The Newsletter of the Freshwater Mollusk Conservation Society

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In this issue:
2010 Workshop Agenda
2009 Freshwater Mollusk Bibliography
Freshwater Mollusk Conservation Society Officers

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Submissions for the December 2010 issue of Ellipsaria may be sent to the editor at any time but are requested by November 22, 2010. Anyone may submit an article but you must be a member of FMCS to receive Ellipsaria. Please limit submissions to about one page. Categories for contributions include news, new publications, meeting announcements, current issues affecting mollusks, job postings, contributed articles (including ongoing research projects), abstracts, and society committee reports. Electronic submissions are preferred; contact the editor with any questions. Note that submissions are not peer reviewed, but are checked for content and general editing.

Please send change of address information to the Secretary.
President’s Message

Transitions

It’s been an exciting past several months as I, your Executive Committee, and your Board have all worked to help transition FMCS into a new era of member services and support and outward visibility. Specifically, through the dedication of Greg Zimmerman, Heidi Dunn, Andy Roberts, and many others in the Society, coupled with the expertise and hard work of Sophie Binder with Sophie Binder Designs, we have unveiled our new Society web site and presence at http://www.molluskconservation.org. I encourage every member to visit the site and look around at what we have to offer. There is information there for people wishing to learn more about mollusks, as well as a new members-only section that with time will allow you to pay dues, register for meetings, access newsletters, update your contact information, and submit a manuscript for publication in the Society Journal, among others. This very important step in the growth and evolution of our Society will allow us to become timelier with communications and services, reduce our operating costs, and certainly reduce our carbon footprint. Of course, as with any new endeavor, there will be some minor glitches to figure out, some editing that is needed, a lot of new and important information added. I ask that you please be patient, offer your constructive criticism and comments, and most of all, submit material and information that will make this a better web site for you and for others. Please contact your Committee Co-Chairs, especially those who need to populate their pages with information, with your suggestions and content. By the time this newsletter gets to your mailbox, one of the last hard copies we will likely produce as we transition to electronic newsletters, you will have received an e-mail message that contains your member password and explains how to login and update accordingly. I encourage you to get in, look around, and most of all, let us know what you think can be improved upon.

I wish you all the best for the remainder of the summer and fall and will hope to see many of you in Kirkwood, Missouri on October 19-21 for the 2010 FMCS Workshop on Regional Fauna Identification and Sampling---Greg
A panel of regional fauna experts will give presentations on mussels unique to their area, common species shared with other regions that “just look different here”, and the ever popular “problem children”. They will also give tips and pointers on unique collecting methods used in the region. Additional experts will give presentations on general freshwater mussel identification and sampling techniques. There will be ample time to view representative specimens from the regions, and time to spend discussing characters with the experts.

The workshop will be held at Missouri Department of Conservation’s Powder Valley Conservation Nature Center (http://www.mdc.mo.gov/areas/cnc/powder), located in a 112 acre oak-hickory forest just southwest of St. Louis, Missouri in the lower Meramec River watershed. Following the workshop, field trips to the nearby Meramec River, Mississippi River and the U.S. Geological Survey’s Columbia Environmental Research Center are planned.

The workshop is limited to 200 attendees. For Registration form, hotel link, and more information: http://molluskconservation.org/2010_Registration.html.

For more information please contact Steve McMurray (Stephen.McMurray@mdc.mo.gov; 573.882.9909) or Heidi Dunn (hdunn@ecologicalspecialists.com; 636.281.1982).

**ATTENTION STUDENTS!** The planning committee needs your help! Student workers are needed to assist with registering participants and with other tasks during the workshop. In return for working a few hours during the workshop, students will receive 50% off the registration rate for the conference. A limited number of spots are available. Contact Steve McMurray, 2010 Workshop Co-Chair (Stephen.McMurray@mdc.mo.gov) to sign up on a first-come, first-served basis.

### 2010 Workshop Agenda

**Monday, October 18, 2010**
- 1:00 pm – 8:00 pm Workshop set up: Powder Valley Conservation Nature Center (CNC) Classrooms
- 5:00 pm – 7:00 pm Registration: Holiday Inn Viking Conference Center, Concourse Area
- 6:00 pm – 8:00 pm *FMCS Fall Board Meeting*: Holiday Inn Viking Conference Center, Concourse Area

**Tuesday, October 19, 2010**
- 8:00 am – 5:00 pm Registration: Powder Valley CNC Lobby
- 8:00 am – 8:15 am Welcome/Call to Order: Powder Valley CNC Auditorium
  - Greg Cope, FMCS President, North Carolina State University
- 8:15 am – 8:30 am Introduction to the Workshop
  - Stephen McMurray, Missouri Department of Conservation
- 8:30 am – 9:00 am Overview of Freshwater Mussel Identification
  - G. Thomas Watters, Ohio State University Museum of Biological Diversity
- 9:00 am – 9:45 am Northern & Southern Atlantic Slope Fauna
  - Arthur E. Bogan, NC State Museum of Natural Sciences
- 9:45 am – 10:00 am Break
- 10:00 am – 12:00 pm Shell Time: Powder Valley CNC Classrooms
- 12:00 pm – 1:15 pm Lunch (Provided)
- 1:15 pm – 2:00 pm Southeast U.S./Mobile Basin Fauna
  - Paul D. Johnson, Alabama Aquatic Biodiversity Center
  - Jeff Garner, Alabama Wildlife and Freshwater Fisheries
- 2:00 pm – 3:30 pm Shell Time: Powder Valley CNC Classrooms
- 3:00 pm – 3:15 pm Break
- 3:30 pm – 4:15 pm Apalachicola-Chattahoochee-Flint & St. Marys Fauna
  - Michael Gangloff, Appalachian State University
- 4:15 pm – 5:30 pm Shell Time: Powder Valley CNC Classrooms
- 5:30 pm – 7:00 pm Dinner (On Your Own)
- 7:00 pm – 10:00 pm Mixer/Social: Holiday Inn Viking Conference Center, Concourse Area
Wednesday, October 20, 2010

8:00 am – 5:00 pm  Registration: Powder Valley CNC Lobby
8:00 am – 8:30 am  Overview of Sampling
                          Heidi Dunn, Ecological Specialists, Inc.
                          Dave Strayer, Cary Institute of Ecosystem Studies
8:30 am – 9:15 am  Interior Highlands/Mississippi Embayment Fauna
                          John L. Harris, Arkansas Highway & Transportation Department
                          and Arkansas State University Museum of Zoology
9:15 am – 10:00 am  Cumberlandian Fauna
                          Steve Ahlstedt, U.S. Geological Survey
                          Gerry Dinkins, Dinkins Biological Consulting
10:00 am – 10:15 am  Break
10:15 am – 12:00  Shell Time: Powder Valley CNC Classrooms
12:00 pm – 1:00 pm  Lunch (Provided)
1:00 pm – 1:45 pm  Interior Basin Fauna
                          Kevin Cummings, Illinois Natural History Survey
                          Jeremy Tiemann, Illinois Natural History Survey
1:45 pm – 2:30 pm  Western U.S. Fauna
                          Jayne Brim Box, Confederated Tribes of the Umatilla Indian Reservation
2:30 pm – 3:30 pm  Shell Time: Powder Valley CNC Classrooms
3:00 pm – 3:15 pm  Break
3:30 pm – 4:15 pm  Texas/Western Gulf Fauna
                          Robert G. Howells, Biostudies
4:15 pm – 5:30 pm  Shell Time: Powder Valley CNC Classrooms

Thursday, October 21, 2010

8:00 am – 4:30 pm  Field Trips (Lunch Provided) – Depart from Holiday Inn Viking Conference Center
                      1. Meramec River at Pacific Palisades Conservation Area
                      2. Mississippi River
                      3. USGS Columbia Environmental Research Center
                      A Missouri Wildlife Collector’s Permit may be needed if you plan on retaining specimens collected on the field trip; please contact Steve McMurray (Stephen.McMurray@mdc.mo.gov)
6:30 pm – 8:30 pm  Public Outreach Event – Powder Valley Conservation Nature Center
                      There will be a presentation by Dr. Chris Barnhart, Missouri State University. Afterwards there will be a "shell and tell" with opportunity to handle specimens and ask questions near the FMCS outreach display for those attending.

Wonders Down Under: the Amazing World of Freshwater Mussels
A presentation by Dr. Chris Barnhart, Missouri State University
Announcements & News

Introducing fwgna.org!
The Freshwater Gastropods of North America project is pleased to announce our new website, www.fwgna.org! The new site retains all the features that made the old familiar cofc.edu/fwgna so convenient for users from the Atlantic drainages of Virginia, North Carolina, South Carolina, and Georgia. Plus we've now added species indexes (both alphabetical and sortable taxonomic) that allow users from anywhere to access any of the 65 species accounts directly, without becoming lost in a forest of synonyms.

Funding from the Virginia Department of Game and Inland Fisheries has allowed us to expand our coverage of the Virginia Atlantic drainages significantly, and supported the development of single-page species accounts downloadable as PDF documents. Photo galleries, dichotomous keys, distribution maps and conservation recommendations are included for the four-state area as well.

There's a nice bibliography of references to the North American freshwater gastropod literature since 1900 and a collection of links to online resources. See the FWGNA blog for discussions of the most recent news, and archives back to 1998.

So visit us again, for the first time, at www.fwgna.org!

Submitted by Rob Dillon

OVUM - Ohio Valley Unified Malacologists

We are pleased to announce the fourth annual meeting of OVUM, the Ohio (River) Valley Unified Malacologists, November 6 & 7, 2010. OVUM is open to all individuals interested in molluscs. OVUM has no dues, officers, abstract requirements, or publications – just a meeting. The meeting is open to professionals, amateurs, conservationists, agency folk, students – everyone. Previous meetings have been held at the Carnegie Museum of Natural History in Pittsburgh and the Cincinnati Museum Center. OVUM is a one-day meeting, which will be held at the Division of Molluscs, Museum of Biological Diversity of The Ohio State University, Columbus, Ohio. There will be a second day field trip.

For more information, please click on the link at http://www.biosci.ohio-state.edu/~molluscs/OSUM2

We hope to see you in November!

G. Thomas Watters

Publications


Please contact Greg Cope (e-mail: greg_cope@ncsu.edu) to request a reprint of the above articles.


Submitted by Teresa Newton, tnewton@usgs.gov


A Review: by Marian E Havlik, Malacological Consultants, La Crosse, WI 54601-6609.

This is an important paper, published in a journal that has a limited distribution. The author summarizes past unionid records/museum vouchers for the entire Missouri River. This casts doubt on earlier authors who stated that there were no unionids in the lower Missouri River because of the sediment load. Although the author agrees that there has been substrate
NEW: Guide to Texas Freshwater Mussels

This new guide includes color photographs of all freshwater mussel species (Unionidae) documented in the fresh waters of Texas, as well as other bivalve species from inland waters (Asian Clam, fingernail clams, Atlantic Rangia, Carolina Marshclam, Zebra Mussel, Dark Falsenmussel). Description and range accompany each species account. The guide (30 pages) also contains a brief text addressing basic biology and life cycle, as well as labeled figures of shell features, references, and full color photos of every species.

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Contributed Articles

The following articles were contributed by FMCS members and others in the malacological community. The contributions are incorporated into the newsletter with minimal editing and the opinions expressed therein are those of the authors.

Some Holocene Unionids from the Chicago Outlet

David Walker
Field Museum
218 South Edgewood Ave.
LaGrange, IL 60525

The Chicago Outlet drained Lake Michigan, with some lengthy interruptions, until around 4000 BP. When open, two broad rivers flowed southwest from the lake along either side of a knob and kettle upland called Mount Forest Island, converging at the Des Plaines River, which farther south, along with the Kankakee, becomes the Illinois River.

Between Sagamashkee Slough and the Cal-Sag Canal, roughly in the middle of the southern or Sag Channel of the old outlet is an exposure of sandy silt containing fossils of unionids and gastropods.

F.C. Baker found eight unionid species at the canal and West 92nd Ave.. The current survey, a mile southwest at 108th Ave. nearly duplicates his collection.

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<thead>
<tr>
<th>Baker 1910 -1912</th>
<th>Current Survey 2009</th>
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<tr>
<td>Elliptio crassidens</td>
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<td>Elliptio gibbosus =Elliptio dilatata</td>
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<td>Pleurobema coccineum</td>
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<td>magnalacustris= Pleurobema sintoxia</td>
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<td>Crenodonta undulata= Amblema plicata</td>
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<td>Fusconaia undata=Fusconaia flavo</td>
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<td>Eurynaia recta=Ligumia recta</td>
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<td>Lampsilis ventricosa=Lampsilis cardium</td>
<td>Obovaria oliveria</td>
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<td>Quadrula pustulosa</td>
<td>Quadrula pustulosa</td>
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<td>Lasmiognsa costata</td>
<td>Cyclonaias tuberculata</td>
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These remains date from the last time the outlet was open, between ca. 5500 and 4000 BP, during the Nipissing phase of the Holocene great lakes.

References


instability through time causing generally poor habitat, nevertheless there are still microhabitats where unionids live in the lower Missouri River.

Figured are 64 previously unreported sites the author sampled in Missouri, Kansas, and Nebraska. Hoke found 14 unionid species in the lower Missouri River including state and federally listed mussel species, plus the exotic Corbicula fluminea.
New Depths for the Florida Apple Snail, *Pomacea paludosa*

Jennifer L. Bernatis  
School of Natural Resources and Environment, University of Florida, Gainesville, FL  
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The Florida apple snail, *Pomacea paludosa*, is the only apple snail native in the United States. *P. paludosa* is found throughout Florida and is the primary food source for the endangered Everglade Snail Kite, *Rostrhamus sociabilis plumbeus* (Darby, 2005; Kushlan, 1975). The snail was once abundant in many locations throughout Florida, but population numbers have been suspected to be declining in recent years. Reasons for this decline may include environmental perturbations (i.e. pollutants, water levels), destruction of habitat, and establishment of populations of non-native apple snails belonging to the *Pomacea canaliculata* complex. Darby et al. (2002) suggested *P. paludosa* exhibits an aversion to water depths greater than 50 cm. Reasons for this include the need to breathe atmospheric air, and the amount of energy required to move up to the water/air interface. Darby (1998) also suggested that the accumulation of unconsolidated organic material may restrict movement into deep water. Reduced food availability, habitat structure, and low levels of dissolved oxygen may also account for the absence of snails in deeper water. However, recent observations and collections of *P. paludosa* in Apopka Spring may suggest that depth is not a deterrent to the snails.

Apple snails were observed in Apopka Spring over several monthly sampling trips by diver Tom Morris, of Karst Environmental Services (High Springs, FL). In April 2010, snails were collected and identified as *P. paludosa*. Four snails were removed from the spring vent. Two of the snails were collected at 12.2 m, one at 13.1 m and the last at 14.6 m. The three snails at the lesser depths were all firmly attached to the rocky substrate. The deeper snail was loosely attached and resting on the substrate. Temperature in the spring was 23.3° C and the water was clear. There was no vegetation in the spring vent and no snail egg masses were observed near emergent vegetation around the boil. Although flow at the spring vent was measured at 20 cfs, the flow at the location of the snails was 1-1.5 cfs. The snails were taken to a laboratory facility and remained in good condition until July 2010.

Water level requirements of apple snails continue to be of interest as they are the primary food source for the endangered Everglades Snail Kite. However, while the snail may prefer less deep habitat, this finding may provide insight into where the snails are finding refuge in periods of environmental perturbations. Locations with deeper holes, particularly spring systems, where snail populations are presumed reduced or extirpated, need to be surveyed for the presence of snails; as the presence of snails in these locations may be indicative of other water quality problems.


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A Recent Record of the Cumberland Moccasionshell, *Medionidus conradicus* (Bivalvia: Unionidae), from Alabama

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The freshwater mussel genus *Medionidus* Simpson, 1900, is found in the southeastern United States from Florida north to Kentucky and Virginia, and west to Mississippi, and is comprised of six species, four of which occur in Alabama. The type species, *Medionidus conradicus* (Lea, 1834) (Cumberland Moccasinshell), is a Cumberlandian species historically widespread in the Cumberland River system downstream of Cumberland Falls, Kentucky and Tennessee, and in the Tennessee River system from southwestern Virginia, western North Carolina, and eastern Tennessee downstream to the historic Muscle Shoals in northwestern Alabama. While records have been secured from numerous locations within these areas, it was collected only as archaeological material in the main stem Tennessee River in Alabama at Muscle Shoals before impoundment of the river by TVA, but likely was present elsewhere (Williams et al. 2008).

In Alabama the Cumberland Moccasinshell persists in the upper Paint Rock River system in Jackson County near the Alabama/Tennessee state line and in Foxtrap Creek, a headwater tributary of Spring Creek in Colbert County (Mirarchi et al. 2004, Williams et al. 2008).

Like its congeners, *Medionidus conradicus* is a relatively small species, reaching a maximum size of about 60 mm. It is usually found in riffles and runs in small creeks (e.g. Spring Creek) to medium rivers (e.g. Paint Rock River), but may be found in larger rivers under conditions mimicking a small stream environment, such as the braided channels found at the pre-impoundment Muscle Shoals. It is often found under large flat rocks and uses a byssal thread for attachment to the substrate. Its preferred fish hosts (from laboratory trials) include *Etheostoma caeruleum* Storer, 1845 (Rainbow Darter), *Etheostoma flavellare* Rafinesque, 1819 (Fantail Darter), *Etheostoma ruﬁlineatum* (COPE, 1870) (Redline Darter), and *Etheostoma virgatum* Jordan, 1880 (Striped Darter) (Mirarchi et al. 2004, Williams et al. 2008).

The Cumberland Moccasinshell’s preference for free-flowing streams and its dependence on host fishes also suited to that habitat render it especially susceptible to the deleterious effects of impoundment, the inundation of riffles and runs by...
sediments, and channel modification. Its precipitous decline in abundance and distribution could likely be traced to the impoundment of larger rivers and the lower ends of tributaries, and to careless land uses in and along tributaries leading to sedimentation and altered flow regimes. Stansbery (1976) considered the Cumberland Moccasinshell to be endangered. Williams et al. (1993) considered it to be a species of special concern throughout its range, as did Lydeard et al. (1999) within Alabama. Its vulnerability to extirpation due to limited distribution, rarity, and susceptibility to habitat degradation led to its designation as a species of Highest Conservation Concern in Alabama by Mirarchi et al. (2004).

Lookout Creek rises near the community of Valley Head, DeKalb County, Alabama at an elevation of about 320 feet above mean sea level (msl). It is located in the Wills Valley District of the Cumberland Plateau Physiographic Section (Sapp and Emplaincourt 1975). From its source it flows northeast for about 7.5 miles into Dade County, Georgia and eventually into the Tennessee River near Chattanooga, Hamilton County, Tennessee. The valley averages about 2.0 miles in width in Alabama for a drainage area of about 15 square miles. Numerous springs that feed the creek are found at the foot of Lookout Mountain (summit elevation 550 msl), which borders the creek to the southeast, and Big Ridge (summit elevation 350 msl), which borders the creek to the northwest. Its two primary headwater tributaries, East Fork Lookout Creek and West Fork Lookout Creek, run parallel to one another and are divided by a long, sharp ridge known as Little Ridge (summit elevation 340 msl). Those forks meet just before the creek enters Georgia. The valley floor in the area is relatively level and the creek is often dominated by long, sluggish pools among limestone and dolomite rocks, especially in the extreme headwaters, with gentle ripples and runs of stable gravel and sand interspersed further downstream.

During the summer of 2009 personnel of the Geological Survey of Alabama (GSA) conducted Index of Biotic Integrity (IBI) sampling for fishes at selected stations in the Tennessee River system of north Alabama, including one station in Lookout Creek just upstream of the Alabama/Georgia state line near Hartline Cemetery, and in the nearby tributary Dry Creek. Crayfishes were also collected at numerous stations within the system in Alabama during March and November of 2009. Through these efforts a rather diverse aquatic fauna was documented for such a relatively small drainage, including 24 mussel species and Corbicula fluminea (Asian Clam) (Müller, 1774), were encountered. The mussels encountered include Medionidus conradicus and Pleuronasa barnesiana (Lea, 1838) (Tennessee Pigtoe) (one fresh dead shell each), Villosa tris (Lea, 1829) (Rainbow) (one live plus three fresh dead and one weathered dead shells), and Villosa vanuxemensis (Lea, 1838) (Mountain Creekshell) (two live plus one fresh dead and four weathered dead shells). The dead shells were found primarily among muddens dominated by Asian Clams. Another live V. vanuxemensis along with three fresh dead shells and Asian Clams were subsequently collected in the upper reach of West Fork Lookout Creek, and a single live V. vanuxemensis along with Asian Clams in the East Fork, each during sampling for crayfish with kicknets.

As previously stated, the Cumberland Moccasinshell is a species of Highest Conservation Concern in Alabama. The status of two of the other species encountered that day also warrant some concern. Due to its limited, disjunct distribution and susceptibility to habitat degradation, the Tennessee Pigtoe has been given a status of High Conservation Concern in Alabama, and due to its disjunct distribution and possible decreasing population trend or viability, the Rainbow has been given a status of Moderate Conservation Concern (Mirarchi et al. 2004).

The presence of the Cumberland Moccasinshell at this location is likely due to the rural setting of the stream minimizing anthropogenic impacts and the fact that a large percentage of its watershed is forested. Furthermore, and likely also due to those same factors, there is a relatively intact fish fauna typical of a healthy headwater system in the Tennessee River valley of north Alabama. In fact, one of the recognized fish hosts for the Cumberland Moccasinshell, the Redline Darter, was the most commonly encountered of the 24 fish species collected during the fish IBI, and represented 24% of the catch.

This population of the Cumberland Moccasinshell is very important in that it represents only the third population extant in Alabama. And, given that the continued viability of the Foxtrap Creek population in Colbert County is questionable (Mirarchi et al. 2004), it is even more important. The mussel fauna found during this effort incidental to fish sampling suggests that concerted effort using appropriate methodology might yield more species in this relatively isolated system, and underscores the need for additional research in other under-sampled tributaries that might harbor as yet unknown populations of rare mussels and other taxa.

Appreciation is extended to the family of Paul Ray for permitting access to the stream on their property and for assistance with field sampling. Also to Tom Shepard, Brett Smith, and Cal Johnson of GSA, Jeff Garner of the Alabama Department of Conservation and Natural Resources, Guenter Schuster of Richmond, Kentucky, and Chris Taylor of the Illinois Natural History Survey for assistance with field sampling and identifications of collected material.
For more information contact:

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Teresa J. Newton, USGS, Upper Midwest Environmental Sciences Center, 608-781-6217, tnewton@usgs.gov

**The Aquarium Trade Continues to Endanger the Freshwater Mollusc Fauna in Israel**

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In so called pet-shops the sale of aquarium attributes has always played an important part in the overall income. To these attributes belong of course not only all the necessary items like aquaria in all sizes and forms, water pumps, filters, heating systems (where necessary), but also an extremely rich variety of fish, aquatic plants and usually some snails in order to combat excessive algae growth.

The snails encountered in most aquaria in Israel belonged usually to such species like *Planorbarius duryi* (Wetherby, 1879) (Planorbidae), *Pseudosuccinea columella* (Say, 1817) (Lymnaeidae), *Haitia acuta* (Draparnaud, 1805) (Physidae) and *Melanoides tuberculata* (Müller, 1774) (Thiaridae). Except for *Melanoides tuberculata*, all are non-native species, which have found their way to natural aquatic habitats throughout Israel a long time ago.

In the last 10-15 years the number of exotic freshwater snails offered for sale in local pet shops has increased considerably. They range from an assortment of fist sized species of *Pomacea* from the Americas to much smaller additional species of the families Planorbidae, Lymnaeidae, and Physidae. Some of these species can be found here and there now in natural habitats and have to be looked upon as serious competitors of native species (Mienis, 2009).

Most recently also other species of Thiaridae: *Tarebia granifera* (Lamarck, 1822) and *Thiara scabra* (Müller, 1774), both from the tropics, went on sale in Israel. Like the local *Melanoides tuberculata* they do extremely well in aquaria and turn soon into a nuisance. Since aquarium keepers are usually also animal lovers, excess snails are not killed but given away to other aquarium lovers or simply released in a nearby spring, stream, pond or lake. The latter event has recently happened in Israel with both *Tarebia* and *Thiara*. Within a very short time they managed to establish large populations in the Bet She'an Valley and *Thiara scabra* has even turned into the most common species in the Sea of Galilee, Israel's major source for drinking water (Mienis, 2010; Mienis & Mienis, 2008)!

In spite of warnings given to the proper authorities about the danger of allowing the almost free import of freshwater snails for the aquarium trade, new species continue to arrive in the local shops: *Marisa cornuarietis* (Linnaeus, 1758), *Vittina natalensis* (Reeve, 1845) and a still unidentified *Clithon* species. How long will it last until we find the first specimens of such new arrivals in the wild?

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**References**


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**Modeling the Response of Imperiled Freshwater Mussels to Anthropogenically Induced Changes in Water Temperature, Habitat, and Flow in Streams of the Southeastern and Central United States**

Freshwater mussels are in serious global decline and urgently need protection and conservation. Declines in the abundance and diversity of North American mussels have been attributed to a wide array of human activities that cause pollution, water-quality degradation, and habitat destruction, and recent findings suggest that many species are living close to their upper thermal tolerances. This project will combine the expertise and resources of multiple scientists, agencies, and universities and build on past findings. The primary objective is to use newly developed mussel vulnerability and risk threshold data in downscaled watershed and instream regional models to allow federal and state natural resource managers to forecast species responses to climate change over the next 30-50 years and to develop adaptation strategies to mitigate the adverse effects. Secondary objectives will be to refine these models and to generate new models with empirical data produced from integrated laboratory and field studies of mussel temperature sensitivities in water and sediment, and instream flow and habitat assessments for mussels. Each objective specifically addresses priority needs of federal and state management partners. The research combines laboratory, field, and modeling approaches utilizing existing data and gathering new empirical information; spans broad spatial, temporal, and organizational scales; supports the higher education of future natural resource professionals; and contributes to the science and conservation of the most imperiled fauna in the world as affected by climate change.

For more information contact:

W. Gregory Cope, NC State University, Department of Environmental and Molecular Toxicology, 919-515-5296, greg_cope@ncsu.edu or

Teresa J. Newton, USGS, Upper Midwest Environmental Sciences Center, 608-781-6217, tnewton@usgs.gov
Additional Information Concerning the Conquest of Europe by the Invasive Chinese Pond Mussel Sinanodonta woodiana. 22. News from Austria, France, Italy, Poland and Ukraine.

Henk K. Mienis
National Collections of Natural History, Dept. Zoology, Tel Aviv University, IL-69978 Tel Aviv, Israel, and National Natural History Collections, Berman Building, Hebrew University, IL-91904 Jerusalem, Israel mienis@netzer.org.il

Recently some new aspects dealing with the invasive Chinese Pond mussel Sinanodonta woodiana (Lea, 1834), Fam. Unionidae, in Europe have been published. The most important data are here given in a concise form.

Austria
Taurer (2009) reports the presence of a vital population of the Chinese Pond mussel in the "Leonharder See", a lake in Villach. It represents the first record of this invasive mussel species from Kärnten, Austria. According to the author this bivalve most probably reached the lake by means of illegal stocking of this water body with infected Amur carps Ctenopharyngodon idella. Sinanodonta woodiana shares the lake with the Swan mussel Anodonta cucnea, the Pond mussel Anodonta anatina, the Painter's mussel Unio pictorum and the invasive Zebra mussel Dreissena polymorpha.

France
Audibert (2010) reported Sinanodonta woodiana as being common in the Laclet pond near Saint-Nizier-le-Désert. This pond is situated in the Dombes, a vast area of artificial lakes and ponds used for growing freshwater fish. It constitutes the first record of this invasive mussel species in the Ain department.

Italy
Cappelletti et al. (2009) reported the presence of empty valves of the Chinese Pond mussel washed ashore at three localities in the south-eastern part of Lake Garda. This represents the fourth invasive of mussel species which managed to reach this southern Alpine lake. The presence of Dreissena polymorpha, Corbicula fluminea and Corbicula fluminalis had been reported previously. If Sinanodonta woodiana succeeds in getting a foothold in the lake then it may turn into a serious competitor of Microconchylaea compressa, which is considered an endangered species in Europe.

Poland
Juchno & Kraszewski (2009) carried out a histological analysis of the gonads of Sinanodonta woodiana collected almost monthly from May 2005 until June 2006 and at various localities in the Konin lakes. Their study revealed that this mussel species reproduces during the summer and that the reproductive abilities of Sinanodonta woodiana are distinctly reduced in the cold lake (Slesińskie) if compared with that in the warm lake (Licheńskie) and discharge canal of the power plant.

Łabęck & Domagala (2009) studied the histological structure of the ovary of this mussel in specimens collected from the discharge canal of the power plant in Nowy Czarnów.

Ukraine
Son (2010) recently published an English version of his original Russian article dealing with the alien molluscs within the territory of Ukraine. The Chinese Pond mussel is reported by him from the Danube basin and a man-made lake near the town of Kotovsk.

Yurishinetz (2010) published some information on parasites present in Sinanodonta woodiana collected in Ukraine.

General Remarks
Over and over the various authors point out the connection between the introduction of various exotic Carp species and the discovery of new populations of the Chinese Pond mussel.

In addition, Panov et al. (2009) stressed the role of various artificial waterways now connecting once separated rivers and inland seas, in the distribution of aquatic invasive species throughout Europe. Although this is especially important for such well known hitchhikers like Dreissena polymorpha and Dreissena bugensis, also species like Corbicula fluminea, Corbicula fluminalis and to a lesser degree Sinanodonta woodiana seem to profit from this situation.

References
Continental Mollusks Occurrence in the North Region of Paraná - PR, Southern Brazil, with Additional New Records and Observations for the State Territory

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Recently, November 16-18 2009 (hot and rainy period of the southern spring), field work was accomplished in the Northern region of the Paraná State - PR, specifically in the Municipal District of Cornélio Procópio, seeking the freshwater and terrestrial mollusks present in the highlands that conform the regional section of the Third Plateau, geographical domain of Araucária forest and several tributaries of the macrobasin of the Paranapanema River Basin, located at the "Pioneering North" of the State (Fig. 1).

In this opportunity were explored the lands, ciliary forest, and farms neighboring property of the Aguativa Golf Resort, a famous Brazilian tourist aquatic complex (mineral waters), lands irrigated by the secondary river Congonhas, branch of the Tibagi River Basin, born at the Second Plateau – going by the Vila Velha Ecological State Park territory (Agudo 2007, 2008 a-b) – and flows its waters in the Paranapanema River for its time, main fluvial current that travels the Third Plateau until finally to be integrated to the great Paraná River System.

The material obtained in field for this report was deposited in the Malacological Collection at the University of Santa Catarina's State (ECZ/CCB/UFSC), Florianópolis, and its specific determination was based on Simone (2006).

In the course of research in the locality an adult specimen of the native snail-eating-snake Simynomorphus neuwiedii (Ihering, 1911) (Serpentes:Dipsadidae) was observed, preserved in the facilities of the Aguativa Golf Resort for environmental education.

Results - Systematic Species List:
Class GASTROPODA
Subclass Prosobranchia / Caenogastropoda
Family HELICINIDAE
- Oxyrhombus densetelriatus Wagner, 1910*
* Referred by Thomé et al (2007: 21) for the State ...
Subclass Gymnobranchia
Family VERONICELLIDAE
- Sarasinula linguiformis (Semper, 1885)*
* Referred by Thomé et al (2007: 28) for the State ...
Subclass Pulmonata
Family ANCYLIDAE
- Gundialia tica (Marcus & Marcus, 1962)*
* Referred by LANZER (1966: 184, 194) for Toledo River (Toledo Municipal District, Western region) …
- Hebetancylus moricandi (d’Orbigny, 1846)*
* Referred by LANZER (1966: 186, 197) for the Ocoi River (Itaipú region – Paraná River Basin, Western region), and Curitiba (Municipal District) …
Family BULIMULIDAE
- Bulimus tenuissimus (d’Orbigny, 1835)
Family MEGALOBULIMIDAE
- Megalobulimus sp (*)
* Presence of mollusks referred by the inhabitants of the region …
Family BRADYBAENIDAE
- Bradybaena similaris (Férrussac, 1821)

In another order of ideas, and continuing the search results presented in a previous edition of this newsletter, new bibliographical contributions with some additional malacological registrations for the State they were confirmed, including two species of freshwater limpets (Lanzer 1996: 184, 186, 194, 197) and four terrestrial gastropods – one slug & 3 snails (Tomé et al 2007: 21-23, 28), elevating for 145 the previous confirmed number of continental species and subspecies (Agudo-Padrón 2009 c:6).

Systematic Species List:
Class GASTROPODA
Subclass Prosobranchia / Caenogastropoda
Family HELICINIDAE
- Oxyrhombus densetelriatus Wagner, 1910*
* Referred by Thomé et al (2007: 21) for the State ...
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* Presence of mollusks referred by the inhabitants of the region …
Family BRADYBAENIDAE
- Bradybaena similaris (Férrussac, 1821)

Other new geographical registrations in the Paraná State territory, some superficially referred in the literature for Telêmaco Borba Municipal District – Northern region in the Third Plateau (Shibatta et al 2008: 88-89), including inedit researches in specific localities of the Western (Cascavel Municipal District, mainly), are the following:
I. PARANÁ STATE (Territory in General):

The following four native species constitute new registrations, all located between the coastal plain and the Second Plateau region, elevating to 149 the known species number: tree snails *Helicina angulifera* Wagner, 1910 (Helicinae), *Simpulopsis pseudosulculosa* Breure, 1975 (Amphibulimidae), *Cyclodontina tudiculata* (Martens, 1868) (Odontostomidae), and the terrestrial slug *Vaginulus taunaisii* Férussac, 1821 (Veronicellidae).

II. CAIOBÁ (Matinhos Municipal District):
The following material, coming from the coast of the State, was examined by us on August 6, 2009 in the Fritz Plaumann Museum of Entomology - MEFP, Seara Municipal District (Nova Teutônia Valley), Western of Santa Catarina State: 19 specimens of limnic snails *Littoridina* sp (Gastropoda: Prosobranchia/Caenogastropoda:Hydrobiidae), MEFP 95, and 18 specimens of terrestrial micro-snails *Radiodiscus* sp. (Gastropoda:Pulmonata:Charopidae), MEFP 97.

III. CURITIBA (Municipal District):

IV. CAMPO LARGO (Municipal District):
Personal registrations, from November 16, 2009, of terrestrial exotic invasive slugs *Pallifera* sp (Philomicidae) and the little snail *Subulina octona* (Bruguière, 1789) (Subulinidae) to this locality of the First Plateau territory, belonging the Metropolitan area of Curitiba.

V. TELÊMACO BORBA (Municipal District):
Brief references concerning the inclusion of "little uncertain bivalves" among the alimentary items of the freshwater fishes *Hisonotus francirochai* (Ihering, 1928) and *Hisonotus* sp. (Loricariidae), inhabitants of denominated Ribeirão Varanal (Varanal Creek Microbasin), Monte Alegre Farm, Northern region in the Third Plateau territory (Shibatta et al 2008: 88-89), to South of Cornélio Procópio (Fig. 2).

"Besides the mollusks found in the stomach contents of the fishes (which are minuscules), we have been finding few individuals (uncertain bivalve species of small load and another of great load)"... "...specimens are coming of a close mountain stream to the "Ribeirão Varanal..." (Sirlei Bennemann, Londrina State University (UEL), October 26, 2009. Pers. comm.)*.

* On December 22, 2009, we received from this researcher a small lot of aquatic mollusks coming from the ecosystem...
denominated Ribeirão João Pinheiro (João Pinheiro Stream), including four gastropod specimens – two Biomphalaria straminea (Dunker, 1848) (Planorbidae), one Aplexa (Stenophysa) marmorata (Guilding, 1828) (Physidae), one Lymnaea columella (Say, 1817) (Lymnaeidae) – and four freshwater bivalves – two naiads Rhipidodonta charruana (d'Orbigny, 1835) (Hyriidae), one naiad Diplodon cf. besckeanaus (Dunker, 1848) (Hyriidae), and one minuscule uncertain clam (Pisidiidae). Material deposited in the Malacological Collection allotted in the Augusto Ruschi Zoobotanical Museum (Museu Zoobotânico Augusto Ruschi – MUZAR), Passo Fundo University (UPF), Rio Grande do Sul State - RS. Specific determination was basically based on the contribution of Simone (2006) …

Particularly, the native naiad Diplodon cf. besckeanaus (Dunker, 1848) (Unionoida:Hyriidae) configure another new registration for the Paraná's State, elevating to 150 the known number of species (Agudo 2008 a; Agudo-Padrón 2009 a-c; this contribution).

VI. CASCABEL (Municipal District):
Inedit regional malacological research in process, including several other specific Municipal Districts of the Western (Medianeira, to Southwest; Marechal Cândido Rondon & Palotina, to Northwest) in the Third Plateau territory (Fig. 3), tends the city of Cascavel as headquarters (André Hipólito, academic of Biological Sciences, West Paraná State University (UNIOESTE), November 11 and December 23, 2009, Pers. comms). With 19 nominal species Gastropoda confirmed: 4 freshwater/limnic (1 exotic) and 15 terrestrial (5 exotic). Of the continental species-like this striped, only 5 native terrestrial forms (1 slug, 4 snails) configure most other new registrations for the Paraná's State, elevating to 155 the definitive known species number (Agudo 2008 a; Agudo-Padrón 2009 a-c; this contribution).

Systematic Species List:
Class GASTROPODA
Subclass Gymnophila
  Family VERONICELLIDAE
    - Phyllocaulis soleiformis (d’Orbigny, 1835)
Subclass Pulmonata
  Family BULIMULIDAE
    - Rhinus cf. scobinatus (Wood, 1828)

Family SUBULINIDAE
  - Lamellixia gracilis (Hutton, 1834)
Family SYSTROPHIDAE
  - Happia muelleri Thiele, 1927
  - Tamayoan banghaasi (Boettger in Thiele, 1927)

VII. ITAIPÚ LAKE REGION (Paraná River Basin):
Presence in the Ocoi River (Lanzer 1996: 187), Western region, of the freshwater limpet Laevapex sp (Ancyliidae).

VIII. FOZ DO IGUAZÚ (Municipal District):
Presence in the locality of Iguaçu Waterfalls National Park, located in the Westernmost extreme of the State, Iguaçu River Basin of the binacional "Brazil/Argentina" region, of the tree snail species Cyclodontina fusiformis (Menke, 1828) (Odontostomiidae) http://www.paranamio.com/photo/7817540, based on photographic material in the “CONCH-L list Forum”, November 27 2009, besides the species Leiostracus perlucidus (Spix, 1827) http://www.paranamio.com/photo/7817496 and Mesembrinus interpunctus (Martens, 1887) (Bulimulidae) http://www.paranamio.com/photo/7817294, these last ones previously referred at this location by us (Agudo 2007: 11).

IX. TOLEDO (Municipal District):
Presence in the locality "Toledo River" (Lanzer 1996: 187), in the Western region, of the freshwater limpet Uncancylus concentricus (d’Orbigny, 1835) (Ancyliidae).

References
http://www.ots.ac.cr/tropiweb/attachments/suppls/sup51-3%20malacol/11-Barboza-Estado.pdf

Visit the new Society web site at http://www.molluskconservation.org

FMCS 2010 Workshop
http://www.molluskconservation.org/2010_Registration.html
Little is known regarding the distribution of Maryland’s freshwater gastropods and this poor understanding is an impediment to conservation. Gerberich (1985) provided a list of Maryland’s freshwater gastropods that included 38 native and two non-native species. Recent treatments have centered on the Potomac River basin (Fuller 1978, Pearce & Evans 2008). Two statewide monitoring programs of the Maryland Department of Natural Resources have produced an extensive database of benthic macroinvertebrate genera that allows us to present this checklist of freshwater gastropod distribution in Maryland’s streams: the Maryland Biological Stream Survey (MBSS) and CORE/TREND. The MBSS is a probabilistic survey that has assessed the ecological health and biodiversity of Maryland’s wadeable, non-tidal streams since 1995. The CORE/TREND program was established in response to the 1972 Federal Clean Water Act to document changes in water quality of Maryland’s larger rivers and streams through analyses of benthic macroinvertebrate community data. Based on data from these monitoring programs, we compiled a list of freshwater gastropod genera in Maryland by major river basin to aid in the future assessment of their statewide diversity.

Snail genera were identified from approximately 3,000 MBSS sites sampled from 1995-2009 and 111 CORE/TREND benthic macroinvertebrate stations sampled on a regular basis from 1976-2008 in every major river basin across the state. MBSS benthic macroinvertebrate samples were collected by disturbing 20 ft² of the most productive macroinvertebrate habitat into a D-net (540μ mesh), in order of preference: riffles; root wads, root mats, and woody debris; leaf packs; macrophytes; and undercut banks. CORE/TREND sites were sampled with 0.09 m² Surber samplers in riffle habitats and Fullner modified Hester-Dendy samplers (~ 0.135 m² of substrate) in habitat that lacked riffles. Organisms in both studies were preserved in 95% ethanol and processed in the MDNR laboratory by NABS certified taxonomists. Although these methods do not specifically target gastropods, the large spatial and temporal distribution of both monitoring programs should allow for the compilation of a robust checklist.

Freshwater gastropod genera by major river basin are presented in Table 1. Snails were present at 670 MBSS sites (1995-2009) and 87 CORE/TREND (1976-2008) sites. We excluded a single record of Pleurocera sp. in the Upper Potomac River basin from a CORE/TREND station pending verification and a single record of Hydrobia sp. from the Nanticoke River basin since it represents a brackish species. Of particular note is collection of the genus Radix from a single basin in Maryland. This genus consists of a single species, R. auricularia, and is not native to North America (Turgeon et al. 1998).

The evolving state of freshwater mollusk taxonomy often makes the comparison to prior treatments (Fuller 1978, Gerberich 1985, Pearce & Evans 2008) and presentation of checklists difficult. We hope to use these past efforts along with recent taxonomic treatments and faunal databases (e.g. NatureServe and museums) to mine our benthic macroinvertebrate samples and resolve generic level identifications to species in order to assess the distribution and diversity of Maryland’s freshwater gastropods.

Literature Cited


Table 1. List of freshwater gastropod genera by river basin in Maryland from Maryland Department of Natural Resources monitoring programs.

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FMCS 2009 Freshwater Mollusk Bibliography

Compiled by Kevin S. Cummings
Illinois Natural History Survey, Champaign, Illinois

This bibliography lists freshwater mollusk papers that have been published up to and including 2009 and that have not appeared in previous FMCS bibliographies. Citations are split into five groups for the convenience of researchers: Unionoida, Sphaeridae, Corbiculidae, Dreissenidae & Other Bivalves, and Gastropoda. Papers that list taxa from more than one category are included in each group. A searchable database of over 19,000 references on freshwater mollusks is available at: http://ellipse.inhs.uiuc.edu:591/mollusk/

To insure that papers are cited correctly, researchers are encouraged to send pdf's or reprints to: Kevin S. Cummings, Illinois Natural History Survey, 1916 S. Oak Street, Champaign, Illinois 61820 or ksc@inhs.uiuc.edu

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