

Newsletter of the Freshwater Mollusk Conservation Society Volume 18 – Number 4 December 2016

Cover Story1
Society News 3
Announcements 13
Regional Meetings 14
Upcoming Meetings 19
Contributed Articles 20
FMCS Officers 33
Committee Chairs and Co-chairs 34
Parting Shot 35

Evidence of Our Success

On October 7, 2016, the Knoxville News Sentinel, the daily newspaper in Knoxville, Tennessee, printed a fairly standard story about students being involved in stocking some endangered freshwater mussels into a nearby river. More importantly, a week later the same newspaper ran an editorial describing the value of that project in a much broader context. With permission from the News Sentinel, we are reprinting their editorial to demonstrate that members of our Society are being successful in educating the general public -- and the media -- about the importance of freshwater mollusks to healthy rivers and to the lives of people.

Knoxville News Sentinel, Friday, October 14, 2016, page 2B

Editorial

Mussels a sign of a healthy Powell

Scientists proved long ago that all of life is related, a fact re-emphasized in the environmental movement of the 1960s and 1970s. Recent work to populate the Powell River with freshwater mussels illustrated that point.

The Powell River in upper East Tennessee is considered one of the most diverse aquatic systems in the nation. Conservation partners in Tennessee and Virginia last week released 750 freshwater mussels into the river as part of a restoration effort. The project was made possible through the Tennessee Valley Authority, which put \$100,000 into the work carried out by biologists from Virginia Tech in Blacksburg, Va. and students from Lincoln Memorial University in Harrogate, Tenn.

Why mussels? Google "mussels," and you will find not the environmental and ecological relationships but recipes – how mussels go with garlic, parsley and butter or with wine. In contrast, the U.S. Fish and Wildlife Service website says mussels have little value as food for humans, although they are part of the food chain for a number of aquatic animals. However, as the website noted, their ecological value is immense. The little creatures that can be held in one's hand provide a natural source of filtering, and they improve the water quality by screening out sediments and pollutants from rivers and streams.



Lincoln Memorial University (LMU) students stocking mussels in the Powell River. Photograph curtosy of the LMU Student Chapter of the Wildlife Society.

sediments and pollutants from rivers and streams. A single mussel can filter several gallons of water each day, thereby making the waters safer for humans.

Last week's activity in the Powell River in Claiborne County drove home that realistic context. Braven Beaty, one of the collaborators on the project, said, "From an ecological perspective, mussels are sort of the foundation layer that makes a river function like it should." Beaty is an ecologist with the Nature Conservancy's Clinch Valley program. Freshwater mussels perform their filtering function when they burrow into the sand and gravel at the river bottom. The young mussels – 1 to 2 years old – were raised at Virginia Tech's Freshwater Mollusk Conservation Center and the Aquatic Wildlife Conservation Center in Marion, Va. The LMU students carefully released four different types into the river, and the mussels can live for 30 years or longer.

The Powell River was an important site for the project. Jess Jones, a restoration biologist with the U.S. Fish and Wildlife Service at Virginia Tech, said the Powell River "is one of the last places that has the right ecological conditions for these endangered species to exist." Jones said the health of the mussels will help determine the health of the river. "If the mussels are dying," he said, "then we know the river is not in good condition."

And, while the Powell River is not dying, Beaty said there has been a steady decline in mussel populations, due largely to human causes: the aftermath of mining, higher levels of salt and metals, runoff from roads, and untreated sewage. Beaty and others want to increase the mussel population by about 10 times the current level, with the ultimate goal to remove mussels from the endangered species list.

The health of the mussels goes beyond an indicator of the health of the river. Their survival eventually affects the entire food chain, including humans. That is a part of ecology all of us should watch.

Congratulations to Bevan, Jess, and all the un-mentioned Society members and others who participated in this project or contributerd to its coverage by the press. The resulting article and editorial indicate that it clearly was worth all of your time and effort.

Society News

OH NO! Not Another Election!

Well, yes, but this one is easier to deal with than the recent U.S Presidential election. The FMCS Nominations Committee has selected candidates for the three Society elective offices: President-Elect, Secretary, and Treasurer. Statements from each of the candidates are presented below.

Once you have reviewed those statements, we encourage you to vote for your candidate of choice for each office. Voting will occur online at the following site: <u>http://tinyurl.com/FMCS2017Ballot</u>. That site is open now and will close on January 31, 2017. If you have any questions about the election process, please contact Leroy Koch, Nominations Chairperson at Leroy_Koch@fws.gov.

Candidates for President-Elect



Todd Morris

I am humbled and honoured to accept the President-elect nomination for of the Freshwater Mollusk Conservation Society. I had the privilege of attending the 1995 UMRCC meeting in St Louis as a young impressionable first year graduate student and was in awe of the scope and magnitude of work being conducted by so many dedicated individuals. Coming from a country where, at that time, you could count the malacologists on one hand, it was an eve-opening experience. I now consider myself lucky to be able to call many



Jeremy Tiemann

I have been a Field Biologist/Aquatic Zoologist specializing in stream ecology with the Illinois Natural History Survey since 2002. I grew up on a farm in northeastern Kansas and developed a keen interest in aquatic biology while traipsing through steams as a kid. This passion led me to a Bachelor of Science in Biology from the University of Kansas (KU) in 1998, and a Master of Science in Biological Sciences from Emporia State University (ESU) in 2002. While at KU, I first learned about the conservation plight of

(Morris Statement, continued)

of those same individuals my friends and colleagues. I have learned a lot from all of you and to be given the chance to help shape the direction of our Society today and into the future would be a true honour.

I received an Honors B.Sc. in Zoology from the University of Western Ontario in 1993 where I got my start working with freshwater mussels in the Thames River, London, Ontario, as part of my undergraduate thesis. I received a M.Sc. in aquatic ecology in 1996 from the University of Windsor and a Ph.D. from the University of Toronto in 2002. I am currently a Benthic Research Scientist with Fisheries and Oceans Canada where I am tasked with leading the only research program within the Canadian government dedicated to the protection and conservation of freshwater My research interests focus on mussels. understanding distributional patterns, life history and assessing threats to species at risk. I also have a keen interest in education and outreach and building partnerships to I am a facilitate our conservation goals. member of the Committee on the Status of Endangered Wildlife in Canada's Mollusc Specialist Subcommittee, The American Fisheries Society's Endangered Mussel Subcommittee, FMCS Status and Distribution Subcommittee. **FMCS** Professional Development Ad-hoc committee, and co-chair of the Ontario Freshwater Mussel Recovery Team.

Our Society has always benefited from strong and positive leadership. If elected as president -- the first from outside the United States -- I will strive to continue the good work of those who came before and to advance the mission of the Society. I will look to continue to build the Society both within the United States and also internationally to ensure that all those working on freshwater molluscan issues can benefit from the incredible knowledge and experience that our Society encompasses.

(Tiemann Statement, continued)

freshwater mussels when I mapped Element Occurrence records for the Kansas Biological Survey. Realizing their importance, I was able to work a mussel component into my thesis project at ESU, where I addressed the effects of lowhead dams on a Midwestern stream.

My professional research interests include stream ecology and life history of non-game fishes and freshwater mollusks. I am a collaborator on several conservation projects. including the reintroduction of two federallyendangered mussels into the Vermilion River basin, and documenting the distribution and status of aquatic gastropods in Illinois. Since arriving in Illinois, I have been involved in several other professional societies including the American Fisheries Society (President, Illinois Chapter, 2009-2010). I started in the FMCS "mailroom" in 2002, where I assisted with the preparation and mailing of *Ellipsaria*. Today, I am co-chair of the Gastropod Distribution and Status Committee (since 2011) and am the AFS-FMCS liaison, disseminating information between the two societies when their goals and interests overlap. I have over 35 peer-reviewed papers, including being а co-author on the "Conservation Status Freshwater of Gastropods of Canada and the United States," published in Fisheries in 2013, and "A review of the interactions between catfishes and freshwater mollusks in North America," published in Conservation, ecology, and management of catfish: the second international symposium in 2010.

I am honored to be nominated for Presidentelect of FMCS. If elected, I will strive to continue the high standards set by those who have served before. I will work with past leaders while encouraging the next generation to step forward into leadership roles. Some FMCS items that I am passionate about include making aquatic gastropods (which are just as imperiled as mussels) more visible, bolstering international collaboration, and making sure the updated "mussel kill valuation and guidelines book is received by the proper people. If elected, I look forward to working with the Board and Committees to determine how best to achieve these goals.

Candidate for Secretary



Janet Clayton

A native of West Virginia (WV), I obtained my BS in Biology in 1982 from Marshall University where I took every aquatic biology class that they had to offer. I received my MS in Biology from Tennessee Technological University (TTU) After spending three years as a in 1984. conservation officer in Nashville TN, I moved back to my home state in 1987 and began working for the WV Division of Natural Resources. Primarily working with aquatic insects in the Compliance and Monitoring Section, I was fortunate to be at the right place at the right time. Our group was being tasked with conducting a mussel survey and the new guy on the block was given the opportunity to go to TTU for two weeks to take Dr. Stansbery's He was telling my malacology class. supervisor, right outside my office door, that he really didn't want to go. I immediately popped out of my door and said, "Can I?" That class was my introduction to freshwater mussels back in 1989. Shortly thereafter, I moved to the Fish Research Section where I

(Clayton Statement, continued)

again was primarily tasked with aquatic insects, this time for acid rain mitigation research. The only difference was that I now worked in close proximity to the endangered species biologist. This provided me the opportunity to continue to work with freshwater mussels as time allowed. Over the years, I had the opportunity to develop the freshwater mussel program for the state. As the Fish Research Section disappeared, I began working with mussels full time.

The state's mussel program has grown from conducting general presence/absence surveys the establishment of 26 long-term to monitoring sites and conducting mussel restoration activities. As a long standing member of the Ohio River Valley Ecosystem Mollusk Group, I was involved with the development of the original Ohio River Protocol in 2004 which I later used as the basis for development of the WV Mussel Survey Protocol with the assistance of other FMCS members. The WV Protocol has served as an example for other states to develop their own protocols and has been a great assistance to contractors working within mussel streams. I also teach a week-long mussel identification and ecology each help researchers, class year, to managers, and consultants become familiar with the mussel fauna of WV.

I have been actively involved with FMCS since its inception. I am a member of the Guidelines and Techniques Committee which I co-chaired for a time. I worked on the development of the AFS Special Publication 30, Investigation and Monetary Values of Fish and Freshwater Mussels. I have used this document several times in the course of my work in evaluating mussel kills and I look forward to the opportunity to provide comments as we move forward with revisions of this document. I have attended many board meetings both as co-chair and interested member, and I look forward to expanding my opportunity to serve the Society if re-elected as vour Secretary.

Candidate for Treasurer



Emily (Grossman) Robbins

Ever since I was a small child, I have been interested in the natural world. I earned a B.A. in biology from Augustana College in 2009 and a M.S. from Western Illinois University in 2011, but I was only introduced to freshwater mussels a few short years ago while working for the U.S. Fish and Wildlife Service. I was given the opportunity to tag along on Iowa DNR's annual "mussel blitz" in 2011, and after that first encounter, I was hooked. Mv newfound interest in these often-overlooked creatures led me to a position with Ecological Specialists, Inc., where I have now worked for nearly 5 years. My job duties include managing projects and leading field crews on mussel projects throughout the Midwest.

I was elected Treasurer of FMCS in 2015 and, over the past two years, have worked to ensure the books are balanced, bills are paid, and taxes are filed. I have also implemented a new system for accepting credit cards that has reduced the fees we pay. I have enjoyed working with the other officers and society members and being able to serve this unique organization. I hope you will give me the opportunity to continue working as Treasurer in 2017-2019.

Right now, before it slips your mind, go to <u>http://tinyurl.com/FMCS2017Ballot</u> and **vote !** Please take advantage of this opportunity to help select the officers of our Society.

Last Call for 2017 FMCS Professional Award Nominations

Do you know someone who has made worthwhile contributions to mussel conservation or to the Society, either through donating their professional time or expertise or through their scientific endeavors? If so, please consider nominating them for one of the three FMCS Professional Awards.

• **The Meritorious Service Award** is given to an individual for singular accomplishments or long-term contributions to the Society. The recipient of this award must be a past or present FMCS member who has performed long-term, exceptionally high-quality service to the Society.

- The William J. Clench Memorial Award is given to an individual for singular accomplishments or long-term contributions that have advanced the natural history and understanding of freshwater mollusks at an academic or non-academic level. The recipient of this award must have had (1) activity in one or more aspects of freshwater mollusks for a substantial period of time, with a recommended minimum guideline of 20 years, and (2) made substantial contributions to the field of freshwater malacology.
- The Lifetime Achievement Award is given to an individual for singular accomplishments or long-term contributions that have advanced the conservation and science of freshwater mollusks at a national or international level. The recipient of this award must have had (1) activity in one or more aspects of freshwater mollusk research and/or conservation for a substantial period of time, with a recommended minimum guideline of 20 years, and (2) made substantial contributions to the scientific understanding of freshwater mollusks and/or their conservation.

If you would like to nominate someone for one of these professional awards, please go check out the procedures and requirements on the Awards Committee website at http://molluskconservation.org/Mservices_awards.html. Nominations and the supporting documentation for all three awards are **due by December 31, 2016**. For more information, contact Dr. Greg Cope, greg_cope@ncsu.edu, 919-515-5296 or Dr. Teresa Newton, tnewton@usgs.gov, 608-781-6217.

Freshwater Mollusk Conservation Society 10th Biennial Symposium

Sunday, March 26, to Thursday, March 30,2017 Cleveland Marriott Downtown at Key Center, 1360 West Mall Drive, Cleveland, OH 44114

Our 10th Biennial Symposium has been built around the theme The Roles of Freshwater Mollusks in Changing **Environment:** а Engineering, Valuation. Ecosystems, and Practice. The Local Committee has lined up an incredible group of keynote speakers (see below) who are sure to engage and inform. This symposium will include joint plenary sessions focusing on the key themes, contributed papers on



a range of policy, research, and management topics in both oral and poster presentation format; FMCS Committee Meetings; and our Business Meeting. In addition to the platform and poster sessions, there will be a one-day snail identification and sampling workshop, a mussels of the Great Lakes identification workshop, and some exciting field trips to local attractions and water quality programs. The mixers, breaks, auction, and banquets will offer multiple opportunities to network among members. Also, for the first time ever, we will host a student-mentor mixer to foster relationships between young biologists and the leaders in the field of freshwater malacology. This Symposium is being hosted by TRC Environmental Corporation and EnviroScience, Inc.

Sunday March 26	Monday March 27	Tuesday March 28	Wednesday March 29	Thursday March 30	
Workshops	Plenary Sessions	Plenary Sessions	Concurrent Sessions		
Board Meeting	Concurrent Sessions	Concurrent Sessions	Business Lunch and Awards	Dield Tring	
Welcome Mixer	Committee Meetings	Committee Meetings	Mixer	Field Trips	
Student/Mentor Mixer	Poster Session and Mixer	Dinner, Auction			

2017 FMCS Symposium - Schedule Overview

Keynote Topics and Speakers

- **Ecosystems Dr. David L. Strayer**, Freshwater Ecologist with the Cary Institute of Ecosystem Studies in New York State. Dr. Strayer's research has focused on the distribution and roles of freshwater invertebrates. He is currently working on the ecology of the Hudson River and on understanding the controls on the distribution and abundance of pearly mussels. <u>http://www.caryinstitute.org/science-program/our-scientists/dr-david-l-strayer</u>
- **Valuation Mr. Don Blankenau**, Attorney and partner at Blankenau, Wilmoth, Jareckle LLP based in Lincoln, Nebraska. Mr. Blankenau and his partners provide sophisticated solutions to complex legal matters across the country. His practice is devoted to Water, Natural Resources, Energy, Agribusiness, and Environmental Law. Don has extensive experience with litigation regarding water rights and the Endangered Species Act, including cases related to freshwater mollusk species at the highest levels of the U.S. legal system. <u>http://aqualawyers.com/</u>
- **Practice Dr. Gregory Cope**, Professor, Extension Leader and Coordinator of NC State University Agromedicine. Dr. Cope's research interests are in aquatic toxicology, ecology, and physiology, as well as in the transport, fate, and effects of aquatic pollutants and other human-mediated stressors. This research utilizes sentinel aquatic organisms, biomarkers of exposure, effect, or susceptibility, or alternative toxicological models from which linkages to environmental and human health are evaluated. Major areas of research include: 1) assessment of pesticides, persistent organochlorine contaminants, and metals in surface waters, 2) effects of waterborne and sediment-associated contaminants on fish and native mussels in inland waterways, 3) efficacy of constructed wetlands and other Best Management Practices) for reducing non-point source pollution from urban (e.g., polycyclic aromatic hydrocarbons) and agricultural (e.g., nutrients) watersheds, and 4) the effects of contaminant availability and cycling on threatened and endangered species of mussels and fish.
- **Mollusks as Ecosystem Engineers Dr. Timothy Hoellein**, Aquatic Ecologist, Loyola University of Chicago. Dr. Hoellein's research interests are ecosystem processes and biogeochemistry; the use of metrics of ecosystem function and seasonal dynamics for evaluation of human impacts and restoration in aquatic ecosystems. Currently, he is conducting research projects related to the influence of restoration on N cycling in eutrophic coastal habitats in NYC, measuring the role of freshwater bivalves on N transformations, and analyses of biofilm activity on anthropogenic litter and microplastic in aquatic ecosystems.

"Hands On" Workshops: **Limited Space**

- <u>Gastropod Identification and Sampling Workshop</u> presented by the FMCS Gastropod Status and Distribution Committee - The focus of this workshop is to provide participants with a background on biology and ecology of freshwater gastropods, sampling techniques, and taxonomic skills for commonly encountered species. A lab setting and dissecting scopes will be provided.
- <u>Unionid Mussels of the Upper Ohio and Great Lakes</u> presented by Dr. Tom Watters This workshop will cover all freshwater mussels, including extinct species, from the upper Ohio River and Great Lakes drainages.

You can register for these Workshops on the Symposium Registration page: <u>http://molluskconservation.org/EVENTS/2017Symposium/2017_FMCSSymp_Registration.ht</u> <u>ml</u>, but do it soon because **space is limited**!

Field Trips:

<u>Sightseeing Tour</u> Cleveland Aquarium, Great Lakes Brewing Company Tour, and Rock and Roll Hall of Fame. Come see some of the best that Cleveland has to offer! First, check

out local and other aquatic ecosystems on display at the Great Cleveland Aquarium via a special behindthe-scenes tour. Next, tour the famous Great Lakes Brewery and restaurant where award-winning beer is crafted using an ecologically sustainable production process. Finally, see and hear the most amazing display of Rock and Roll memorabilia under one giant, prism-shaped roof at the Rock and Roll Hall of Fame! Transportation will be provided from and back to the hotel.

- <u>http://greaterclevelandaquarium.com/</u>
- <u>https://www.greatlakesbrewing.com/</u>
- <u>https://www.rockhall.com/</u>

<u>Restoration in Action</u> Northeast Ohio Regional Sewer District and Stream Restoration Site Reviews. This tour will be led by Joel Bingham and Neal Hess from EnviroScience and

Paul Kovalcik and others from the Northeast Ohio Regional Sewer District (NEORSD). This trip will visit an estimated four sites where habitat restoration and green infrastructure has been used to improve water quality and manage stormwater. Presenters will discuss the key issues surrounding each project including purpose, funding, regulatory basis, and some of the metrics that are being used to gage success. An estimated 1.7 Billion dollars is expected to be invested into the Cleveland/Akron quality area for stormwater and water



improvements. Come see what has already been done and what may be on the horizon! Transportation will be provided from and back to the hotel.

- http://www.neorsd.org/stormwater-watersheds.php
- <u>http://enviroscienceinc.com/services/ecological-restoration/</u>

You also can register for one or the other of these field trips on the Registration page: <u>http://molluskconservation.org/EVENTS/2017Symposium/2017_FMCSSymp_Registration.ht</u> <u>ml</u>,



Registration is NOW OPEN!

You can access the Symposium registration page via the event website: <u>http://molluskconservation.org/EVENTS/2017Symposium/2017_FMCSSymp_Registration.ht</u> <u>ml</u>. Save money now by registering TODAY! Early Registration will run through January 20, 2017. Late Registration will occur from January 21 through March 3, 2017. Fees increase by \$50 after January 20th. Non-member registration includes a 2-year membership in FMCS.

Location

Cleveland, Ohio, is located on the southern shore of Lake Erie at the mouth of the Cuyahoga River, the river that caught fire at least 13 times between 1868 and 1969 from massive levels of pollution and habitat modifications. The poor state of the river helped initiate the public momentum that created current pollution control laws like the Clean Water Act and agencies such as the U.S. EPA. Today, the river continues to undergo recovery; the reach from Cleveland upstream to Akron that once was completely devoid of any life now supports at least 44 fish species and populations of native freshwater mollusks. Similarly, the ecology of Lake Erie has seen major shifts and losses to native freshwater mollusks over the past 150 years caused by a variety of factors, including the widespread and complex effects of exotic and invasive Dreissenid mussels and, most recently, changes from nutrient loading and toxic algal blooms. We think you will agree that the City of Cleveland provides an excellent backdrop for the 2017 symposium as we explore the roles of freshwater mollusks in society and ecology, in these changing times.

Lodging

This Symposium will be held at the Cleveland Marriott Downtown at Key Center (http://www.marriott.com/hotels/travel/clesc-clevelandmarriott-downtown-at-key-center/). This hotel is located at 1360 West Mall Drive (A.K.A. 127 Public Square), Cleveland, OH 44114. [When navigating to the hotel using GPS, <u>enter</u> the 1360 West Mall Drive address; not the Public Square address.] The hotel is within short walking distance of many restaurants and entertainment districts.

For Symposium attendees, the discounted room rate will be \$129/night (1 king or 2 double beds), including complimentary continental breakfasts on Monday and Tuesday. That rate will be available for the nights of March 26 to March 30, 2017. Reservations can be made by telephone



(216-696-9200) or online by clicking <u>http://www.marriott.com/meeting-event-hotels/group-</u> <u>corporate-</u>

travel/groupCorp.mi?resLinkData=2017%20FMCS/%20Symposium%20Mar2017%20%5Ecles c%60rmurmua%60129.00%60USD%60false%602%603/26/17%603/30/17%6003/05/17&ap p=resvlink&stop_mobi=yes Make sure to mention our Group Name "FMCS." These rates are only available until **5:00pm EST, Sunday, March 5, 2017, SO RESERVE YOUR ROOMS NOW!**

Travel

The Cleveland Marriott Downtown at Key Center is easily accessible by car from three directions via Interstates 90, 71, and 77; and by air via the Cleveland Hopkins International Airport (CLE), and the Akron-Canton Airport (CAK), located 50 minutes south of Cleveland. A very cheap (~\$1.75) RTA rail option is available from the CLE directly to Public Square next to the hotel (<u>http://www.riderta.com/airportservice</u>). Several ground-transportation vendors,

taxis, Uber and car rental facilities also are available. If you are driving, please know that parking will be approximately \$20/day.

Student Awards Judges Needed

The Awards committee needs judges for the Best Student Platform and Poster awards. If you are interested in serving as a judge for these awards, please reply to Emy Monroe (<u>emy_monroe@fws.gov</u>). Note that all of the student presentations are completed early during the meeting so we can finalize results in time for the awards presentation at the banquet. With that in mind, please indicate which general topics you would prefer to judge, list if there are any conflicts to be avoided, and if you will be arriving late to the meeting.

Student Travel Awards Available

CALLING ALL STUDENTS - To facilitate your participation in the 10th Biennial Symposium, travel awards are being offered by the FMCS. Support is provided in the form of Society-paid lodging accommodations for the duration of the meeting at the Cleveland Marriott Downtown at Key Center. It is anticipated that up to 9 awards will be made for the 2017 Symposium. Please see the Awards Committee web site at http://molluskconservation.org/Mservices_awards.html for application forms and procedures. A complete application package must be submitted by email as a PDF file to Teresa Newton, FMCS Awards Committee **on or before January 30, 2017**. You also can contact Teresa (tnewton@usgs.gov, phone 608-781-6217) if you need more information.

Auction Items Needed!

We need you to donate items for the "World-Famous FMCS Auction" to be held at the Cleveland Symposium. Past items have included field equipment, rare books, T-shirts, art, jewelry, fishing gear, regional foods and beverages, and more. Proceeds go to FMCS student awards. When you come to the meeting, you can deliver your auction items to the registration desk, Greg Zimmerman, Becca Winterringer, or auctioneer Steve Ahlstedt. If you can't make the meeting in person or would rather ship your donations, please send the items to Attention: Greg Zimmerman, EnviroScience, Inc., 5070 Stow Rd., Stow, Ohio 44224 (Phone 330-688-0111). Please clearly label shipped items as FMCS auction items and indicate if a receipt is desired.



Help Sponsor the Symposium

We are actively seeking sponsorships for this Symposium. All sponsor contributions include recognition in the program. The FMCS is a not-for-profit, (501-(c) 3 corporation, dedicated to the advocacy and conservation of freshwater mollusk resources. The Symposium provides a great opportunity to network and build relationships with conservation professionals from state and federal government, industry, and conservation organizations. FMCS has a membership of 500, and 250 members typically attend the biennial symposiums. 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 symposium facilities. In addition to monetary contributions, FMCS also would accept donations of equipment and other items to support our student travel awards and scholarships.

All Sponsor Contributions Include Recognition in the Symposium Program					
River	<u>></u> \$1000	One Complimentary Registration, Logo on Website Registration Page and Symposium Materials			
Stream	\$500-\$999	One Registration Reduced by 25%, Logo Displayed at the Welcome Mixer, Logo on Website Registration Page			
Eddy	\$100-\$499	Logo on Website Registration Page			
Mussel	<\$100	Recognition in the Symposium Program			

To make a donation please contact FMCS Treasurer, Emily Robbins [formerly Grossman] at <u>erobbins@ecologicalspecialists.com</u> or fill out the form available on the Symposium page of the website.

ONE LAST THING! - Send Us Your Photos!!

This has been a big hit at the last few meetings. We will run a PowerPoint presentation when possible during the mixers, etc., showing FMCS members doing their things. So, send your field photos, lab photos, etc., to show off what you do at work or when just having fun! Send photos to Phil Mathias, <u>PMathias@EnviroScienceInc.com</u>. It would help if you would use "FMCS Photos" as the subject line.

Last Call for Abstracts for the Cleveland Symposium

The **abstract submission deadline** for the 2017 Symposium is **Friday December 16, 2016**. The symposium format will include both oral and poster presentations. Oral presentations will be limited to 20 minutes (including a question and answer period). Laptops for the oral presentations will be running Microsoft Windows 10 and PowerPoint 2010. Poster size is limited to 4 feet by 4 feet. Poster panels for display will be provided. An example abstract is posted on the website: <u>http://molluskconservation.org/EVENTS/2017Symposium/2017-Abstract-sample.pdf</u>

Abstracts for posters and oral presentations are to be limited to 300 words. Abstracts should be written in Word utilizing Arial 11-point font. The abstract title should appear in all caps and be followed by the author name(s) and affiliation(s). The text should include clearly stated objectives, brief methods, general results, and the basic conclusion. At the bottom of your abstract, please indicate your preference of oral or poster presentation, and if you are willing to switch formats. Also indicate if this is a senior-authored student presentation that is to be judged for the best student platform/poster award. (Note: only 1 senior-authored presentation, be it platform or poster, will be judged; please indicate which presentation you want judged.) Submit your abstract to: <u>2017fmcssymposium@gmail.com</u>.

The Program Committee is targeting to post the Symposium program and schedule on the FMCS website (<u>http://molluskconservation.org</u>) by mid-February, 2017.

FMBC Volume 19, Number 2 is Now Posted

In case you missed the announcement, the latest issue of our journal, was posted in mid-September. As you can see from the Table of Contents (below), this issue includes a wide variety of articles that should be interesting to most of our members. You can access it here: <u>http://molluskconservation.org/PUBLICATIONS/FMBC/FMBC_Vol19/FMBC_Volume19-2.pdf</u>

Freshwater Mollusk Biology and Conservation

VOLUME 19

NUMBER 2

SEPTEMBER 2016

Pages 1-18

Quantitative Monitoring of Freshwater Mussel Populations from 1979–2004 in the Clinch and Powell Rivers of Tennessee and Virginia, with Miscellaneous Notes on

the Fauna Steven A. Ahlstedt, Mark T. Fagg, Robert S. Butler, Joseph F. Connell, and Jess W. Jones

Pages 19-26

Growth and Longevity Estimates for Mussel Populations in Three Ouachita Mountain Rivers

Brandon J. Sansom, Carla L. Atkinson, and Caryn C. Vaughn

Pages 27-50

Microhabitat Suitability and Niche Breadth of Common and Imperiled Atlantic Slope Freshwater Mussels Tamara J. Pandolfo, Thomas J. Kwak, and W.

Gregory Cope

Pages 51-55

Use of Side-Scan Sonar to Locate *Tulotoma magnifica* (Conrad, 1834) (Gastropoda: Viviparidae) in the Alabama River Jeffrey T. Garner, Michael L. Buntin, Todd B. Fobian, Jesse T. Holifield, Thomas A. Tarpley, and Paul D. Johnson

Pages 56-68

Genetic Structure of Faucet Snail, *Bithynia tentaculata* Populations in North America, Based on Microsatellite Markers

Kathryn E. Perez, Rebecca L. Werren, Christopher A. Lynum, Levi A. Hartman, Gabor Majoros, and Rebecca A. Cole

Pages 69-79

Life Stage Sensitivity of a Freshwater Snail to Herbicides Used in Invasive Aquatic Weed Control

Jennifer M. Archambault and W. Gregory Cope Pages 80-87

Assessment of a Short-Distance Freshwater Mussel Relocation as a Viable Tool During Bridge Construction Projects Jeremy S. Tiemann, Michael J. Dreslik, Sarah J. Baker, and Christopher A. Phillips

Announcements

Free European Freshwater Pearl Mussel Conference Proceedings

In the framework of the Life+ project "Conservation of the freshwater pearl mussel from the Armorican Massif (France)", a conference was organized called "**Conservation and restoration of freshwater pearl mussel population and habitat in Europe**". This conference was held on November 26th and 27th 2014 in Brest, France. The 140-page proceedings of this conference are free and on open access, you can find them here: <u>http://goo.gl/6QH3PM</u>

[from the Introduction] "The themes of this conference dedicated to *Margaritifera margaritifera*, an emblematic species of the rivers of Brittany and Armorican Massif that is considered threatened at the

Ellipsaria Vol. 18 - No. 4

European level, will enable us to take stock of the biology and ecology of this species, but also its protection and strategies to be implemented to maintain or restore populations. The issues to be discussed will be related to water quality and river management and restoration. The presentations will demonstrate that conservation management of a threatened species, including its lifecycle which depends on salmonid fish, goes well beyond the concerns of biologists and naturalists, but requires a comprehensive approach applied at the catchment scale, which works through the raising of awareness and involvement of politicians, managers, and land users as well as closely collaborative work with naturalists and scientists. This is a vast endeavour, but we trust that your work and this conference will contribute to creating an impetus for its success."

Free Ebook for Conchologists

A new free ebook just appeared and is downloadable from the website: <u>http://www.conchology.be/?t=4224&id=148&year=2016</u>. It is a well-documented guide for shell collectors – conchologists – using the internet today. 408 pages, with hundreds of figures. "To help people situate themselves and to guide them in order to live a better 'conchological experience', we made the book here presented as a pdf-file and an iBook-file, both to download on your computer or iPad. The iBook works only on Apple equipment, and the pdf is definitely a less pleasing version, having less interactive functionalities."



COLLECTING SHELLS In times of Internet

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 a given calendar year.

The complete program description and application form may be obtained from the Awards Committee website at <u>http://www.molluskconservation.org/Mservices_awards.html</u>. 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.

2016 Meeting of the Ohio River Valley Ecosystem Mussel Group

Miami University, Hamilton, Ohio Nov. 2 – 3, 2016

Introduction of attendees. Welcoming remarks from Dave Berg, our host. Thanks to FMCS for supporting our regional meeting with the \$100 grant !

<u>Riffleshell and clubshell Introduction in Illinois (IL</u>). Jeremy Tiemann, IL Natural History Survey. 3700 *E. t. rangiana* and 4200 *P. clava* have been stocked at 8 sites in the Vermillion River system. They conducted 2012-2014 class monitoring, estimated survival. *P. clava* are 5x more likely to survive than *E. t. rangiana;* larger individuals more likely, better anchored perhaps; Salt Fork survival better than Vermillion; series of high flow/ discharge events during summer/fall reduced survival; some mussels moved downstream > 1 KM. Now working on questions the DNR wants answered, species guidance plan, conservation strategy, site plans for Salt Fork, landowner agreements. Would help to have all states' data in FMBC journal, to support common experiences on detection, survival, population equilibrium. Cooperators have discussed this and hopefully will work on it.

Corbicula news – 1924 introduced into British Columbia, as food source; now throughout US. Temp limited, biofouler, benthos competitor. Taxonomy not settled. Reproduction is complex; some sexual some asexual, androgenesis. In 1957, was recorded in the Ohio River in IL. New species, *C. largillierti*, pure purple nacre, tight ridges. Another new one, with rays, white nacre purple teeth; may be novel invasion. 3 taxa detected genetically. Jeremy has photo cards to share.

<u>Huntington Corps mussel bed monitoring</u>, Andy Johnson, Steve Foster. Using steering currents to help avoid certain mussel beds immediately below the dam, works fairly well when flows are good (> 2' on gates). Trying to estimate how long sediment stays on bed. Use oxygen sensor to measure interstitial flow. 2015 was problematic lower flow Sept., > 3 cm deposition on bed. In 2016, dredged during June flood event, TOTO unit was moved by the river 25 miles downstream. New device called WIZARD to monitor sediment depth and oxygen. Another new unit like underwater drone can run transects and collect physical and biological data.

<u>Dave Berg, Miami U of Ohio.</u> Population Viability Analysis (PVA) and population genetics assessments for endangered freshwater mussels and their recovery plans. PVA useful to assess extinction risk, predict the effects of alternative mgmt. strategies. Spatial data analysis adds information on movement and connectivity. Not many plans have demographic PVA, < 4% of invertebrate plans. Mussel Recovery Plans: 90 listed, looked at 71 plans, looked at keywords for PVA and genetics analysis. 7% and 18%, respectively. Population genetics recommended more than PVA. Viable defined differently, like reproducing populations, stable or increasing.

Work with *Cumberlandia monodonta*, genetics analysis of populations throughout the range. Ouachita River is different from the rest of the upper Miss. PVA for *Cumberlandia*, based on demographic and genetic literature. Early life history has strong influence. Juvenile survival is important to extinction probability, finite growth rate. 3 successful juveniles per female can withstand mortality. Retention of genetic diversity influenced by population size and growth rate. To create quantitative recovery goals, need a lot of data. Demographic, genetic, host fish demography. Ultimate goal of recovery would be to ensure sufficient genetic variation for evolution to occur.

<u>Muskingum River, OH mussel survey, Becca Winterringer</u>. ODOT project at Philo Dam. Near Duncan Falls, 13 species found, bridge to be replaced.

<u>Heidi Dunn, FMCS and Ecological Specialists, Inc.</u> AFS Fish and Mussel Kill Guidelines being updated. Chapter 5 deals with the field investigations; Chapter 6 is replacement techniques and costs (propagation). Monetary values chapter is being revised based on questionnaire to production facilities. Costs include collection, holding, propagation, grow-out to taggable size, and future monitoring costs. Funds still being solicited for publication. <u>Leroy Koch - CRI initiative</u>. \$638,000 grant to work with 8 endangered species. Multiple cooperators in the ecosystem, KY is handling most of the funding through KY Waterways Alliance, with MOUs to the individual cooperators. WVDNR agreement being handled by Refuge.

<u>Purple cat's paw</u>: More individuals collected in 3 cages in Killbuck Creek, to be visited in spring 2017. In 2015, a few hundred juveniles; in 2016, > 3000 juveniles ready to release in 2017. Wild males in the river are fertilizing females in the cages now.

Species at risk in the ORVE: Elliptio crassidens, Obovaria subrotunda, Simpsonaias ambigua, others??

<u>Jacqueline Halmbacher OSU/CZ</u> Work with in vitro is progressing well. No update on the Big Darby Creek mussel kill.

<u>Eric Chapman, Western PA Conservancy</u>. Hunter Station animals, rebirth of the Clarion River. History, resource extraction, dams, etc., cuts off dispersal and recolonization. In 2014, worked with USFS to survey hellbenders and found mussels, 16 sites surveyed. Took common mussels from Hunter Station, and tagged them 5 per m2, 10 sites, 7 species. Good detection and survival after 1 year. In 2016, lots more mussels collected and tagged for the Clarion, all hand-placed, lots of volunteers involved, outreach and education. 23,944 total mussels moved in 2016.

<u>Tyler Hern, WSSNFH</u>. Missions of the hatchery include rainbow trout egg production and imperiled aquatic species. Mussels and crayfish. *L. abrupta, O. subrotunda, L. recta* produced, grown out and stocked in 2016. Recap of June flood event with pictures. Stresses after flood claimed a lot of 2016 cohort juvenile mussels.

<u>John Spaeth, Environmental Solutions & Innovations</u>. Follow up on sampling along 168 transects Ohio River near Cincinnati, 10 miles. 19,000 mussels, many beds, 30 species, 50 *P. cyphyus* detected. Densities ranged 15 to 40. Revisited 10%, 3000 mussels, 27 species, *Q. pustulosa* dominates, 11 *P. cyphyus* all > 40 m from shore. Max 2 per transect, 2 per 10-m segment. Stocked juvenile *L. abrupta* in Markland Pool. No apparent effect from petrochemical spill and baseline in 2014. This part of the river previously understudied, and this is great new information.

<u>ES, Ryan Schwegman</u>, Hunter Station Mussel salvage update 2016. 1300 hours in water, 54 days, revised take numbers last winter. Clubshell greatly increased over estimate, 4x more. Great team effort over 3 years, cooperators from 6 states. Totals for 2 year's salvage, 6.47K *P. clava*, 27.5K *E. t. rangiana*. (get Table from Ryan if more detailed data needed). Total of 19 species. Did quadrats also, estimated > 90% efficiency for most zones. Estimates of expected populations were based on old data, circa 2001, so larger numbers not too surprising. This was also found at earlier bridge projects.

<u>Dunkard Creek, PA, Nevin Welte</u>. Total creek-wide kill occurred in 2009. PA stocked 500 tagged common mussels from Hunter Station, plus some stockings of infested drum from WV. Some wild *P. alatus* found this year.

<u>Mike Miller, U. Cincinnati</u>. Monitoring WQ in this area, using volunteers, along Dayton-Cincy area. Great Miami, Little Miami, and Mill Creek. These rivers are effluent dominated. Greenumbrella.org has stream database, equipment costs \$10K. Water quality samples are collected 2nd Saturday of each month, 9 months, 7 am to 10 am. GMR is 21% effluent; LMR is 100% effluent at low flow.

Discussion on zebra mussel trends, black carp. Round goby are in French Creek system. Bighead and silver carp up as far as PA, sporadically.

<u>Monongahela River work, Mike Everhart, WVDNR</u>. Update on restoration efforts. The Monongahela was devastated by acid mine drainage historically, but water quality improvements since the CWA have shown promise for mussel restorations. Opekiska and Hildebrand tailwaters. Follow-up on stockings since

2006, normal mortality, no recruitment yet. Natural recruitment of *P. alatus* wild stock, plus individuals of *T. parvus., U. imbecillis*, and *L. fragilis*.

A major tributary of the Monongahela, the West Fork River, 3 dams have been removed this year, the last dam went out last week !! Mussels salvaged and relocated to areas upstream, all habitat now connected.

<u>Mike Turner, USACE Louisville</u>, Green River and Barren River old locks and dams (L&D) in KY. These are old dams built circa 1836-1934, one failed in 1965, never repaired. Section 216 of Flood Control Act allows for re-evaluation. Safety issues are key. Disposition study was not high profile enough to get attention or funding. Green L&D 3,4,5,6 and Barren 1 are now targeted. Need legal mandate by Congressional de-authorization. That bill is in Congress right now, still a chance during this lame duck session. Recent failures which occurred this year will not be repaired.

<u>Monte McGregor, KYDFWR.</u> CMC established in Frankfort in 2002. Elkhorn Creek in KY River watershed. Plus Minor Clark hatchery on Licking River. New bioreactor installed for algae production. They make their own food and water. Many multi-state cooperative efforts underway. Goal is to produce taggable sized juveniles. In vitro work now being optimized, many endangered species successfully transformed. First ever *P. cooperianus* juvenile produced, unknown fish host but late August gravidity. *E. o. obliquata.* <1-year-old are becoming sexually dimorphic. Working with Wendell Haag USFS to bioassay with juveniles in silos to track cryptic mussel declines throughout KY. Survival has been good but growth very different. Expanding silos along problem streams, may be basin wide impairments. Also, comparing common and endangered juveniles in silos in the better streams.

Compared mortality of shipped vs trucked mussels in water from PA Hunter Station. Immediate stocking via truck route, coolers went straight to river 1 day later. No immediate mortality seen, maybe < 10 dead.

Cage culture work at Wolf Creek NFH. Cost-effective method for propagation and grow-out even if you don't have a brick and mortar facility.

<u>Janet Clayton, WVDNR</u>. eDNA study funded by USEPA. Crew collecting water and sediment samples in WV, looking for *E. triquetra* in Little Kanawha River watershed. Will help target future surveys in the basin. Also building a library of tissue samples and estimating dispersal patterns of eDNA in river systems.

<u>Jeff Thomas, ORSANCO</u>. Mussel monitoring initiative. Valuable metric can be developed to supplement fish and macroinvertebrates. Funding has been secured to update the existing Ohio River mussel database from 2000. Efforts are planned to begin Jan 1, 2017 and will continue throughout the year.

- New publication on distribution of mussels in Kentucky. FREE. Get through the Kentucky Natures Preserves Commission.
- PA AFS joint meeting to be held at California University, Feb 8-9, 2017.
- Thanks to Dave Berg for hosting us!! Great facility, hotel was close and lots of places to walk to.
- Next Meeting of the ORVE Mussel Group: Nov. 1-2, 2017 Marshall University, Huntington WV, offers to host, Tom Jones is contact person.

Name	Affiliation	E-mail Address
Andrew Johnson	USACE – Huntington District	Andrew.N.Johnson@usace.army.mil
Marty Huehner	Enviroscience	mhuehner@enviroscienceinc.com
Dale Dunford	Enviroscience	ddunford@enviroscienceinc.com
Mason Murphy	Miami U.	murph111@miamioh.edu

ORVE Mollusk Group Meeting Attendees, Miami U., Hamilton, Ohio Nov 2-3, 2016

Steve Foster	USACE – Huntington District	steven.w.foster@usace.army.mil
Craig Moulton	USACE – Huntington District	Craig.m.moulton@usace.army.mil
Jim Scherzinger	USACE – Huntington District	James.a.scherzinger@usace.army.mil
Ashley Stephens	USACE – Huntington District	Ashley.l.stephens@usace.army.mil
Robert "Tony" Francis	Miami U.	<u>francir3@miamioh.edu</u>
Steven Hein	Miami U	<u>heinsr@miamioh.edu</u>
Todd Davis	USACE – Huntington District	Todd.1.davis@usace.army.mil
Chris Lorentz	Thomas More College	<u>lorentc@thomasmore.edu</u>
Janet Clayton	WVDNR	janet.1.clayton@wv.gov
Jeff Thomas	ORSANCO	jthomas@orsanco.org
Jeremy Tiemann	IL Natural History Survey	<u>itiemann@illinois.edu</u>
Ryan Schwegman	Enviroscience	rschwegman@enviroscienceinc.com
Eric Chapman	Western Pennsylvania Conservancy	echapman@paconserve.org
Jordan Allison	PAFBC	Jorallison@pa.gov
Leroy Koch	USFWS, KY Field Office	<u>leroy_koch@fws.gov</u>
Dave Berg	Miami Univ. of Ohio	<u>bergdj@miamioh.edu</u>
Casey Swecker	Environmental Solution Innovations	cswecker@envsi.com
Tyler Hern	USFWS – White Sulphur Springs NFH	tyler_hern@fws.gov
Ric Urban	Newport Aquarium	rurban@newportaquarium.com
Michael Miller	Ohio River Basin Consortium for Research & Education; River Unlimited	<u>mike.miller@uc.edu</u>
Mitchell Kriege	Marshall University	kriege@marshall.edu
Mike Everhart	WVDNR	mike.e.everhart@wv.gov
Marissa Reed	USFWS – Bloomington IN	marissa_reed@fws.gov
Nevin Welte	PAFBC	c-nwelte@pa.gov
Patricia Morrison	USFWS, Ohio River Islands NWR	patricia_morrison@fws.gov
Rebecca Winterringer	TRC	rwinterringer@trcsolutions.com
Lindsey Moss	TRC	lmoss@trcsolutions.com
Phil Mathias	Enviroscience	pmathias@envirosceinceinc.com
Tiernan Lennon	USFWS – WV Field Office	tiernan_lennon@fws.gov
Heidi Dunn	Ecological Specialists, Inc	hdunn@ecologicalspecialists.com
Dan Scoggin	Ecological Specialists, Inc	dscoggin@ecologicalspecialists.com
John Spaeth	Environmental Solution Innovations	jspaeth@envsi.com
Tom Jones	Marshall University	jonest@marshall.edu
Caitlin Byrne	OSU	Byrne.88@osu.edu
Jacqualyn Halmbacher	OSU	Halmbacher.2@osu.edu
Monte McGregor	KY Dept. Fish and Wildlife Resources	Monte.mcgregor@ky.gov
Mike Turner	USACE – Louisville District	Michael.turner@usace.army.mil

Next Chesapeake Bay Freshwater Mussel Workgroup Meeting

The seventh meeting of the Chesapeake Bay Freshwater Mussel Workgroup will be held at the U.S. Fish and Wildlife Service office in Annapolis, Maryland, on Tuesday, January 31, 2017. Should inclement weather pose a problem, we have reserved facilities for Wednesday, February 1st. The need for a second,

short day of focused topic discussion also will be determined based upon participant interest and time. Teleconferencing and webcast capabilities will be available for those interested in participating, but cannot travel. Light refreshments in the morning and afternoon are provided with the generous support of FMCS.

This meeting is open to anyone, but 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. Past topics have included mussel ecology, propagation and relocation, range-wide status assessments, state and federal updates on the species listing, recent surveys, toxicological studies, plus more.

For more information, contact Julie Devers at <u>julie_devers@fws.gov</u> or Matt Ashton at <u>matthew.ashton@maryland.gov</u>. Further details will be 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 sent via the Unio list-serve.

Upcoming Meetings

March 26 – 30, 2017 – FMCS 10th Biennial Symposium, Cleveland Downtown Marriott at Key Center, Cleveland, Ohio Theme: *Ecosystems, Engineering, Valuation, and Practice – The Roles of Freshwater Mollusks in a Changing Environment.* <u>http://molluskconservation.org/EVENTS/2017Symposium/2017_FMCS-</u> <u>Symposium_INTRO.html</u>

- March 26 30, 2017 National Shellfisheries Association 109th Annual Meeting, Knoxville, Tennessee, USA Theme: [not yet posted] <u>https://shellfish.memberclicks.net/annual-meeting</u>
- June 4 9, 2017 Society for Freshwater Science Annual Meeting, Raleigh, North Carolina, USA Theme: *Designing our Freshwater Futures* <u>http://sfsannualmeeting.org/</u>
- July 16-21, 2017 American Malacological Society 83nd Annual Meeting University of Delaware, Newark, Delaware, USA Theme [not yet posted] <u>http://www.malacological.org</u>
- **August 20 24, 2017** American Fisheries Society 147th Annual Meeting, Tampa Convention Center, Tampa, Florida, USA Theme: *Fisheries Ecosystems: Uplands to Oceans* <u>http://fisheries.org/events-page/future-afs-meetings/</u>
- Spring (?) 2018 FMCS Workshop, Topic and location yet to be determined.
- July (?) 2018 Society for Conservation Biology North American Sectional Meeting, Toronto, Ontario, Canada Dates, and Theme not yet posted <u>http://scbnorthamerica.org/naccb2016/</u>



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.

High School and University Researchers Study Cylindrical Papershell (Anodontoides ferussacianus) Host Fishes

Mark Hove¹, Trurisa Pathoumthong¹, Matt Berg², Joshua Curtin², Cassidy Chenal², Dan Hornbach³, Blake Jensen², Mckenzie Johnson², and Emily Livingston²

¹ University of Minnesota (UMN), St. Paul, Minnesota 55108, <u>mark_hove@umn.edu</u>

² Grantsburg High School (GHS), Grantsburg, Wisconsin 54840

³ Macalester College, St. Paul, Minnesota 55105

Knowledge of a species' life history can improve conservation efforts. Many North American freshwater mussels need management attention (Williams *et al.*, 1993), including *Anodontoides ferussacianus*, which is Threatened in Iowa, and a Special Concern Species in Kansas. We had three project objectives: (1) collect and identify juvenile mussels recovered from naturally infested fishes, (2) conduct laboratory studies to determine suitable glochidia hosts, and (3) explore using social media to share study results with the public.



High school students collecting mussels and fishes naturally infested with glochidia.

We followed standard protocols to identify natural and suitable glochidia hosts (Hove *et al.*, 2016a). Gravid *A. ferussacianus* and naturally infested fishes were collected from Memory Lake Park ponds in Grantsburg, Wisconsin, and held in species-specific aquaria at GHS. Naturally-infested fishes collected from Dodge Center Creek, near Claremont, Minnesota, were held at UMN. Unknown juveniles from naturally infested fishes were identified using glochidial shell morphometrics. They were then measured with scanning electron microscopy and, using discriminant function analysis, we compared them with shell dimensions from known anodontine glochidia previously observed from Dodge Center Creek or Wood River (JMP v. 12). A video from our fieldwork was posted on Facebook to show viewers a typical day in the life of a field biologist. The video was used as an education tool to draw the public's attention to the importance of our study and species of interest (link: https://youtu.be/AuV_5Ey.yD8).

Juvenile *A. ferussacianus* were released by a variety of naturally infested and laboratory inoculated fishes. 12 of 16 fish species collected from Dodge Center Creek, and five species from Memory Lake Park ponds released juvenile mussels or glochidia (Table 1). Six of six laboratory inoculated fish species (3 families) facilitated glochidia metamorphosis (Table 2).

Table 1. Naturally infested fishes that released juvenile mussels or glochidia.

Fish species (No. individuals)	Mean height ± 1 std dev (µ)	Mean length ± 1 std dev (µ)	Mean hinge length ± 1 std dev (μ)	Discriminant analysis prediction probability
Memory Lake Park Ponds Chrosomus eos	299±4	304±7	239±7	A. ferussacianus (100%) (2 juveniles)
Pimephales promelas	311±5	314±4	249±2	A. ferussacianus (99- 100%) (2 juveniles)
Ameiurus melas	304±15	316±9	239±3	<i>A. ferussacianus</i> (98- 100%) (3 glochidia)
Ameiurus melas	359±18	369±9	278±10	<i>Pyganodon grandis</i> (79- 100%) (5 glochidia)
Umbra limi	300±14	305±12	235±11	A. ferussacianus (93- 100%) (15 juveniles)
Umbra limi	353±1	345±21	268±25	P. grandis (74-100%) (2 juveniles)
Culaea inconstans	308±24	311±23	238±16	A. ferussacianus (76- 100%) (16 juveniles)
Culaea inconstans	363±9	355±16	269±10	<i>P. grandi</i> s (74-100%) (8 juveniles)
Dodge Center Creek Chrosomus erythrogaster (14)	313±10	311±11	244±10	A. ferussacianus (97- 100%) (12 juveniles)
Luxilus cornutus (4)	321±5	313±12	246±6	A. ferussacianus (97- 99%) (3 juveniles)
Margariscus nachtriebi (3)	317±11	315±12	244±12	A. ferussacianus (90- 100%) (12 juveniles)
Margariscus nachtriebi (3)	299	348	257	Strophitus undulatus (89%) (1 juvenile)
Pimephales notatus (29)	319±8	314±6	249±7	A. ferussacianus (96- 100%) (9 juveniles)
Pimephales promelas (12)	311±4	311±11	247±5	<i>A. ferussacianus</i> (99- 100%) (2 juveniles)
Rhinichthys atratulus (47)	hinichthys atratulus (47) 315 323 253 A.		A. ferussacianus (99%) (1 juvenile)	
Rhinichthys atratulus (47)	279	332	240	Lasmigona compressa (88%) (1 juvenile)
Semotilus atromaculatus (14)	322±7	312±12	245±13	A. ferussacianus (92- 100%) (6 juveniles)
Semotilus atromaculatus (14)	285	344	261	Strophitus undulatus (83%) (1 juvenile)

Catostomus commersoni (8)	327	319	207	Lasmigona complanata (81%) (1 juvenile)
Umbra limi (8)	312±7	307±8	243±11	A. ferussacianus (98- 100%) (10 juveniles)
Culaea inconstans (56)	313±15	306±11	240±9	A. ferussacianus (92- 100%) (12 juveniles)
Culaea inconstans (56)	328±6	322±8	210±3	Lasmigona complanata (69-87%) (4 juveniles)
Culaea inconstans (56)	271±6	324±6	233±5	Lasmigona compressa (92-99%) (4 juveniles)
Culaea inconstans (56)	301±19	380±28	294±25	Strophitus undulatus (100%) (3 juveniles)
Lepomis cyanellus (1)	322±4	321±10	256±13	A. ferussacianus (88- 99%) (6 juveniles)
Etheostoma nigrum (66)	265	331	247	Lasmigona compressa (87%) (1 juvenile)
Etheostoma nigrum (66)	293±6	341±1	262±1	Strophitus undulatus (83%) (2 juveniles)

Table 2. Host suitability trial results for *Anodontoides ferussacianus* on fishes from Dodge Center Creek, near Claremont, Minnesota.

Species	No. inoculated	No. Survivors	Recovery period (d)	Juveniles recovered
Luxilus cornutus	6	6	13-21	94
Hybognathus hankinsoni	4	4	13-16	12
Notropis heterodon	3	3	13-16	12
Semotilus atromaculatus	6	6	8-19	299
Ambloplites rupestris	1	1	13-19	7
Etheostoma exile	6	6	12-17	2

The results from our project offer a couple of insights. First, our research supports increasing evidence that *A. ferussacianus* is a host generalist. Previous studies showed that *A. ferussacianus* glochidia naturally infest a variety of fishes (13 fish species, 5 families) (Wilson and Ronald 1967, Kakonge 1972, Hove *et al.*, 2015, Hove *et al.*, 2016b). Earlier laboratory studies found that 8 fish species (4 families) support metamorphosis of *A. ferussacianus* glochidia (Watters 1995, Hove *et al.*, 1997, O'Dee and Watters 2000, Eckert and Buening 2013). Secondly, based on the tremendous amount of positive feedback we received from our Facebook video, social media can be a useful way to inform and entertain the public.

We thank the Minnesota Department of Natural Resources for their assistance with study site selection in Minnesota, and the UMN Undergraduate Research Opportunity Program for partial funding.

Literature Cited

- Eckert, N. L. and J. T. Buening. 2013. Confirmation of hosts and additional host trials for the cylindrical papershell, *Anodontoides ferussacianus*. *Ellipsaria* 15(4):23-24.
- Hove, M. C., R. A. Engelking, M. E. Peteler, E. M. Peterson, A. R. Kapuscinski, L. A. Sovell, and E. R. Evers. 1997. Suitable fish hosts for glochidia of four freshwater mussels. Pages 21 25 in K. S. Cummings, A. C. Buchanan, C. A. Mayer, and T. J. Naimo, eds. Conservation and management of freshwater mussels II: initiatives for the future. Proceedings of a UMRCC symposium, 16-18 October 1995, St. Louis, Missouri. Upper Mississippi River Conservation Committee, Rock Island, Illinois.
- Hove, M., J. Douglas, E. Rasmussen, A. Ames, L. Drohman, A. Edgcumbe, K. Fiedler, J. Knutson, S. Marr, V. Ohnstad, C. Parker, E. Riewestahl, B. Sietman, A. Scheunemann, N. Swenson, A. Taylor, and M. Berg. 2015. Natural glochidia hosts of Willow River fishes. *Ellipsaria* 17(2):21-23.
- Hove, M. C., B. E. Sietman, M. S. Berg, E. C. Frost, K. Wolf, T. R. Brady, S. L. Boyer, and D. J. Hornbach. 2016a. Early life history of the sheepnose (*Plethobasus cyphyus*) (Mollusca: Bivalvia: Unionoida). *Journal of Natural History*, 50(9-10).
- Hove, M., D. Larson, M. Berg, H. Jensen, C. Palmquist, J. Curtin, N. Larsen, N. Klemann, M. Duncan, H. Fiedler, A. Swenson, D. Hornbach, and B. Sietman. 2016b. Natural and suitable glochidial hosts for the creek heelsplitter (*Lasmigona compressa*). *Ellipsaria* 18(2):18-22.
- Kakonge, S. A. K. 1972. The ecology of some metazoan parasites of, and their effect on, small stream fishes and fry. Ph. D. Dissertation. University of Waterloo, Waterloo, Ontario, Canada. 163 pp.
- O'Dee, S. H. and G. T. Watters. 2000. New or confirmed host identifications for ten freshwater mussels. Proceedings of the Conservation, Captive Care, and Propagation of Freshwater Mussels Symposium. Pp. 77-82. [in:] Tankersley, R.A., D. I. Warmoltz, G. T. Watters, B. J. Armitage, P. D. Johnson, and R.S. Butler. *Freshwater Mollusk Symposium Proceedings*, Ohio Biological Survey, Columbus, Ohio.
- Watters, G. T. 1995. New hosts of Anodontoides ferussacianus (Lea, 1834). Triannual Unionid Report 7:7.
- Williams, J. D., M. L. Warren, K. S. Cummings, J. L. Harris, and R. J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. *Fisheries* 18(9):6-22.
- Wilson, K. A.and K. Ronald. 1967. Parasite fauna of the sea lamprey (*Petromyzon marinus* von linne) in the Great Lakes region. *Canadian Journal of Zoology* 45:1083-1092.

Additional Notes on Amphibious and Aquatic Molluscs from a Drainage Ditch in the Dunes near Oosterend, Terschelling, the Netherlands

 Henk K. Mienis, The Steinhardt National Collections of Natural History - Israel National Center for Biodiversity Studies, Tel Aviv University, IL-6997801 Tel Aviv, Israel, and National Natural History Collections, Berman Building, Hebrew University of Jerusalem, Edmond J. Safra Campus, IL-9190401 Jerusalem, Israel. <u>mienis@netzer.org.il</u>

East of Oosterend, the most eastern village on the island Terschelling in the province Friesland, the Netherlands, a large nature reserve is situated of some 4400 hectares called the "Boschplaat". The major part of the reserve may be classified as a brackish-marine wetland. It is so unique that it has received the status of an European Nature Reserve since 1970.

Freshwater sources like drainage ditches, waterholes for cattle and a small artificial lake are restricted to the dry western part of the reserve, which consists primarily of sand dunes. Molluscs encountered in the drainage ditches during the autumn of 1999, 2005, 2008, and 2009 have been briefly enumerated in several short notes (Mienis, 2001, 2009a, and 2009b).

On 26 September 2016, I again had the opportunity to briefly sample the drainage channel which crosses the "Kooipad". It was impossible to collect molluscs from the northern part of the channel because of a severe lack in rainfall during the preceding months -- i.e. the channel was more-or-less completely dry. The part south of the "Kooipad," however, still carried plenty of water and was sampled at various points over a stretch of about 80 m.

Twelve different species were collected alive, of which 5 turned out to constitute first records for that drainage channel: Acroloxus lacustris, Physella acuta, Pisidium casertanum, Musculium lacustre, and Sphaerium corneum.

All molluscs collected so far during the various years are enumerated in Table 1. Among these 16 species are two invasive species: *Potamopyrgus antipodarum* from New Zealand and *Physella acuta* from North America. Both have been well established species in the Netherlands for a long time.

Gyraulus laevis is considered an endangered species in the Netherlands (de Bruyne et al., 2003). It is confined to the northern part of the drainage channel and, therefore, was not collected in 2016.

Species	September 24, 1999	October 4, 2005	September 22, 2008	September 30, 2009	September 26, 2016
Bithynia tentaculata	-	-	-	+	-
Potamopyrgus antipodarum	-	-	+	+	+
Acroloxus lacustris	-	-	-	-	+
Physa fontinalis	+	+	+	+	+
Physella acuta	-	-	-	-	+
Radix balthica	+	-	+	+	+
Anisus vortex	+	+	-	+	+
Gyraulus albus	-	-	+	+	+
Gyraulus laevis	+	-	+	-	-
Planorbis planorbis	-	+	+	+	+
Oxyloma elegans	+	-	+	-	-
Pisidium casertanum	-	-	-	-	+
Pisidium milium	-	-	-	+	+
Pisidium obtusale	+	-	-	-	-
Musculium lacustre	-	-	-	-	+
Sphaerium corneum	-	-	-	-	+
Total (16 species)	6	3	7	8	12

Table 1. Amphibious land snails and freshwater molluscs encountered in a drainage ditch at the western edge of nature reserve the "Boschplaat" near the "Kooipad", Terschelling, the Netherlands

References

Bruyne, R.H. de, Wallbrink, H. & Gmelig Meyling, W. 2003. *Bedreigde en verdwenen land- en zoetwatermollusken in Nederland (Mollusca). Basisrapport met voorstel voor de Rode Lijst.* 88 pp. Stichting European Invertebrate Survey – Nederland, Leiden & Stichting ANEMOON, Heemstede.

Mienis, H.K. 2001. Enkele notities over de land- en zoetwatermollusken van Terschelling. *De Kreukel*, 37(6):103-107.

Mienis, H.K. 2009a. Amfibische- en zoetwater mollusken in afwateringsgreppels en sloten van het duingebied tussen de Badweg van Oosterend en de Boschplaat, Terschelling. *De Kreukel*, 45(2-3):19-21.

Mienis, H.K. 2009b. Amphibious and aquatic molluscs from drainage ditches in the dunes near Oosterend, Terschelling, the Netherlands. *Ellipsaria*, 11(3):13-14.

Malaysia's Unique Freshwater Mussels in Danger

Press Release from The University of Nottingham Malaysia Campus, Jalan Broga, 43500 Semenyih, Selangor Darul Ehsan, Malaysia

In a ground-breaking study for the Southeast Asian region, a research group led by The University of Nottingham Malaysia Campus revealed that Peninsular Malaysia hosts at least three rare mussel species, one of which (*Hyriopsis bialata*) is not found anywhere else on the planet. Another species (*Ensidens ingallsianus*) may have already gone extinct. Most native species are severely threatened by ongoing nutrient pollution and acidification of freshwater habitats caused by atmospheric pollution, deforestation, oil-palm plantations and a lack of functioning wastewater treatment particularly in rural areas. As mussels are efficient filter-feeders and provide habitat for smaller organisms such as insect larvae, their loss can lead to algal blooms and further loss of aquatic biodiversity.

An international group of scientists (Dr John-James Wilson and Pei-Yin Ng from University of Malaya; Samuel Walton from Universiti Malaysia Terengganu; Dr Khairul Adha A. Rahim from Universiti Malaysia Sarawak; Dr Elsa Froufe and Manuel Lopes-Lima, Interdisciplinary Centre of Marine and Environmental Research, Portugal; Professor Ronaldo Sousa from University of Minho, Portugal; Dr Arthur E. Bogan from North Carolina State Museum of Natural Sciences (USA); Dr Suzanne McGowan from The University of Nottingham UK, and Dr Alexandra Zieritz from The University of Nottingham Malaysia Campus, who is leading this research) surveyed 155 localities across all states of Peninsular Malaysia for mussels and recorded their environmental requirements. The team spent a total of 30 days in the field, scouring the sandy and muddy beds of Malaysia's rivers and lakes for mussels simply using their hands. Environmental conditions at each location, such as water pH and oxygen concentration, were also recorded. The findings of this study, worth USD 9,262 (RM 38269.19) and funded by The Mohamed bin

Zayed Species Conservation Fund, are published in Science of the Total Environment (571:1069–1078), a leading international scientific journal.

The group found nine Malaysian and one introduced Chinese species in the peninsula. Whilst the introduced species is rapidly spreading and posing an additional threat to native mussels, many of the native species are declining. Authors believe that another species previously recorded from the region may have already become extinct in the country.

Sungai Pahang and Sungai Perak, two of the longest rivers in Peninsular Malaysia are of particular importance to the conservation of very rare mussel species. One of these, holding the scientific name *Hyriopsis bialata* but simply called "layar" (sail) by the locals in the surrounding villages, cannot be found anywhere else on the planet. To



Dr Zieritz collecting mussels in Sungai Pahang

protect these globally unique populations of mussels, the authors recommend establishing riparian buffers and improving waste water treatment for rivers running through agricultural and residential land.

"I hope that the study will serve as an example for future projects of this kind in Southeast Asia and ultimately lead to the legal protection of these important organisms. Mussels and other invertebrates are often overlooked in this respect, because they are less charismatic than beautiful large mammals such as tigers. However, these small organisms represent an equally important part of our ecosystems, especially in freshwater habitats." said Dr Zieritz.

"Our ultimate goal is to get concrete Action Plans for the most endangered species in Malaysia in place, which could involve habitat restoration and breeding programs. Whilst this might come too late for the presumably extinct *Ensidens ingallsianus*, taking action will be vital to preserve Malaysia's unique and rare species such as *Hyriopsis bialata* for future generations," Dr Zieritz said.

"Freshwater mussels and many other freshwater animal groups show very high rates of endemism in Southeast Asia. This means that many of these species have a very restricted distribution, such as *Hyriopsis bialata*, which can be found exclusively in the lower Pahang river. That means if we lose these mussels in the lower Pahang, we have lost the entire species for good on the whole planet," Dr Zieritz explained.

In collaboration with the International Union for Conservation of Nature, Dr Zieritz and her team are currently revising the conservation status of the Malaysian species and developing a National Red-list of the freshwater mussels of Malaysia, including Sarawak and Sabah, which will be publicly available at the National Red List website. Readers interested in becoming involved in the project are encouraged to get in touch with Dr. Zieritz through her <u>project webpage</u>.

More information is available from Dr Alexandra Zieritz at <u>alexandra.zieritz@nottingham.edu.my</u>; or Josephine Dionisappu, PR and Communications Manager at The University of Nottingham Malaysia Campus on +603 8924 8746, josephine.dionisappu@nottingham.edu.my.

A Short Note Concerning Some Freshwater Ark Shells from Asia

Henk K. Mienis¹ and Oz Rittner²

¹ 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, Hebrew University of Jerusalem, Edmond J. Safra Campus, IL-9190401 Jerusalem, Israel. <u>mienis@netzer.org.il</u>

² The Steinhardt Museum of Natural History – Israel National Center for Biodiversity Studies, Tel Aviv University, IL-6997801 Tel Aviv, Israel. <u>israelbutterflies@gmail.com</u>

Although most bivalve families are confined to marine biotopes, sometimes one or two genera have shifted to freshwater environments. For example, representatives of the family Donacidae are usually considered inhabitants of a marine habitat; however, species belonging to the genus *Profischeria* are confined in their distribution to freshwater habitats in West and Central Africa (Huber, 2010; Mienis, 2016).

In South and Southeast Asia, a small group of tiny bivalves belonging to the family Arcidae or Ark shells inhabits exclusively freshwater rivers, this in spite of the fact that all other genera in that family are true marine species. They all belong to the genus *Scaphula* which was described by Benson in 1834, although the first species placed in that genus received its official name two years later (Benson, 1836).

- Currently at least five species of freshwater Ark shells are known:
- Scaphula celox Benson, 1836 living in India and Bangladesh. (Figure 1)
- Scaphula pinna Benson 1856 (synonym S. bensoni H. Adams, 1872) known from Myanmar.
- Scaphula deltae Blanford, 1867 reported from India, Bangladesh and Myanmar. (Figure 2)
- Scaphula minuta Ghosh, 1922 usually reported as S. pinna (not of Benson!) from Thailand and Vietnam.
- Scaphula nagarjunai Janaki Ram & Radhakrishna, 1984 confined to India.

All of these species are rather small, the largest ever collected measured only 13 mm. Some of them have been reported living in freshwater streams more than 2000 miles from the nearest marine habitat!

None of them seem to be endangered at the moment, although some of the rivers in which they live are suffering regularly from intensive pollution.

Some additional information, especially dealing with the literature concerning the genus *Scaphula*, may be found in Mienis and Rittner (2016).



Figure 1. *Scaphula celox* Benson, 1836, length 10.33 mm. Photograph Oz Rittner.



Figure 2. *Scaphula deltae* Blanford, 1867, length 7.51 mm. Photograph Oz Rittner.

References

- Benson, W.H. 1834a. A collection of land and freshwater shells found in the Gangetic Provinces of India. *Proceedings of the Zoological Society of London*, (2)20: 89-91.
- Benson, W.H. 1836. Descriptive catalogue of a collection of land and fresh-water shells, chielfly contained in the Museum of the Asiatic Society. Part 2, Fluviatile shells. *Journal of the Asiatic Society of Bengal*, 5(59):741-750.

Huber, M. 2010. Compendium of Bivalves. 901 pp. ConchBooks, Hackenheim.

Mienis, H.K. 2016. Mussels belonging to the genus *Iphigenia* and *Profischeria* (Donacidae) in the National Mollusc Collections in Israel. *Ellipsaria*. 18(2):24-26.

Mienis, H.K. & O. Rittner. 2016. Brief review of the freshwater Ark shells belonging to the genus Scaphula Benson, 1834 (Family Arcidae). *Triton* 34 (in print).

Fieldtrip to Northern Vietnam, 2016

Arthur E. Bogan¹ and Van Tu Do²

¹ North Carolina Museum of Natural Sciences, 11 West Jones St, Raleigh, NC 27601. ² Institute of Ecology and Biological Resources, Vietnam Academy of Sciences and Technology, Hanoi, Vietnam.

This trip was planned to focus on the collection of live specimens of unionid species not collected alive for decades from northern Vietnam. These taxa are unknown anatomically and lack any DNA samples.

In preparation for the field part of this trip, we first visited the Vietnam National University, Hanoi University of Science, Museum of Biology, Hanoi, to examine specimens of species not collected alive since 1971, including lots of *Lamprotula blaisei*, *Pseudobaphia* sp. and *Protunio messageri*.

Between October 26 and November 6, 2016, we visited 40 sites, including a variety of local markets in seven provinces. We had a dedicated driver, Dang Thanh Ha, and a field assistant, Nguyen Tong Cuong. Local and roadside markets were examined for freshwater mussels, gastropods, and freshwater/terrestrial crabs. We spoke with the local merchants about the origin of their specimens and, in several instances, went to look at their holdings at their homes or encouraged them to assist us in locating their collecting sites and help us collect specimens. On one occasion, Van Tu Do was able to go back to a site with local farmers to collect a large series of *Pseudodon resupinatus*. Another local contact was able to collect a large number of live *Solenaia olivareus* for us from the Red River basin. These animals were living in a clay bottom area of the local river and were collected with the aid of a long thin metal rod with a right angle to the tip to pull the animals from the clay. We have been able to collect several fresh-dead specimens, but no live specimens, of *Protunio messageri*.

Van Tu Do had located a local farmer in Cao Bang Province who claimed to have collected specimens of *Gibbosula crassa* in the Bang River. One of our destinations was to visit this farmer. We visited him and collected several species of unionids and, at a site three kilometers downstream from their community, collected three live specimens of *Gibbosula crassa* (Figure 1) from a one-meter deep riffle with a boulder/cobble substrate (Figure 2), along with a single live specimen of *Aculamprotula nodulosa*.



Figure 1. *Gibbosula crassa* from the Bang River, Cao Bang Province. Vietnam. Photograph by Van Tu Do.



Figure 2. Two local farmers collecting live *Gibbosula crassa* from the middle of the Bang River, Cao Bang Province, Vietnam. Photograph by Arthur Bogan.

Guido Poppe (2014) figured a single specimen identified as *Lamprotula mansuyi* from the market in Hoa Binh, Hoa Binh Province, just west of Hanoi. We visited the market and examined several large piles of unionids but failed to find this species. We did find numerous specimens of *Sinanodonta jourdyi*, *Lanceolaria* sp., *Nodularia dorri*, *Lamprotula leai/Lamprotula quadrangulosa* and *Ptychorhynchus pfisteri* (Figure 3). We found a few dead shells of the odd little *Lamprotula* illustrated by Poppe and, finally, one

live specimen. A local collector was able to find about 15 live specimens of this animal, which resembles *Nodularia nuxpersicae*, but their shells are taller than *N. nuxpersicae*. Examining this series of specimens, it was clear these were specimens of *Nodularia* and not *Lamprotula*.

Figure 3. Piles of unionids in the Hoa Binh Market, Hoa Binh Province, Vietnam. Photograph by Arthur Bogan.



Reference:

Poppe, G.T. 2014. Newsletter- the quantities of shells-Vietnam 3. Newsletter, Conchology, Inc. 25 March 2014. <u>http://www.conchology.be/?t=4224&id=88&year=2014</u>

New Record of the Invasive Non-native Asian Clam Corbicula largillierti (Philippi, 1844) in the "Irani River" Microbasin, Western Region of Santa Catarina State/ SC, Southern Brazil

A. Ignacio Agudo-Padrón, Project "Avulsos Malacológicos - AM", P.O. Box 010, 88010-970 Centro, Florianópolis, Santa Catarina/ SC, Brazil – <u>ignacioagudo@gmail.com</u>; <u>goodcatt30@gmail.com</u>; <u>http://noticias-malacologicas-am.webnode.pt/</u>

Continuing with our previous malacological research reports on the western region of Santa Catarina State/ SC (Agudo-Padrón 2016), on October 6, 2016, Marieli Cristina Scartezini, a local profissional biologist, requested the identification of some small limnic bivalve mollusks illustrated in several field photographs (Figure 2). These animals were found in a localy dense population downstream of the installations of a small local hydroelectric power plant (Figure 1) in the "Xanxeré River" – $26^{\circ}59'23.23''S$ / $26^{\circ}59'42.01''S$ and $52^{\circ}27'6.39''W$ / $52^{\circ}27'9.27''W$ -- , within the Municipality of Xanxeré (Figure 1). This river is a tributary of the "Irani River," a component of the great Upper Uruguay River Basin.

The species was immediately confirmed by us as typical exotic invasive Asian mussels *Corbicula largillierti* (Philippi, 1844), confirming once again our forecasts for the region (Agudo-Padrón 2016). Recognized globally, invasive alien forms are the second major cause of the extinction of native species, immediately behind the destruction of habitats by human intervention. Unfortunately, in Santa Catarina State/ SC, this worrisome situation results increasingly evident, in rampant form. The future of our still little known native and endemic continental mollusks is uncertain!

Reference:

Agudo-Padrón, A.I. 2016. Progress to "downstream" of the invader asiatic golden mussel *Limnoperna fortunei* (Dunker, 1857) in the "High Uruguay River Basin" section of Santa Catarina State/ SC, Central Southern Brazil region, with "New Additions to State Inventory" of native freshwater bivalve species. *FMCS Newsletter Ellipsaria*, 18(3):16-19.



Figure 1.- The"Xanxeré" Municipal District (Map - red color) in the geographical territory of Santa Catarina State/ SC, and some images of where the population of *Corbicula largillierti* was found. Photographs by Biologist Marieli Cristina Scartezini.







Figure 2. Specimens of the regional invasive Asian clam *Corbicula largillierti* (Philippi, 1844) found in the Xanxeré River on September 27-29, 2016. Photographs by Biologist Marieli Cristina Scartezini.

First Geographical Record of the Little Native Freshwater Operculate Snail Potamolithus catharinae Pilsbry 1911 in the "Urubici" Municipal District, Highlands Region of Santa Catarina State/ SC, Southern Brazil.

A. Ignacio Agudo-Padrón, Project "Avulsos Malacológicos - AM", P.O. Box 010, 88010-970 Centro, Florianópolis, Santa Catarina/ SC, Brazil – <u>ignacioagudo@gmail.com</u>; <u>http://noticias-malacologicas-am.webnode.pt/</u>

The highest point of the brazilian territory, at 1,822 meters above sea level, is the Morro da Igreja, (Hill of the Church) in the Municipality of Urubici in Santa Catarina's State/ SC (Figure 1). Geographically located at coordinates 28°00'54"S & 49°35'30"W, strong frosts and abundant snow are common in this area, and it has registered the lowest temperatures in the country, surpassing -17°C in the austral winter period. The area is world renowned for its diverse yet unspoiled natural beauty and scenic landscape, including the Mixed Ombrophilous Forest or Araucária Forest. It is framed by the fertile "Canoas River" Valley, an important member of the hydrographic network of the great Uruguay River Basin.



Figure 1. Location of the Urubici Municipal District (Map - red color) in the geographical territory of Santa Catarina State/ SC, and some environment aspects of the area.

Despite being generously irrigated by several springs, streams, and waterfalls, this singular locality is poorly known and studied in reference to its fauna of limnic/ freshwater and other continental mollusks.

On date 07/08/2016, during a field visit, brazilian naturalist and shell collector Mauricio Uhle found some live operculated aquatic snails with aprox. 5 mm. (Figure 2) in the "Canoas River" basin, at 1,100 m above sea of this malacological state region (Agudo-Padrón 2014: 9-Fig. 2,11). The specimens in question were confirmed by us as typical native operculated freshwater snails Lithoglyphidae *Potamolithus catharinae* Pilsbry 1911, the first geographical record of this species for the locality/ municipality.

This little subtropical gastropod represents the second freshwater mollusk species reported for this region. The first is the non-native limnic pulmonate snail *Lymnaea columella* Say, 1817 (Agudo-Padrón

2008:155; Agudo-Padrón *et al.* 2013:68-Figure 20), a vector in Southern Brazil of the veterinarian parasitic disease "Fascioliase" (Agudo-Padrón *et al.* 2013: 65-75).



Figure 2. Specimens of the freshwater snail *Potamolithus catharinae* Pilsbry 1911 found in the Canoas River, Urubici Municipal District. Photographs by Mauricio Uhle.

References:

- Agudo-Padrón, A.I. 2008. Listagem sistemática dos moluscos continentais ocorrentes no Estado de Santa Catarina, Brasil. *Comunicaciones de La Sociedad Malacológica del Uruguay*, 9(91):147-179. Available online at: <u>http://www.redalyc.org/pdf/524/52412049003.pdf</u>
- Agudo-Padrón, A.I.; Veado, R.V. ad-V. and Saalfeld, K. 2013. Moluscos e saúde pública em Santa Catarina: subsídios para a formulação de políticas preventivas sanitaristas. Duque de Caxias, RJ: Espaço Científico Livre Projetos Editoriais, 1ª. Ed., 2013, 134p. Available online at: < https://issuu.com/espacocientificolivre/docs/moluscosesaudepublicaemsantacatarina >.
- Agudo-Padrón, A.I. 2014. Inventario sistemático de los moluscos continentales ocurrentes en el Estado de Santa Catarina, Brasil/ Inventário sistemático dos moluscos continentais ocorrentes no Estado de Santa Catarina, Brasil. *Bioma*, El Salvador, América Central, 2(21):6-23. Available online at: < https://www.academia.edu/7712248/Revista_BIOMA_julio_2014 >.



FMCS Officers

President

Teresa Newton

U.S. Geological Survey Upper Midwest Environ. Science Center 2630 Fanta Reed Road LaCrosse, WI 54603 608-781-6217 tnewton@usgs.gov

Secretary

Janet Clayton West Virginia Division of Natural Resources PO Box 67 Elkins, WV 26241 304-637-0245 Janet.l.clayton@wv.gov

Past President Patricia Morrison

U.S. Fish and Wildlife Service Ohio River Islands NWR 3982 Waverly Road Williamstown, WV 26187 304-375-2923 x 124 patricia morrison@fws.gov

President Elect

Heidi L. Dunn Ecological Specialists Inc. 1417 Hoff Industrial Park O'Fallon, MO 63366 636-281-1982; Fax: -0973 <u>Hdunn@ecologicalspecialists.com</u>

Treasurer

Emily Robbins [formerly Grossman] Ecological Specialists Inc. 1417 Hoff Industrial Park O'Fallon, MO 63366 636-281-1982 <u>erobbins@ecologicalspecialists.com</u> *Note new e-mail address, too*

Ellipsaria is posted on the FMCS web site quarterly: around the first of March, June, September, and December. This newsletter routinely includes Society news, abstracts, meeting notices, pertinent announcements, informal articles about ongoing research, and comments on current issues affecting freshwater mollusks. Anyone may submit material for inclusion in *Ellipsaria* and all issues are accessible to anyone on the FMCS website (http://molluskconservation.org).

Information for possible inclusion in *Ellipsaria* should be submitted via e-mail to the editor, John Jenkinson, at <u>jjjenkinson@hotmail.com</u>. Those contributions may be submitted at any time but are due by the 15th of the month before each issue is posted. MSWord is optimal for text documents but the editor may be able to convert other formats. Graphics should to be in a form that can be manipulated using PhotoShop. Please limit the length of informal articles to about one page of text. Note that submissions are not peer reviewed but are checked for clarity and appropriateness for this freshwater mollusk newsletter. Feel free to contact the editor with questions about possible submissions or transmission concerns.

FMCS Standing Committees and Their Chairs/Co-chairs

If you are interested in participating in committee activities, please contact one of the appropriate chairs.

Awards

 W. Gregory Cope North Carolina State University <u>greg_cope@ncsu.edu</u>
Teresa Newton Upper Midwest Environ. Science Center <u>tnewton@usgs.gov</u>
Emy Monroe Midwest Fisheries Center

emy monroe@fws.gov

Environmental Quality & Affairs

Steve McMurray Missouri Dept. of Conservation <u>stephen.mcmurray@mdc.mo.gov</u> Braven Beaty The Nature Conservancy <u>bbeaty@tnc.org</u>

Gastropod Status and Distribution

Nathan Whelan Auburn University <u>nwhelan@auburn.edu</u> Jeremy Tiemann Illinois Natural History Survey <u>jtiemann@illinois.edu</u>

Genetics

David J. Berg Miami University <u>bergdj@miamioh.edu</u> Curt Elderkin The College of New Jersey <u>elderkin@tcnj.edu</u>

Guidelines and Techniques

Mary McCann HDR, Inc. <u>mary.mccann@hdrinc.com</u> Ryan Schwegman EnviroScience, Inc. <u>RSchwegman@EnviroScienceInc.com</u>

Information Exchange

<u>Newsletter</u> -- John Jenkinson Clinton, Tennessee jjjenkinson@hotmail.com

Information Exchange (continued) Journal

- -- G. Thomas Watters OSU Museum of Biological Diversity Watters.1@osu.edu
- W. Gregory Cope North Carolina State University <u>greg_cope@ncsu.edu</u>
 Wendell R. Haag U.S. Forest Service whaag@fs.fed.us

Mussel Status and Distribution

Arthur E. Bogan N.C. State Museum of Natural Sciences <u>arthur.bogan@ncdenr.gov</u> John L. Harris Arkansas State University <u>omibob1@gmail.com</u>

Nominations

Leroy Koch U.S. Fish and Wildlife Service <u>leroy_koch@fws.gov</u>

Outreach

Megan Bradley U.S. Fish and Wildlife Service <u>Megan_Bradley@fws.gov</u> Jennifer Archambault North Carolina State University <u>jmarcham@ncsu.edu</u>

Propagation, Restoration, & Introduction

Dan Hua Tennessee Wildlife Resources Agency <u>Dan.Hua@tn.gov</u> Rachael Hoch North Carolina Wildlife Resources Commission <u>rachael.hoch@ncwildlife.org</u>

Symposium

Heidi L. Dunn Ecological Specialists Inc. <u>Hdunn@ecologicalspecialists.com</u>

Parting Shot



As you may know, unusually severe droughts are occurring this fall in much of the southeastern United States. Across the region, seasonal (September – November) rainfall is now 87% below normal in Asheville, North Carolina; 63% below normal in Atlanta, Georgia; 93% below normal in Brimingham, Alabama; and 79% below normal in Memphis, Tennessee. This drought also has been accompanied by an unusually high number of forest fires. In mid-November, there were 73 active forest fires burning in the southeastern states and a total of 120,000 acres had been affected by fire in the region so far this year.

This dramatic image shows the extremely low water level in the Nantahala River in western North Carolina and part of a control fire, set to prevent the loss of the riverside recreation facilities by an approaching wildfire. We will have to wait until next year to begin to assess the impacts on the freshwater mollusks and other aquatic species that live in these exceptionally diverse rivers and streams.



If you would like to contribute a freshwater molluskrelated image for use as a **Parting Shot** in *Ellipsaria*, email the picture, informative caption, and photo credit to jjjenkinson@hotmail.com.