



**Newsletter of the Freshwater Mollusk Conservation Society**  
**Volume 19 – Number 4** **December 2017**

Cover Story . . . . .	1
Society News . . . . .	4
Announcements . . .	7
Regional Meetings . . . . .	8
Upcoming Meetings . . . . .	9
Contributed Articles . . . . .	10
FMCS Officers . . .	19
Committee Chairs and Co-chairs . .	20
Parting Shot . . . . .	21



**March 12 – 15, 2018**  
**Radisson Hotel and Conference Center,**  
**La Crosse, Wisconsin**

How do you know if your mussels are healthy? Do your sickly snails have flukes or some other problem? Why did the mussels die in your local stream? The 2018 FMCS Workshop will focus on freshwater mollusk health assessment, characterization of disease risk, and strategies for responding to mollusk die-off events. It will present a basic understanding of aquatic disease organisms, health assessment and disease diagnostic tools, and pathways of disease transmission. Nearly 20 individuals will be presenting talks and/or facilitating small group sessions during this Workshop. This Workshop team includes freshwater malacologists and experts in animal health and disease from: the School of Veterinary Medicine, University of Minnesota; School of Veterinary Medicine, University of Wisconsin; School

of Fisheries, Aquaculture, and Aquatic Sciences, Auburn University; the US Geological Survey Wildlife Disease Center; and the US Fish and Wildlife Service Fish Health Center.

The opening session of this three-day Workshop will include a review of freshwater mollusk declines, the current state of knowledge on freshwater mollusk health and disease, and a crash course in disease organisms. The afternoon session that day will include small panel presentations on health assessment tools, mollusk die-offs and kills, and risk characterization of disease organisms to freshwater mollusks.

On the following two days, participants will rotate in small groups among three sessions: 1) health assessment and diagnostic techniques (e.g., laboratory techniques, mussel histology, and necropsy) at the US Fish and Wildlife Service (FWS) La Crosse Fish Health Center, 2) response actions to mollusk die-offs/kills, and 3) risk characterization of disease related to mollusk conservation.

The Workshop also will include a poster session, evening mixers with a jam session one night, and a separate opportunity to tour the FWS Genoa National Fish Hatchery Mussel Propagation Facility.

### Schedule Overview:

Monday, March 12 – Arrival, Registration, and Informal Meet and Greet

Tuesday, March 13 – Introduction and Morning I session, break, Morning II session, Lunch, Afternoon Panel presentations and Discussion, with break, Evening Social and Poster Session.

Wednesday, March 14 – Two Small group sessions: (1) Health Assessment methods (at La Crosse Fish Health Center, transportation provided), (2) Risk characterization, and/or (3) Response actions to die-offs, Lunch provided, Evening Social and Jam Session.

Thursday, March 15th – Final Small group session, Departure or Field Trip

**Location:** This Workshop will be held at the Radisson Conference Center in La Crosse, Wisconsin. The conference facility is located on the banks of the Mississippi River in the heart of downtown La Crosse. The La Crosse Regional airport receives service from Chicago O'Hare and Minneapolis International airports. The hotel provides free shuttle service from the airport. Transportation will be provided from the Conference Center to the La Crosse Fish Health Center each day.



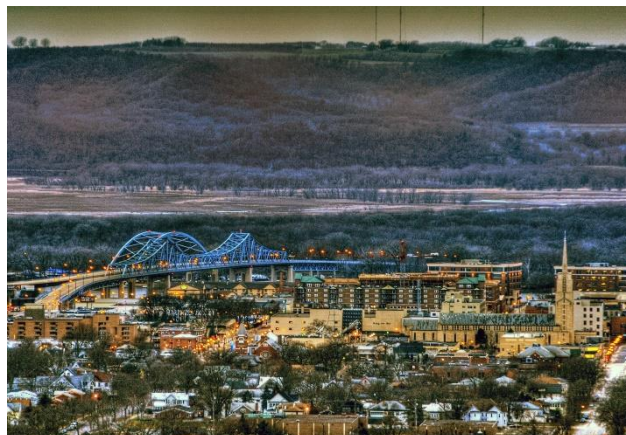
**Registration:** Early registration began on **November 17, 2017**, and will close on **January 31, 2018**. Registration costs are:

Type of Registration	Early Registration (November 17 – January 31)	Late Registration (February 1 – March 12)
Regular FMCS member	\$175	\$225
Regular non-member	\$215	\$265
Student FMCS member	\$155	\$205
Student non-member	\$175	\$225

Register online at the FMCS Events page (<http://molluskconservation.org/Events.html>).

**Lodging:** A block of rooms has been reserved for Workshop attendees at the Radisson Hotel and Conference Center, 200 Second Street South, 200 Harborview Plaza, La Crosse, Wisconsin, 54601. To qualify for the Group Room Rate (\$93/night, plus tax), attendees must make the reservations by **Thursday March 1, 2018** and **ask for the Freshwater Mollusk Conservation Society rate.** For Reservations, call (608) 784-6680. Parking is free at the hotel and Conference Center.

For more information on lodging in the La Crosse area, visit <http://www.explorelacrosse.com>. The La Crosse Area Visitors guide is available at: <http://www.explorelacrosse.com/visitor-guide/>



### Transportation:

**Air:** The La Crosse Regional Airport offers daily flights through Chicago O'Hare (American) and Minneapolis-St. Paul International Airports (Delta). The Radisson Hotel provides shuttle service to and from the airport.

### Ground transportation

**Train:** La Crosse is served by [Amtrak](#)'s daily Empire Builder line. Amtrak makes daily stops in La Crosse.

**Bus:** [Greyhound](#) has a bus station located in downtown La Crosse, just 2 blocks from the Radisson Hotel.

**Car:** Driving distance to La Crosse from major metropolitan areas: Chicago 4 hours; Des Moines Iowa 4 hours; Madison Wisconsin, 2 hours 15 minutes; Minneapolis, Minnesota 2½ hours; St. Louis, Missouri 8 hours.

**Poster Session:** The Workshop poster session will take place on Tuesday, March 13, from 7:00-8:30 pm. Workshop participants are invited to submit an abstract for a poster presentation on any topic related to freshwater mollusk conservation. A special section will be reserved for reports and case studies of mollusk die-offs. See the Call for Abstracts on the Workshop web page (<http://molluskconservation.org/Events.html>) for details regarding poster and abstract formats. Abstracts should be emailed -- in Word format -- to [megan\\_bradley@fws.gov](mailto:megan_bradley@fws.gov) or [dwaller@usgs.gov](mailto:dwaller@usgs.gov) no later than **January 31, 2018**.



**Field trip:** Take a ride down the scenic Great River Road from La Crosse to the Genoa National Fish Hatchery. The drive will take visitors along the Mississippi River and portions of the Upper Mississippi Wildlife Refuge. Tour the FWS Genoa National Fish Hatchery and learn about their freshwater mussel propagation program.

**Sponsorships:** The FMCS is a not-for-profit society, dedicated to the advocacy and conservation science of freshwater mollusk resources. Our Workshops provide great opportunities to network and build relationships with conservation professionals from state and federal government, industry, universities, and conservation organizations. The Society has a membership of 500, of which about 150 generally attend the biennial Workshops. Instructors for the workshops are



members of the Society and other leaders in conservation. These professionals are constantly working to conserve freshwater mollusks, and we need your help. We are requesting monetary sponsorships to help cover the costs of the Workshop facilities.

All Sponsor Contributions Include Recognition in the Workshop Program		
<b>River</b>	>\$1000	One Complimentary Registration, Logo on Website Registration Page
<b>Stream</b>	\$500-\$1000	One Registration Reduced by 25%, Logo Displayed at the Welcome Social, Logo on Website Registration Page
<b>Eddy</b>	\$100-\$499	Logo on Website Registration Page
<b>Mussel</b>	<\$100	Recognition in the Workshop Program

**Further Information:** For further information about the Workshop and inquiries about sponsorships, contact the Workshop co-chairs: Megan Bradley at [megan\\_bradley@fws.gov](mailto:megan_bradley@fws.gov) or Diane Waller at [dwaller@usgs.gov](mailto:dwaller@usgs.gov).

## Society News

### First FMCS International Meeting in Europe

As announced in the last issue of *Ellipsaria*, the first FMCS International Freshwater Mollusk Meeting will be held on 16--20 September 2018, in the Theater Maggiore in Verbania, Italy. The theme for this meeting is: ***"Bridging the gap between freshwater mollusk research and conservation in the Old and New Worlds."*** The Local Committee has begun planning for four days of presentations on a variety of topics that will cover all aspects of freshwater Malacology, targeting the latest research advances in both theoretical and applied issues. A number of internationally-recognized keynote speakers will present the state of current research on these topics and, we expect, will spark debate and interest on research needs concerning the many ways mollusks affect society and ecosystems.

More detailed information about the meeting and a list of its sessions will be posted soon on the FMCS Events Page (<http://molluskconservation.org/Events.html>). For the moment, we count on everyone's enthusiasm to build a solid foundation for this bridge, the first among many future bridges that FMCS can build among freshwater malacologists around the world.

**Deadlines:**      **Abstract Submission:**    **30 April 2018**  
                          **Early Registration:**            **30 April 2018**  
                          **Late Registration:**            **31 July 2018**



## Professional Development Ad-hoc Committee Needs Your Feedback

It has been almost a year since the FMCS Board approved establishing this ad-hoc committee to explore creating a certification program for specialists working in the field of freshwater mollusks. *Just a reminder, as we see it this would **not** be a taxonomic certification!* Preliminarily, we have considered this to be an education-based certification that would support the Society's education strategy. Components of the certification likely would include level of education and coursework, experience, and other service accomplishments. Certifications like this are typically used by organizations and institutions to establish standards and guidelines for recognition as a professional.



We have done a lot of preliminary work but, before we go any further, we would like your input about this potential certification program. Please follow this link to participate in a very short survey: <https://www.surveymonkey.com/r/RZLZV2C>. We will compile all the responses from this survey and use them to determine Society interest in an education-based certification program. The survey will be open until January 1, 2018, but don't delay; participate TODAY! If you have any questions, feel free to contact the committee co-chairs Rebecca Winterringer at [rwinterringer@trcsolutions.com](mailto:rwinterringer@trcsolutions.com) or Amanda Rosenberger at [rosenbergera@missouri.edu](mailto:rosenbergera@missouri.edu).

**Thank you for participating in this survey !**

## Wanted: Ideas for the 2020 and Future Workshops

We are still exploring ideas for topics to be addressed during the 2020 and future FMCS Workshops. Some ideas that have been mentioned in the past include:

- Sampling protocols/standardized sampling (are there minimum guidelines?), review state-by-state, with a panel discussion
- New tools, such as eDNA, genomics, acoustic Doppler current profiler, etc.
- Watershed protection projects - multi-discipline groups/other societies?
- Reintroduction strategies: genetic concerns, stocking strategies, and monitoring plans
- Current issues facing Freshwater Malacology - climate change, funding issues, exotic species

If you would like to organize our Workshop in 2020 on any of the above or other topics you think might interest our members, please contact Jeremy Tiemann at [jtiemann@illinois.edu](mailto:jtiemann@illinois.edu). Jeremy also is the person to contact if you would like to explore hosting one of our future Symposia (in odd-numbered years).

## CASS Condemns Silencing of EPA Scientists

On July 21, 2017, the Consortium of Aquatic Science Societies (CASS) issued the following statement expressing concern with the actions of the US Environmental Protection Agency (EPA) to prohibit three EPA scientists from presenting their research at “The State of Narragansett Bay and Its Watershed” workshop in Providence, Rhode Island.



The Consortium of Aquatic Science Societies (CASS) is very concerned with the actions of the US Environmental Protection Agency (EPA) to prohibit three EPA scientists from presenting their research at “The State of Narragansett Bay and Its Watershed” workshop in Providence, Rhode Island, on 23 October 2017. CASS values scientific freedom and recognizes the importance of collaboration among scientists from all sectors to solve complex challenges facing aquatic systems worldwide. Scientific research and the communication of findings must be protected to ensure informed decisions are made in the public interest.

“The action by EPA to censor scientists sends a chilling message to science societies that the United States does not protect the freedom of information exchange vital for an informed public to solve real and important coastal issues,” said Robert Twilley, President of the Coastal and Estuarine Research Federation. “Such censorship compromises the democratic tradition of free speech and intellectual freedom, and goes against the EPA’s long history of being an important partner in aquatic science research.”

The workshop and associated report were developed by the EPA-funded Narragansett Bay Estuary Program, and summarize three years of work by more than 50 researchers representing universities, governmental agencies, non-profit organizations, and the private sector. The final report went through extensive peer review and public comment processes, and is one of the most comprehensive studies of Narragansett Bay and its watershed to date. It highlights many successes that resulted from sound, science-based policy and management of the Bay. EPA cancelled the presentations of three scientists who were heavily involved in the development of this report: Dr. Autumn Oczkowski, ecologist in the EPA Atlantic Ecology Division, was invited to provide the keynote address, and Drs. Rose Martin (postdoctoral fellow with EPA Atlantic Ecology Division) and Emily Shumchenia (EPA consultant) were scheduled to speak on a panel.

CASS comprises nine professional societies representing almost 20,000 experts in the aquatic sciences. CASS members work in the private sector, academia, non-governmental organizations, and government agencies. CASS represents professional scientists and managers who combine deep subject matter expertise, a commitment to independent objectivity, and the critical review of environmental information, along with a passion for natural places and resources. CASS supports the development and use of the best available science to sustainably manage our freshwater, estuarine, coastal, and ocean resources for the benefit of all people worldwide.

Interested FMCS members can read the original of this and other letters issued by CASS at <https://aquaticsocieties.org/category/letters/>. As mentioned in the last issue of *Ellipsaria*, FMCS joined CASS in March 2017.

## Announcements

### Update on Gaining Endangered Species Act Listings for Imperiled Freshwater Mollusks

**Tierra Curry**, Center for Biological Diversity, Portland, Oregon, USA

In 2009, the Freshwater Mollusk Conservation Society, the Center for Biological Diversity, and the late James Deacon petitioned the US Fish and Wildlife Service (USFWS) to protect dozens of species of endemic springsnails from the Great Basin Desert in Nevada, Utah, and California under the Endangered Species Act. The snails are threatened because the springs in which they occur are projected to dry up if the Southern Nevada Water Authority's proposal to build a groundwater pipeline from rural areas to Las Vegas is granted. In October 2017, the USFWS denied protection for 14 of the springsnails and, in the negative finding, failed to even mention the threat proposed by the pipeline.

The USFWS also has failed to issue three decisions on freshwater mollusks that were scheduled under a listing work plan developed in 2016 by the previous administration. By September 30, 2017, a final listing rule should have been published for the Texas Hornshell; and the Black Mudalia and Atlantic Pigtoe should have been proposed for protection. The Yellow Lance was proposed for protection under a court-ordered deadline in spring 2017.

The Beaverpond Marstonia, Canoe Creek Pigtoe, and Atlantic Pigtoe will receive final decisions under court-ordered deadlines. Fifty-six other freshwater mollusks were scheduled for decisions under the 2016 work plan, but it is uncertain if these decisions will be issued because the decisions slated for 2017 were not issued. There are 47 petitioned freshwater mollusks that were not addressed in the 2016 work plan and that are not scheduled for status reviews. The Center for Biological Diversity has submitted Freedom of Information Act requests concerning the negative and missed findings. To get more information on these species or to become involved in the campaign to gain protection for them, scientists are welcome to contact Tierra Curry at the Center for Biological Diversity, [tc Curry@biologicaldiversity.org](mailto:tc Curry@biologicaldiversity.org).

### New Book Available

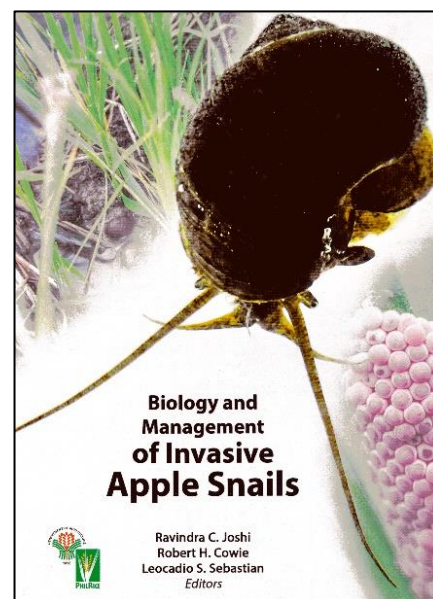
#### ***Biology and Management of Invasive Apple Snails.* 2017.**

Ravindra C. Joshi, Robert H. Cowie, and Leocadio S. Sebastian, Editors. Philippine Rice Research Institute (PhilRice), Maligaya, Science City of Muñoz, Nueva Ecija 3119, 406 pages. Full text available at [Joshi et al 2017 - Invasive Apple Snails Book.pdf](#)

[from the Forward]

. . . The invasion of *Pomacea maculata* in the southeastern USA probably results from its introduction through the aquarium trade, which is also responsible for the establishment in Florida of *P. diffusa*, yet another South American species popular among aquarium enthusiasts. Furthermore, confusion about the identity of the invasive *Pomacea* species in Asia, introduced primarily as a human food resource, has only recently been resolved: instead of just one widespread species there are two, the same *P. canaliculata* and *P. maculata*.

Among this welter of introductions and confusion, it is heartening and timely to have this comprehensive, up-to-date volume on the history of apple snail invasions, their various impacts, their biology (including proper systematics), and what to do about them. *Biology and Management of Invasive Apple Snails* serves not only as an authoritative source for those trying to understand *Pomacea* impacts, how to





manage them, and how to prevent further introductions, but as a model for invasion scientists generally as they begin to comprehend and grapple with the complexity of many of the most important invasions by all kinds of animals and plants. It highlights how important good basic science is to slowing the wave of invasions transforming the ecology of much of the earth.

## Regional Meetings

### **FMCS Regional Mollusk Meeting Assistance Award Program**

As described in the December 2012 issue of *Ellipsaria*, the FMCS has established a Regional Mollusk Meeting Assistance Award Program to facilitate regional mollusk meetings that address local and regional concerns with freshwater mollusk conservation and management. Our interest in assisting with these meetings is to bring people together who work with freshwater mollusks to exchange information on how to conserve and protect this faunal group. These meetings are often attended by a variety of individuals, including agency personnel, academia, private citizens, scientists, and others, some of whom may not be FMCS members. Therefore, a secondary goal of this program is to increase the awareness of, and membership in, FMCS among individuals in these groups. Support is provided via a cash award of \$100 to the regional group to help defray the costs (e.g., meeting room rental, speaker travel, break refreshments, etc.) associated with holding their meeting. It is anticipated that about 15-20 awards will be made in each calendar year.

The complete program description and application form may be obtained from the Awards Committee website at [http://www.molluskconservation.org/Mservices\\_awards.html](http://www.molluskconservation.org/Mservices_awards.html). One copy of the completed application must be received by the Chair of the Awards Committee at least two months prior to the Regional Mollusk Meeting to allow for application and payment processing.

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### **Chesapeake Bay Freshwater Mussel Workgroup Meeting January 16, 2018, Annapolis, Maryland**

We will be holding the eighth meeting of the Chesapeake Bay Freshwater Mussel Workgroup at the US Fish & Wildlife Service offices in Annapolis, Maryland on Tuesday, January 16, 2018. The need for a second, short day of focused topic discussion will be determined based upon participant interest and time. Teleconferencing and webcast capabilities will be available for those interested in participating, but cannot travel. Past topics include mussel ecology, propagation and relocation, range-wide status assessments, state and federal updates on the species listing, recent surveys, toxicological studies, and more. Light refreshments in the morning and afternoon are provided with the generous support of FMCS.

The meeting is open to anyone, but is primarily attended by resource agency biologists, consultants, and others interested in and working on freshwater mussels in rivers and streams of the Chesapeake Bay watershed. We particularly encourage any students who might be interested or involved to attend to increase exposure to the issues mussels face in the region.

For more information, contact Julie Devers at [julie.devers@fws.gov](mailto:julie.devers@fws.gov) or Matt Ashton at [matthew.ashton@maryland.gov](mailto:matthew.ashton@maryland.gov). Further details are sent via email, including a call for presentations, attendees, and a request for those in need of conference capabilities. Information is primarily sent through a distribution list of past and interested attendees, but will also be posted on the Unio list-serve.



## Upcoming Meetings

**March 12 – 15, 2018** – FMCS Mollusk Health and Disease Workshop, Radisson Conference Center, La Crosse, Wisconsin, USA.

<http://molluskconservation.org/EVENTS/2018Workshop/2018Workshop.html>

**July 21 – 26, 2018** – Society for Conservation Biology North American Sectional Meeting, Westin Harbour Castle Conference Centre, Toronto, Ontario, Canada. Theme: *Conservation Science, Policy, and Practice: Connecting the Urban to the Wild* <http://conbio.org/groups/sections/north-america/meetings/>

**March 18 – 22, 2018** – National Shellfisheries Association 110<sup>th</sup> Annual Meeting, Renaissance Hotel, Seattle, Washington, USA Theme: [not posted] <https://shellfish.memberclicks.net/annual-meeting>

**May 20 – 24, 2018** – Society for Freshwater Science Annual Meeting, Detroit, Michigan, USA Theme: *Navigating Boundaries in Freshwater Science* <http://sfsannualmeeting.org/>

**June 19 – 22, 2018** – American Malacological Society 84<sup>th</sup> Annual Meeting, Honolulu, Hawaii, USA Precise Location, and Theme not yet posted] <http://www.malacological.org>

**August 19 – 23, 2018** – American Fisheries Society 148<sup>th</sup> Annual Meeting, Atlantic City, New Jersey, USA Theme: *Communicating the Science of Fisheries Conservation to Diverse Audiences* <http://fisheries.org/events-page/future-afs-meetings/>

**September 16 – 20, 2018** -- First FMCS International Freshwater Mollusk Meeting, Theater Maggiore Verbania, Italy, Theme: *Bridging the gap between freshwater mollusk research and conservation in the Old and New Worlds* <http://molluskconservation.org/Events.html>

**October 21 – 24, 2018** -- Southeastern Association of Fish and Wildlife Agencies 72<sup>nd</sup> Annual Conference, Renaissance Riverview Plaza Hotel, Mobile, Alabama, USA. Theme: [not yet posted] <http://www.seafwa.org/conference/overview/>

**March 2019** – FMCS Symposium, San Antonio, Texas, USA. Theme: *Life on the Edge: Reconciling River Management*. Other details not yet announced.



## Contributed Articles

The following articles have been contributed by FMCS members and others interested in freshwater mollusks. These contributions are incorporated into *Ellipsaria* without peer review and with minimal editing. The opinions expressed are those of the authors.

### **Native Unionoida Surveys, Distribution, and Metapopulation Dynamics in the Jordan River-Utah Lake Drainage, Utah**

**David C. Richards<sup>1</sup> and Theron Miller<sup>2</sup>**

<sup>1</sup> OreoHelix Consulting, Vineyard, Utah 84058

<sup>2</sup> Wasatch Front Water Quality Council, Salt Lake City, Utah

We conducted the most extensive surveys to date of two native freshwater mussel taxa, *Anodonta* and *Margaritifera falcata* in the Jordan River-Utah Lake drainage in Utah. We have documented our findings and a discussion of the reasons for their apparent near extinction in the drainage and potentially all of Utah in a 221-page report including many illustrations, resulting in a large file size of >70mb; much too large to include in this newsletter. Here, we provide a summary of our findings and links to the full document so that readers of *Ellipsaria* interested in the demise of Utah's native freshwater mussels can have access to the full document and supplemental field information.

#### **Summary from Report**

North America supports the richest diversity of freshwater mollusks on the planet. Although the western USA is relatively mollusk depauperate, the one exception is the historically rich molluscan fauna of the Bonneville Basin area, including waters that enter Great Salt Lake and, in particular, those waters in the Jordan River-Utah Lake drainage. These mollusk taxa serve vital ecosystem functions and are truly a Utah natural heritage. Unfortunately, freshwater mollusks are also the most imperiled animal groups in the world, including those found in Utah. The distribution, status, and ecologies of Utah's freshwater mussels are poorly known despite this unique and irreplaceable natural heritage and their protection under the Clean Water Act. Very few mussel-specific surveys have been conducted in Utah which requires specialized training, survey methods, and identification expertise. We conducted the most extensive and intensive survey of native mussels to date in the Jordan River-Utah Lake drainage from 2014 to 2016 using a combination of reconnaissance and qualitative mussel survey methods. We also developed probability of detection estimates to illustrate how critically low *Anodonta* densities are in the drainage and determined that, even at theoretically extremely low search efficiencies, our methods had much greater than 90% probability of detections.

Our findings were very disappointing. Out of the dozens of stream and shoreline kilometers surveyed, only two very small, highly-fragmented, and isolated populations of only one mussel species, *Anodonta* sp. were encountered. Reasons for the demise of native mussel in the drainage are numerous and entirely due to human activities, including sedimentation, intensive and extensive unprecedented urbanization and industrialization, agriculture impacts (including dewatering and channelization), water quality impairment, invasive species particularly Asian clams and carp, loss of and extremely low densities of native fish hosts for glochidia larvae attachment, loss and fragmentation of suitable and occupied habitat, metapopulation and isolated population dynamics (demographic and environmental stochasticity), and absence of a monitoring program. These combined impacts have reduced or completely eliminated dispersal between populations and have negatively affected population abundance and viability, which resulted in loss of genetic diversity, and, subsequently, have multiplicatively resulted in extremely high extinction risk in the drainage. We do not expect native mussels in the Jordan River-Utah Lake drainage to persist into the near future without adequate protection, improved habitat, and a comprehensive reintroduction program.

Our full survey report can be downloaded from Research Gate at the following web address: <http://wfwqc.org/wp-content/uploads/2017/04/Native-Unionoida-Surveys-and-Metapopulation-Dynamics-in-the-Jordan-River-Utah-Lake-drainage-UT-Version-1.5-compressed.pdf> . A supplemental Excel (read only) spreadsheet containing locations, habitat conditions, and findings is available at <http://wfwqc.org/wp-content/uploads/2017/10/Appendix-8-Native-Mussels-Spreadsheet-FINAL-read-only.xlsx>

## **An isolated Population of *Musculium lacustre* in a Watering Hole in the Dunes of Terschelling, Friesland, the Netherlands**

**Henk K. Mienis**, The Steinhardt Museum of Natural History – Israel National Center for Biodiversity Studies, Tel Aviv University, IL-6997801 Tel Aviv, Israel, and National Natural History Collections, Berman Building Room 119, Hebrew University of Jerusalem, Edmond J. Safra Campus, IL-91904 Jerusalem, Israel. [mienis@netzer.org.il](mailto:mienis@netzer.org.il)

On September 18, 2016, I saw for the first time an artificial water hole (Figure 1) not far from a bicycle path in the dunes between Lies and Formerum at Sea on the island Terschelling in the Netherlands. Such water holes are being dug in the dunes where efforts are being made to reduce the excess growth of unwanted grasses by grazing of certain breeds of cows and horses. Such water holes are usually rather small (2-4 meters in diameter) and shallow because they are situated at places where groundwater is available near the surface.



Figure 1. The water hole in 2016



Figure 2. *Musculium lacustre* (Photograph by Oz Rittner)

Most water holes contain at least some aquatic insects but usually they are devoid of any molluscs. The hole mentioned above turned out to contain a dense population of the Lake fingernail clam *Musculium lacustre* (Müller, 1774) (Figure 2), Family Sphaeriidae. All shells were characterized by the presence of a prominent capped umbo. Alongside numerous adult specimens, tiny juveniles were seen everywhere, proof that I was dealing with a well-established colony.



Figure 3. The water hole in 2017

On September 24, 2017, I visited that water hole again. Because of heavy rains a week earlier, the water was standing much higher and the diameter of the pool was also much larger (Figure 3). This time, numerous specimens of that Fingernail clam were present.

My fellow travelers to Terschelling asked if I could explain how the first specimens of *Musculium lacustre* had reached that isolated water hole. They could hardly believe my explanation that most probably the first specimen arrived at the water hole by air. I told them that in 1893 Harry Wallis Kew had written that from time to time Fingernail clams (*Sphaerium* including *Musculium* species) and the smaller but related Pea mussels (*Pisidium* species) were seen



adhered not only to the legs of aquatic insects but also to the legs of newts and toads (Figure 4). Since newts and toads are rarely seen in that part of the dunes on Terschelling, this leaves us with an aquatic insect as the most likely carrier of a Fingernail clam to that water hole.



Figure 4. Aquatic animals carrying tiny mussels: (from left to right) Dragon-fly larva, Water scorpion *Nepa*, Water beetle *Dytiscus*, Newt, and Toad foot. (after Kew, 1893)

Rees (1965) has summarized cases of aerial dispersal of molluscs and stated that "...colonization of isolated ponds by these small bivalves [i.e. members of the Sphaeriidae] appears mainly to be due to insects ...". Among carriers of tiny freshwater mussels, he mentioned Water-scorpions *Nepa* sp., aquatic beetles like *Dytiscus marginalis*, and several species of aquatic bugs belonging to the family Corixidae. In 1992, I came across an event in the Netherlands that a pea mussel *Pisidium casertanum* (Poli, 1792) was attached to a leg of a Water boatman *Corixa affinis* (Figure 5) (Mienis, 1992).

Although I do not completely rule out the possibility that tiny mussels attach themselves intentionally to the legs of aquatic insects in order to enlarge their distribution, it is much more likely that aquatic insects are tripping now-and-then accidentally into an open mussel and a leg becomes trapped when the mussel closes its valves suddenly in a reaction of panic.

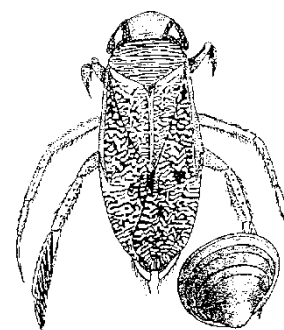


Figure 5. *Corixa affinis* carrying a *Pisidium casertanum* (after Mienis, 1992)

#### Acknowledgement:

I like to thank my colleague Oz Rittner at the Steinhardt Museum of Natural History (Tel Aviv University) for the excellent photograph of *Musculium lacustre*.

#### References:

- Kew, H.W. 1893. *The dispersal of shells. An inquiry into the means of dispersal possessed by fresh-water and land mollusca*. Kegan Paul, Trench, Trübner & Co. Ltd., London, XIV+291pp.
- Mienis, H.K. 1992. Liftende fijnschalen op Wieringen. *Meerkoet*, 1992 (3):24-26.
- Rees, W.J. 1965. The aerial dispersal of mollusca. *Proceedings of the Malacological Society of London*, 36 (5):269-282.

### Recent Observations of the Invasive *Mieniplotia scabra* in two Nature Reserves in the Dead Sea Area of Israel

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The invasive tropical gastropod *Mieniplotia scabra* (Müller, 1774), Family Thiariidae, has recently been found in two Nature Reserves in the Dead Sea Valley, Israel. Zohar Yanai found this typical aquarium snail in 'Enot Zuqim (formerly 'Ein Fashkha) at the northwestern corner of the Dead Sea on 2 July 2015 (SMNH MO 81294). He also found this species in Nahal Dawid, a small stream on the west bank of the Dead Sea, north of 'En Gedi on 7 March 2017 (SMNH MO 82058).

'Enot Zuqim and Nahal Dawid are both important Nature Reserves in the Dead Sea area. The discovery of the rather aggressive *Mieniplotia scabra* (Figure 1) in these areas is of much concern because these aquatic spring systems are known to harbor several enigmatic aquatic invertebrates not only among the molluscs like *Mercuria tchernovi* (Mienis, 2011) and a still undescribed *Heleobia* species, but also among the euryhaline copepod species (Por, 1975).

The springs of 'Enot Zuqim are also the only place where, more than 50 years ago, the late Prof. Heinz Steinitz collected several specimens of the mysterious *Melania judaica* Roth, 1855 (Figure 2). This species was originally described from a streamlet near the Dead Sea. Without doubt, it is an odd form of *Melanoides tuberculata* (Müller, 1774); however, we have no clue of the reason why specimens fitting the original description are characterized by an extreme large size and completely flat whorls. Since the water of the various springs forming 'Enot Zuqim all have different chemistry, it is a pity that Steinitz did not pinpointed the spring where he found his *judaica*-like specimens of *Melanoides tuberculata*.

We have no idea how *Mieniplotia scabra* reached both localities. We know only that in the past several mollusc species have disappeared from the reserve of 'Enot Zuqim and that people have transferred molluscs of unknown origin to that area in the hope that they will establish viable populations. In this way also *Melanopsis costata* reached 'Enot Zuqim, a species which had never been recorded in the past from that spring system. Dana Mienis has collected it in small numbers on 28 December 2012 (SMNH MO 77289).

#### Acknowledgements:

I like to thank my colleague Oz Rittner from the Mollusc Collection of the Steinhardt Museum of Natural History (SMNH MO), Tel Aviv University, for the photo of *Mieniplotia scabra* and Dana Mienis and Zohar Yanai for collecting the discussed material.

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Figure 1. *Mieniplotia scabra* (Müller, 1774). Photograph by Oz Rittner.



Figure 2. *Melania judaica* Roth, 1855 (copy of Roth, 1855: plate 2, figures 1-3).

**First Occurrence Record of the Native Freshwater Mussel/ Naiad Unionoida/ Hyriidae *Diplodon rhuacoicus* (d'Orbigny, 1835) in the Rio do Peixe (Fish River) Basin, Western Region of Santa Catarina State/ SC, Central Southern Brazil**

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On August 28, 2017, a local professional field biologist, Marieli Cristina Scartezini, forwarded to us some photographs of a curious little limnic bivalve (Figure 1) found in an area under study for the next implementation of small hydroelectric power plant (Pequena Central Hidrelétrica - PCH) (Figure 2). The specimen was found in a riverside sector of the Rio do Peixe (Fish River), located in the Tangará Municipal District, 27°06'17"S & 51°14'50"W, at approximately. 641 meters above sea level, Western malacological region of Santa Catarina State/SC, Central Southern Brazil (Figure 3). The Rio do Peixe is part of the great Upper Uruguay River Basin. Another limnic bivalve found in the area was the abundant/dominant invasive exotic Asian clam Corbiculidae/Cyrenidae *Corbicula largillierti* (Philippi, 1844) (Figure 4).

The curious species was confirmed by us to be the native freshwater mussel/naiad Unionoida/Hyriidae *Diplodon rhuacoicus* (d'Orbigny, 1835) (Figure 1), an endemic species of the Southern Cone region in South America (Pereira *et al.* 2012:91- Table III; Pereira *et al.* 2013:24-Table 2). This is the first confirmed geographical record of *Diplodon rhuacoicus* (d'Orbigny, 1835) in the Rio do Peixe. Its previous known distribution in the State of Santa Catarina/SC is presented and revised in the regional literature (Agudo-Padrón 2008:168; Agudo-Padrón 2014:19).



Figure 1. Specimen of the native freshwater mussel/naiad *Diplodon rhuacoicus* (d'Orbigny, 1835) found in the Rio do Peixe (Fish River). Photograph by Marieli Cristina Scartezini.

Figure 2. The influence area in the Rio do Peixe of the next implementation of small hydroelectric power plant (yellow marking to left) located in the Tangará Municipal District, Western region of Santa Catarina State/SC, and the collection point of the *Diplodon rhuacoicus* specimen (yellow marking to right). Photograph composition by Marieli Cristina Scartezini.







Figure 3. Spatial location of the Tangará Municipal District (map – red color) in the Western region of Santa Catarina State/SC, and a typical view of the Rio do Peixe. Photograph by Marieli Cristina Scartezini.



Figure 4. Specimens of the exotic invasive freshwater Asian clam *Corbicula largillierti* (Philippi, 1844) found in the Rio do Peixe. Photographs by Marieli Cristina Scartezini.

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**New Geographical Record of the Amphibian Native Semi-slug Succineidae  
*Omalonyx convexus* (Heynemann, 1868) in Anthropized Territory of the Great  
Florianópolis, Santa Catarina State/SC, Central Southern Brazil**

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The amphibian/limnophile semi-slugs Succineidae of the genus *Omalonyx* d'Orbigny, 1837 are typical little continental mollusks which occur in aquatic macrophytes and adjacent floodplain vegetation of rivers, lakes and reservoirs, often found in disturbed and polluted areas (Arruda 2007, 2011).

On August 26, 2017, in the course of regional sanitary malacological survey in the Jardim Eldorado Neighborhood/Quarter (27°37'22"S; 48°39'13"W), Palhoça Municipal District, Great Florianópolis Metropolitan region, Santa Catarina State/ SC, Central Southern Brazil (Figure 1), the second author of this report observed and collected for first time several specimens – vestigial loose shells (Figure 2) and some live animals (Figure 3) -- of the limnophile *Omalonyx convexus* (Heynemann, 1868). These animals were found in a wetland/flooded area behind a warehouse in industrial area, heavily anthropized although officially considered as of "environmental preservation" (Figure 1). The surface of the water was totally covered by tiny green macrophytes Araceae *Lemna valdiviana* Phil. (lenticilha-d'água) and the native limnic snail Planorbidae *Biomphalaria t. tenagophila* (d'Orbigny, 1835) was also present.

This site is in the Imaruí River Basin, a basin that reaches/crosses three municipalities. Since 1997, this river falls under the category of "polluted" - class three.

An opportune and complete description of this amphibian semi-slug species it is presented in the malacological literature (Arruda and Thomé 2008).

In general, during our malacological researches and regional “continental shellings” in southern Brazil, we have detected *Omalonyx convexus* (Heynemann, 1868) in several localities of Santa Catarina/SC (Agudo-Padrón 2008:154; 2014:13), particularly in the Santa Catarina's Island (Agudo-Padrón 2009), the Serra do Tabuleiro Ecological State Park region (Agudo-Padrón 2011), the North sector (Agudo-Padrón 2012a), and in the neighboring State of Rio Grande do Sul/RS (Agudo-Padrón 2012b).



Figure 1. Environmental general aspect of the collection site and spatial localization (map – red color) of the Palhoça Municipal District in the Great Florianópolis Metropolitan region, Santa Catarina State/SC, Central Southern Brazil. Photograph by Jefferson Souza da Luz.

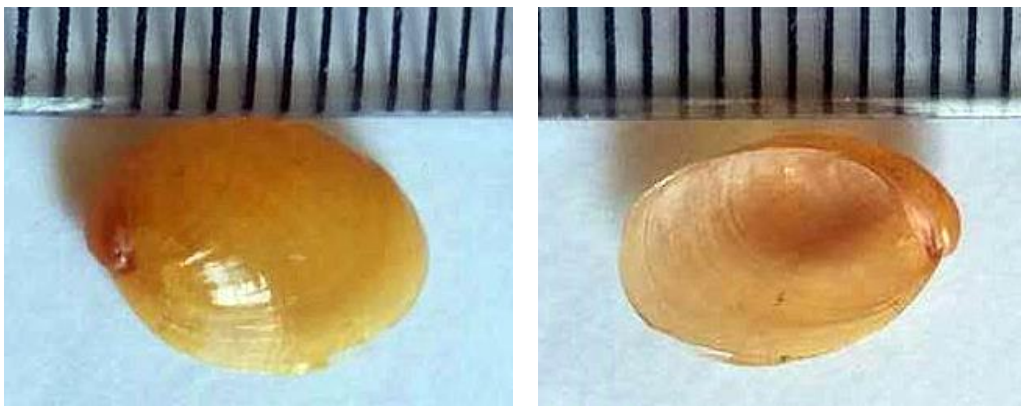


Figure 2. Vestigial loose shell of the amphibian semi-slug *Omalonyx convexus* (Heynemann, 1868), found in wetland/flooded area of the Jardim Eldorado, Palhoça Municipal District, Great Florianópolis Metropolitan region, Santa Catarina State/SC. (scale in millimeters) Photographs by Jefferson Souza da Luz.

Figure 3 Live specimens of amphibian semi-slugs *Omalonyx convexus* (Heynemann, 1868), found in wetland/flooded area of the Jardim Eldorado, Palhoça Municipal District, Great Florianópolis Metropolitan region, Santa Catarina State/SC. Photograph by Jefferson Souza da Luz.

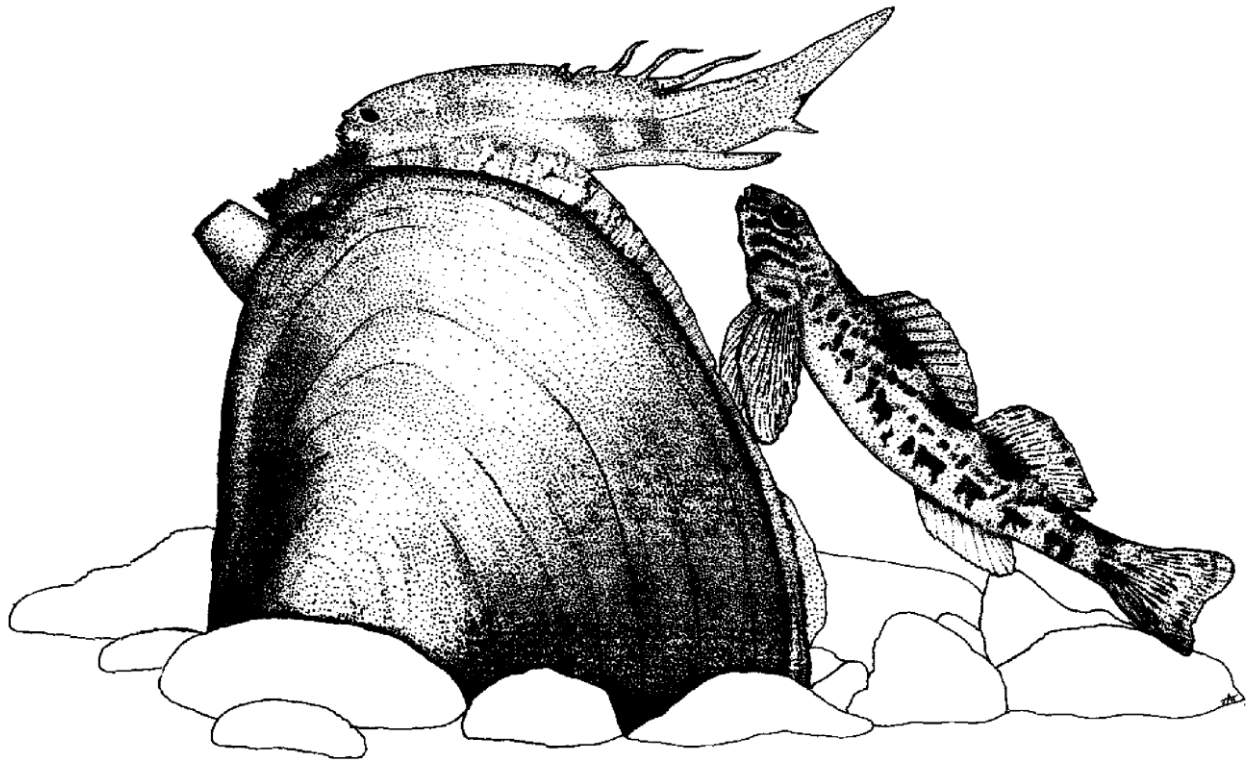


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## Parting Shot



Specimens of the (more-rounded) Plicate Rocksnail, *Leptoxis plicata*, and the (more elongate) Gladiator Elimia, *Elimia hydei*, in the upper Locust Fork of the Black Warrior River, in Blount County, Alabama. Both species once occurred throughout most of the Black Warrior River basin. This population of the Plicate Rocksnail, a federally-listed endangered species, was established between October 2011 and October 2013, through three releases of a total of 18,530 animals spawned and raised at the Alabama Aquatic Biodiversity Center (AABC).

These gastropods have separate sexes, and females lay single eggs in April – June. The reintroduced Plicate Rocksnail population, monitored most recently in September 2017, is persisting and Rocksnail egg cases have been observed during the monitoring period. This photograph was taken in June 2015 by Paul Johnson, AABC.

If you would like to contribute a freshwater mollusk-related image for use as a **Parting Shot** in *Ellipsaria*, e-mail the picture, informative caption, and photo credit to [jjjenkinson@hotmail.com](mailto:jjjenkinson@hotmail.com).

