafts of the Conservation Status of North American Freshwater Mussels and Snails manuscripts. Foighil et al. recently discovered *Rhodacmea filosa* in Alabama, thought to have been extinct. For the first time, a mollusk species (*Tulotoma magnifica*) has been down-listed under the Endangered Species Act (from Endangered to Threatened).

Student Awards Committee Report: Submitted by Janet Voight and presented by Tim Pearce. The 2011 Melbourne R. Carriker student research awards were

given to the following students: Abigail Cahill (Stony Brook University), John M. Pfeiffer III (University of Alabama) and Katie Vazquez (University of Pennsylvania). A one-time \$500 award for student travel to the International Congress on Invertebrate Morphology in Cambridge, MA was awarded to Ignacio Leyva Valencia (CIBNOR). This year's meeting awards committee consisted of Tim Pearce, Bob Prezant and Megan Paustian and the following awards were presented: Constance Boone Award – Serena Ciparis (Virginia Tech) and Best Poster Presentation – John M. Pfeiffer III (co-author Daniel L. Graf) (University of Alabama).

Paula Mikkelsen announced that the auction proceeds this year totaled \$2,243.50 and acknowledged our fabulous auctioneer Charlie Sturm.

It was also discussed that a greater effort should be made to encourage students to attend the business meeting.

A motion to adjourn was made and passed.



MESSAGE FROM THE NEWSLETTER EDITOR

Contributions to the biannual AMS newsletter are always welcomed. Send articles, short notes or news items to **Christine Parent**, the newsletter editor, at the following address:

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University of Texas at Austin
1 University Station C0930
Austin, TX 78712
E-mail: cparent@mail.utexas.edu*