Newsletter of the Freshwater Mollusk Conservation Society
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JASM 2022 is Happening

The second ever Joint Aquatic Science Meeting (JASM) will occur in Grand Rapids, Michigan, USA, May 16 – 20, 2022. While 44% of FMCS members who responded to a recent survey had not heard of JASM before, this event is a big deal that you should know about and consider attending. The first JASM, organized jointly by the Society for Freshwater Science (SFS), Association for the Sciences of Limnology and Oceanography (ASLO), Phycological Society of America (PSA), and the Society of Wetland Scientists (SWS), was held in Portland, Oregon, in 2014 and was a huge

success -- ~3,5000 attendees, some of whom were FMCS members. JASM 2022 is being organized by the Consortium of Aquatic Science Societies (CASS) which includes all of the JASM 2014 societies plus the American Fisheries Society (AFS), Coastal and Estuarine Research Federation (CERF), International Association of Great Lakes Research (IAGLR), North American Lake Management Society (NALMS), and FMCS. The organizers are expecting somewhere around 4,000 aquatic scientists to attend.

The JASM 2022 conference theme is, ***Rapid Changes ~ Collaborative Solutions***, recognizing that collaboration among disciplines is critical as we address common problems affecting aquatic ecosystems and all of the organisms that live in them. There will be > 100 symposia and multiple keynote and plenary speakers, including scientists that are active FMCS members. Symposium topics will range from: "Reeling in Historic Data," and "Connectors Across Ecosystems," to "Advances in Freshwater Technology," "Communicating Science," and "Challenges of Ecosystem Management." There really will be something for everyone.

JASM has encouraged the development of sessions exploring all aspects of aquatic science and a diversity of speakers by career stage, gender, race, ethnicity, geography, and perspective. Unique to this conference, there also will be integrative and student-focused events throughout the week, as well as symposia that will encourage collaboration across and among societies and across fields. There also will be pre-conference workshops/professional development courses.

Given the size and diversity of the conference, there will be multiple concurrent sessions. The organizers are working to make those sessions not feel overwhelmingly large while trying to combine topics to encourage collaboration among societies throughout the conference. So, if you are interested in host fish of particular unionids, it is likely you can sit in on talks presented by your favorite American Fisheries Society member! If you are interested in population modeling, it is likely that you will be able to hear talks on a wide variety of aquatic ecosystem modeling studies and get unique ideas from their work.

Does this mean you will miss talks you want to see while watching other talks? Not at all! All presentations will be live; however, speakers will be asked to submit a pre-recorded versions of their talks so nothing will be missed. As an attendee, you will be able to see all talks either live or in their recorded form. Poster sessions -- Yes, there will be Poster Sessions ! -- are also expected to be up most of the week to allow for more time to see the large numbers of posters, and there will be explicit times to meet with the poster authors.

Not often part of an FMCS conference but sometimes present at larger conferences, exhibitors also will be present to show off new technology and equipment. Representatives from non-governmental and other organizations also will be present to describe their activities and interact with attendees.

All of the JASM 2022 events will be held throughout three main buildings in downtown Grand Rapids: the DeVos Place Convention Center, Amway Grand Plaza Hotel, and JW Marriott Hotel. These facilities have all the amenities one could need for a conference of this size. DeVos Place includes the DeVos Performance Hall, used for large formal concerts and events, as well as conferences even larger than JASM2022 (e.g., auto industry shows). During JASM 2022, the organizers have invited at least a few artists to display their "aquatic art" throughout the week in the entrance hall to the rooms to be used for the poster session.

For students and early career-scientists, there will be events throughout the week for you! There will be early mentor-mentee mixers, interview workshops, as well as a matching of mentees with mentors that will help you maneuver through this large conference setting. So, even if your entire laboratory/office cannot attend, sign up for some of these events early in the week (most are included within the cost of the conference), and you may meet your future graduate advisor or boss!

There are many airports that could be used to fly to the conference, including Grand Rapids Gerald R. Ford (GRR), Detroit Metro (DTW - 2.25 hours away), and Chicago O'Hare (ORD - 3.5 hours away) international airports and many other smaller airports within reasonable driving distance to Grand Rapids. There will be multiple hotel options blocked off for JASM 2022, with a range of price options, all within walking distance to the conference or with shuttle options. There also will be local discounts at restaurants and stores. Many of the food and drink options available in Grand Rapids, as well as the food options at the conference, will be very appealing to FMCS members.

All sorts of information about this conference is being added almost daily to the JASM 2022 website: https://jasm2022.aquaticsocieties.org/ . The recently added Sessions Page lists the **110** (**!**) symposia that will be held during this conference -- in addition to the **33** categories of other contributed talks. The Call for Abstracts will be posted soon at: Call for Abstracts – JASM 2022 (aquaticsocieties.org) and the **deadline for abstract** submission is **January 10, 2022**. While the Registration site is not yet open, fees to register have been posted; they vary depending on your career status, whether you are a member of a CASS Society, and if you want to attend in person or virtually.

During registration, you will be asked what professional society or societies you belong to and, based on our survey, you probably are a member of more than one CASS society. Please select FMCS as one of your professional societies so we can get a good idea of the number of attendees representing us during this important conference.

Many FMCS members are helping on the numerous subcommittees needed to organize a conference of this size. If you have any questions about FMCS participation in JASM, please feel free to reach out to Daelyn Woolnough (wooln1d@cmich.edu).

It will be great to finally ***see*** everyone this May in Grand Rapids!

Society News

FMCS Survey Guidelines and Techniques Workshop Rescheduled

We are going to try again! The FMCS Survey Guidelines and Techniques Workshop, postponed in 2019 because of the COVID-19 pandemic, has been rescheduled for August 8 - 11, 2022, again on the Duck River at Henry Horton State Park, Chapel Hill, Tennessee. Nearly all of the description of this Workshop posted in the March 2019 issue of *Ellipsaria* still applies to the 2022 event; however, the registration fee and lodging rates have increased slightly. An updated, detailed announcement about the Workshop will be included in the March 2022 issue of *Ellipsaria*, to coincide with the opening of the registration site. Until then, if you would like more information about the Workshop content and specific curriculum, please contact the Lisie Kitchel lisie.kitchel@wisconsin.gov. For more information about the venue, lodging, transportation, or sponsorships, please contact: Ryan Schwegman, rschwegman@enviroscienceinc.com.

FMBC, Once Again, Publishes a BioOne Featured Article

In early November 2021, BioOne Complete announced a new group of featured research articles in marine and freshwater biology from its curated database of more than 217 subscribed and open-access journals from independent societies, museums, and research institutes. One of the eight articles in this featured group was "Discovery of the Blue Ridge Springsnail, *Fontigens orolibas*, Hubricht, 1957 (Gastropoda: Emmericiidae) in East Tennessee and Its Conservation Implications" by Nicholas S. Gladstone, Evelyn B. Pieper, Sarah W. Keenan, Audrey T. Paterson, Michael E. Slay, Katherine Dooley, Annette S. Engel, and Matthew L. Niemiller. This article was published in *Freshwater Mollusk Biology and Conservation*, Vol. 24, No. 1 in March 2021. Congratulations to both the authors and the editors of FMBC on this achievement.

Abstract:

The study of spring- and subterranean-associated microsnail species in the Appalachian karst region has focused disproportionately on the northern Appalachian Valley and Ridge (AVR), leaving many areas in the southern Appalachians unexplored. Consequently, biological inventories of subterranean habitats have been initiated in the southern AVR, particularly in the state of Tennessee. In 2013 and 2018, several previously unknown populations of a microsnail species were discovered from caves in eastern Tennessee. Through both morphological and molecular analysis, we identified these populations as the Blue Ridge Springsnail, Fontigens orolibas. These newly discovered populations represent a significant range extension of F. orolibas. As such, we reassess the conservation status of F. orolibas under NatureServe criteria and emphasize the need for further sampling efforts in the southern AVR for microsnails.

The full article is available directly at: untitled (molluskconservation.org) and all of *FMBC* Volume 24, Number 1is available at: Freshwater Mollusks Conservation Society (molluskconservation.org).

Announcements

A Climate Change Article of Note

J. R. Thompson, S. N. Gosling, J. Zaherpour, C. L. R. Laizé. 2021. Increasing Risk of Ecological Change to Major Rivers of the World With Global Warming. *Earth's Future* 9(11):1-20. Available at https://doi.org/10.1029/2021EF002048.

Abstract:

The hydrological characteristics of a river, including the magnitude and timing of high and low flows, are important determinants of its ecological functioning. Climate change will alter these characteristics, triggering ecological changes in river ecosystems. This study assesses risks of ecological change in 321 major river basins across the globe due to global warming relative to pre-industrial conditions of 1.0, 1.5, 2.0 and 3.0°C. Risks associated with climate-driven changes to high and low flows, relative to baseline (1980–2010; 0.6°C warming), are investigated using simulations from nine global hydrological models forced with climate projections from five global climate models, resulting in an ensemble of 14,445 baseline-scenario members for each warming scenario (9 × 5 × 321). At the global-scale, the likelihood of high risks of significant ecological change in both high and low flows increase with global warming: across all basins there is a medium-high risk of change in high (low) flows in 21.4% (22.4%) of ensemble members for 1.0°C warming, increasing to 61.5% (63.2%) for 3.0°C. Risks are particularly pronounced for low flows at 3.0°C for many rivers in South America, southern Africa, Australia, southern Europe and central and eastern USA. Results suggest that boreal regions are least likely to see significant ecological change due to modified river flows but this may be partly the result of the exclusion of processes such as permafrost dynamics from most global hydrological models. The study highlights the ecological fragility and spatial heterogeneity of the risks that unmitigated climate change poses to global river ecosystems.

2021 Ohio State Freshwater Mussel Workshop Held

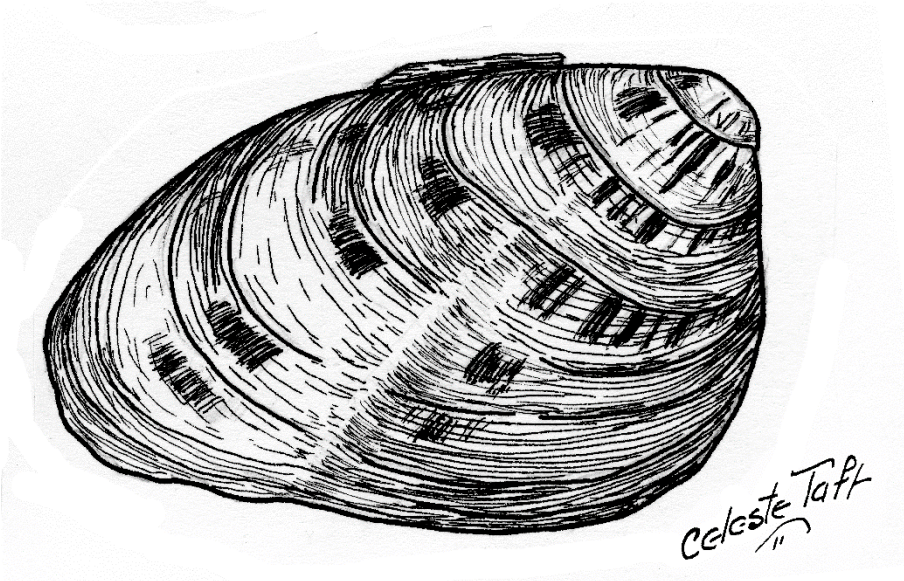
The Ohio State University (OSU) held its first post-COVID lockdown Freshwater Mussel Workshop on October 4-7, 2021, at the Ohio State University Museum of Biological Diversity (OSUMBD). This was the first of these workshops held following the passing of Dr. Tom Watters, although we believe his energy and humor were still present. The 28 attendees included 16 from the private sector and 12 from public institutions.

The workshop introduced the taxonomy and diversity of freshwater mussels in Ohio and provided an overview of field sampling techniques for mussels. The mussel identification and diversity part of the workshop were led by Michael Hoggarth, Otterbein University and co-author of "*The Freshwater Mussels of Ohio*," with assistance from Ieva Roznere, OSU, and Nate Shoobs, OSUMBD. Participants received hands-on instruction in identifying Ohio mussel species and were given access to the collection of the OSUM Mollusk Division, which is the largest collection of unionid mussels in the world. A discussion of regulatory Issues was led by John Navarro, ODNR, and Angela Boyer, US Fish and Wildlife Service.

The field techniques section was led by Becca Winterringer, EnviroScience and Megan Michael, Ohio Department of Transportation, with assistance from Kyla Maunz, Ohio Department of Natural Resources (ODNR), and Greg Zimmerman, EnviroScience. The class spent two days in some central Ohio streams focusing on Ohio Mussel Survey Protocol application scenarios. Topics included setting up surveys, mussel detection techniques, substrate classification, and battling the weather challenges while surveying.

One topic that was hit on during both the classroom and the field portions of this workshop was how important it is that those taking the course, and ultimately collecting mussels in Ohio, recognize that they are an essential part of the conservation plan for mussels in Ohio. They will be depended on to plan appropriate field studies, find and appropriately handle mussels, and identify them correctly.

Going forward, this workshop is proposed to be offered at OSUMBD twice per year, in early fall and late spring. It is worthwhile for anyone who wants to be part of mussel conservation efforts but is targeted towards field biologists in either the public or private sector who are certified or are looking to become certified mussel surveyors in Ohio. Please visit **go.osu.edu/mollusks** for more information about the Workshop and the OSUMBD Mollusk Division. You also can sign up for updates about these workshops at: **go.edu.edu/musselclass_fmcs**.



Pleurobema clava (Lamarck, 1819).

Upcoming Meetings

February 28 - March 4, 2022 – National Shellfisheries Association AQ' 2022 Triennial Meeting, Town and Country Resort and Convention Center, San Diego, California, USA Annual Meeting (shellfish.org)

May 16 - 20, 2022 –Joint Aquatic Sciences Meeting, JASM 2022, DeVos Place Convention Center, Grand Rapids, Michigan, USA. https://jasm2022.aquaticsocieties.org/

June (?), 2022 – American Malacological Society Annual Meeting, [site and other details not yet posted]

August 8 - 11, 2022 – FMCS Field Sampling Workshop, Henry Horton State Park, Tennessee, USA [details still under discussion]

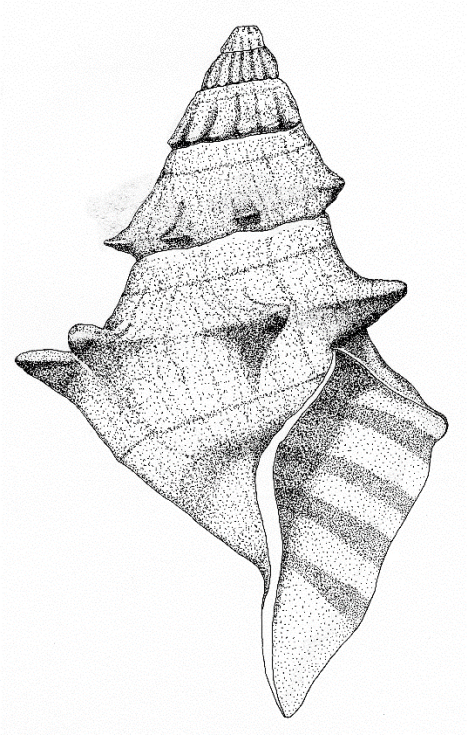
July 16 - 21, 2022 – Society for Conservation Biology North American Sectional Meeting, Reno, Nevada, USA Theme: *Restoring Connections and Building Resilience in a Changing World*, https://scbnorthamerica.org/index.php/naccb-2022/

August 21 – 25, 2022 –American Fisheries Society 152nd Annual Meeting, Spokane, Washington, USA [theme and other details not yet posted] https://afsannualmeeting.fisheries.org/

October 16 – 19, 2022 – Southeastern Association of Fish and Wildlife Agencies 76th Annual Conference,. "West Virginia", USA. http://www.seafwa.org/conference/overview/

April 9 – 12, 2023 – FMCS Biennial Symposium, Double Tree Hotel, Portland Oregon, USA. Theme: *Mountains to Sea and Mollusks Between*. [other details yet to be determined]

May (?) 2025 – FMCS Biennial Symposium, somewhere in Michigan, USA. [dates, location, theme, and other details yet to be determined]



Contributed Article

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.*

New Host Fish Information for *Lampsilis siliquoidea* and *Toxolasma parvum*

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[Not Peer-reviewed]

Lampsilis siliquoidea, Fatmucket, is fairly common in Minnesota, which may be related to its glochidia using a relatively wide variety of host fishes. Under the name *Lampsilis radiata luteola* (which we understand to be a synonym of *L. siliquoidea*), this species is known to have host relationships with members of Centrarchidae, Percidae, Cyprinidae, Catostomidae, Ictaluridae, Lepisosteidae, and Moronidae (Watters et al. 2009). However, variability in host suitability has been observed within and between families, and several fish species remain unstudied (INHS Freshwater Mussel Host Database 2021). To clarify some of these relationships, we studied suitable and natural hosts for the Fatmucket.

We followed standard methods to identify suitable Fatmucket hosts (Hove et al. 2016). Gravid *L. siliquoidea* were collected from Rice Creek, Anoka County, Minnesota, during May 2021. Most fishes were collected within the Twin Cities 7-county metro area. Although *L. siliquoidea* is widespread and common, and fishes may have developed resistance to its glochidia, we assumed that some glochidia would complete metamorphosis on suitable hosts (Dodd et al. 2005). Fishes were inoculated with *L. siliquoidea* glochidia and held in species-specific, flow-through aquaria at between 19-21 °C. Mussel and fish nomenclature follow Williams et al. (2017) and Page et al. (2013), respectively.

Of 14 fish species inoculated with Fatmucket glochidia, eight facilitated metamorphosis (Table 1). Fishes that did not facilitate *L. siliquoidea* glochidia metamorphosis [number of trials, number of surviving fish, glochidia attachment period (d)] include: *Luxilus cornutus* (1, 1, 6-9), *Pimephales vigilax* (1, 5, 4-8), *Rhinichthys atratulus* (1, 2, 6-9), *Semotilus atromaculatus* (1, 1, 4-8), *Catostomus commersonii* (1, 2, 20-23), *Percina maculata* (1, 2, 8-11).

We also attempted to study natural Fatmucket hosts by collecting fishes from Rice Creek at Locke County Park on July 3, 2021. The Fatmucket is one of the few mussel species present at this site because Locke Lake dam prevents the more diverse mussel species living nearby in the Mississippi River from moving very far up into Rice Creek. On this occasion, we collected nine fish species from Rice Creek: *Cyprinella spiloptera* (n=7), *Notropis dorsalis* (2), *Pimephales notatus* (2), *P. promelas* (4), *Rhinichthys cataractae* (10), *Catostomus commersonii* (3), *Lepomis cyanellus* (3), *L. macrochirus* (2), and *Etheostoma nigrum* (18). Of these, only *E. nigrum* released juvenile mussels. Using a dissecting microscope, we studied the 106 unknown juveniles recovered from these fish, and they all appeared to be similar in size and outline. We used discriminant analysis to compare glochidia dimensions of the mussel species known to occur in Rice Creek (Table 2) with the glochidial valves of 14 unknown juveniles. Although we were searching for natural *L. siliquoidea* hosts, all 14 unknowns were determined to be *Toxolasma parvum* (Table 3).

Table 1. *Lampsilis siliquoidea* host suitability trials results.

Fish species	Trial	No. Fish inoculated	No. Fish survived	No. juveniles recovered	Juvenile release/ glochidia attachment period (days)*
Esox lucius†	1	3	2	447	16-30
Lepomis gulosus†	1 2	5 5	5 3	0 1	17-20 32-36**
L. humilis†	1	11	7	3	25-36**
L. macrochirus	1	13	13	55	12-24
Pomoxis nigromaculatus	1	1	1	17	32-39**
Etheostoma exile†	1	17	17	105	16-30
E. nigrum†	1	10	5	6	16-20
Percina phoxocephala†	1	8	8	6	13-16

* Range of days juvenile mussels or glochidia (trials where no juveniles were produced) were recovered.
** Some fishes were held at 11 °C between days 19-22 during an unplanned water-cooling event, and afterward between 14-16 °C.
† Denotes newly identified suitable host species.

Table 2. Reference glochidia shell dimensions from mussels collected from Chanarambia Creek, MN (CC), Chippewa River, WI (CR), Kanaranzi Creek, MN (Ka), Kohlman Creek, MN (Ko), Mississippi River, MN/WI (M), St. Croix River, WI (S), and Turtle Creek, MN (T). Dimension means with different column superscripts were significantly different ($P<0.05$) using the Tukey HSD test (JMP v.16).

Mussel species	Height ± 1 std dev (µm)	Length ± 1 std dev (µm)	Hinge length ± 1 std dev (µm)
Lampsilis siliquoidea (CR, T)	266 ± 19^{a}	217 ± 15^{a}	116 ± 8^{a}
*Ligumia recta** (CR)	257 ± 7^{a,b}	205 ± 3^{b}	104 ± 2^{b}
*Lampsilis cardium** (CR, S)	247 ± 15^{b}	206 ± 11^{b}	101 ± 7^{b}
Toxolasma parvum (CC, Ka, Ko, M)	199 ± 14^{c}	169 ± 14^{c}	96 ± 9^{c}
Leptodea fragilis (S)	90 ± 6^{d}	75 ± 4^{d}	37 ± 2^{d}

* Only empty shells were collected during recent mussel surveys.

Table 3. Glochidial shell dimensions from 14 juvenile mussels released by naturally-infested *Etheostoma nigrum* from Rice Creek and the results of their discriminant analysis identifications.

Height ± 1 std dev (µm)	Length ± 1 std dev (µm)	Hinge length ± 1 std dev (µm)	Discriminant analysis prediction probability
167 ± 2	146 ± 3	81 ± 2	100% *Toxolasma parvum*

Our results add to the variety of observations published on *Lampsilis siliquoidea* hosts because several previously unknown suitable host species were identified during this study. Our observations of *Lepomis machrochirus* and *Pomoxis nigromaculatus* serving as suitable *Lampsilis siliquoidea* hosts are consistent with several studies. The fact that *Esox lucius* and *Lepomis gulosus*, and *L. humilus* facilitate glochidia metamorphosis in our study; however, contrast with the failure of these fishes to serve as potential hosts in the studies by Keller and Ruessler (1997), and Howard and Anson (1923), respectively.

In contrast to the number of studies describing *L. siliquoidea* host relationships, little is known about fish hosts for *Toxolasma parvum*. *Lepomis macrochirus* and *Perca flavescens* have been reported as natural hosts for this mussel (Benedict et al. 2019) and *Sander canadensis*, *L. gulosus*, and *L. macrochirus* have been found naturally infested with *T. parvum* (Wilson 1916, Fritts et al. 2016). During a laboratory study, Hove (1995) showed that *L. cyanellus* is a suitable host species. Our finding of *E. nigrum* serving as a natural *T. parvum* host is consistent with the observation of this darter serving as a potential host (Watters et al. 2005).

Literature Cited

Benedict, A., M. Hove, B. Sietman, A. Franzen, L. Neu, C. Rounds, E. Slaikeu, I. Tolo, M. Pletta, and D. Hornbach. 2019. Natural hosts of some common Mississippi River mussel species. *Ellipsaria* 21(2): 33-35.

Dodd, B. J., M. C. Barnhart, C. L. Rogers-Lowery, T. B. Fobian, and R. V. Dimock. 2005. Cross-resistance of largemouth bass to glochidia of unionid mussels. *Journal of Parasitology* 91(5):1064-1072.

Fritts, A. K, A. P. Stodola, S. A. Douglass, and R. M. Vinsel. 2016. Investigation of freshwater mussel glochidia presence on Asian carp and native fishes of the Illinois River. *Freshwater Mollusk Biology and Conservation* 19:22-28.

Hove, M. C. 1995. Suitable fish hosts of the lilliput, *Toxolasma parvus*. *Triannual Unionid Report* 8:9.

Hove, M. C., B. E. Sietman, M. S. Berg, E. C. Frost, K. Wolf, T. R. Brady, S. L. Boyer, and D. J. Hornbach. 2016. Early life history of the sheepnose (*Plethobasus cyphyus*) (Mollusca: Bivalvia: Unionoida). *Journal of Natural History* 50(9-10):523-542.

Howard, A. D. and B. J. Anson. 1923. Phases in the parasitism of the Unionidae. *Journal of Parasitology* 9:68-82.

Keller, A. E. and D. S. Ruessler. 1997. Determination or verification of host fish for nine species of unionid mussels. *American Midland Naturalist* 138:402-407.

Illinois Natural History Survey. 2021. Freshwater Mussel Host Database; http://wwx.inhs.illinois.edu/collections/mollusk/data/freshwater-mussel-host-database; Accessed 23 October 2021.

Page, L. M., H. Espinosa-Pérez, L. T. Findley, C. R. Gilbert, R. N. Lea, N. E. Mandrak, R. L. Mayden, and J. S. Nelson. 2013. *Common and scientific names of fishes from the United States, Canada, and Mexico*, 7th edition. American Fisheries Society, Special Publications 34, Bethesda, Maryland.

Van Susteren, G., M. Hove, B. Sietman, M. Berg, and D. Hornbach. 2015. Snuffbox (*Epioblasma triquetra*) metamorphose on naturally infested logperch. *Ellipsaria* 17(1):20-21.

Watters, G. T., T. Menker, S. Thomas, and K. Kuehnl. 2005. Host identifications or confirmations. *Ellipsaria* 7(2):11-12.

Watters, G. T., M. A. Hoggarth, and D. H. Stansbery. 2009. *The freshwater mussels of Ohio*. The Ohio State University Press, Columbus, Ohio. 421 p.

Wilson, C. B. 1916. Copepod parasites of fresh-water fishes and their economic relations to mussel glochidia. *Bulletin of the Bureau of Fisheries* 34:333-374.

Williams, J. D., A. E. Bogan, R. S. Butler, K. S. Cummings, J. T. Garner, J. L. Harris, N. A. Johnson, and G. T. Watters. 2017. A revised list of the freshwater mussels (Mollusca: Bivalve Unionida) of the United States and Canada. *Freshwater Mollusk Conservation and Biology* 20(2):33-58.

First Confirmed Record of the Primitive Native Limnic/Freshwater Pulmonate Snail Chilinidae *Chilina rushii* Pilsbry, 1896, from Santa Catarina State, Central Southern Brazil

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[Not Peer-reviewed]

Another species has been added the non-marine mollusk inventory (land/terrestrial and limnic/freshwater species) present in the State of Santa Catarina/ SC (Agudo-Padrón and Carneiro 2021), central-southern region of Brazil. On September 29, 2021, the second author (F.C.) forwarded some photographs of a very singular little limnic gastropod snail for taxonomic determination. These specimens, found with the aid of "Surber Sampler for Benthos" during biotic sampling campaign, came from two lentic peri-urban areas located in the hydrographic region of Joinville (city and Municipal District, the biggest city in the State ~ 26°18'14"S & 48°50'45"W - Figure 1)) This area is part of Malacological Region 2 ~ North, Santa Catarina State/ SC, Central Southern Brazil (Agudo-Padrón 2018:58-Figure 1). One specimen, an apical shell fragment (Figure 2A), was found in a possible spring run which forms a lake in the middle of the vegetation with little current flow and a lot of deposited organic matter (located at 26°19'19.05"S & 48°52'49.28"W). At the other site, a complete shell (Figures 2B and 2C) was found in a similar environmental situation, but open water with black-colored sandy-mud substrate (located at 26°20'39.98"S & 48°51'11.86"W). Both specimens have been deposited in the Malacological Collection of the Regional University Foundation of Blumenau – FURB, Blumenau/ SC ~ Voucher FURB-MO 385.

Accompanying malacofauna found in these localities included GASTROPODA Cochliopidae *Littoridina piscium* (d'Orbigny, 1835), Ampullariidae *Pomacea sordida* Swainson, 1823, Lymnaeidae *Galba* cf. *truncatula* (Müller, 1774), and BIVALVIA naiads Hyriidae *Diplodon expansus* (Küster, 1856) & *Diplodon rhuacoicus* (d'Orbigny, 1835).

These specimens have been identified as Chilinidae *Chilina rushii* Pilsbry, 1896, a primitive native limnic/freshwater pulmonate gastropod snail. Previously, only three species in the family Chilinidae Dall, 1870 had been recorded in the State (Agudo-Padrón 2018). Our last report of this species in field was from the neighboring State of Rio Grande do Sul/ RS (Agudo-Padrón 2019). These new records of this freshwater/limnic gastropod species bring the known non-marine molluscan total for this small Brazilian geographical territory to 257 species: 88 limnic/freshwater, 3 amphibious/limnophiles, and 166 terrestrial forms.

Figure 1. Views of the two collection sites and loction of the Joinville Municipal District in the North region of Santa Catarina State/ SC (map – red color).

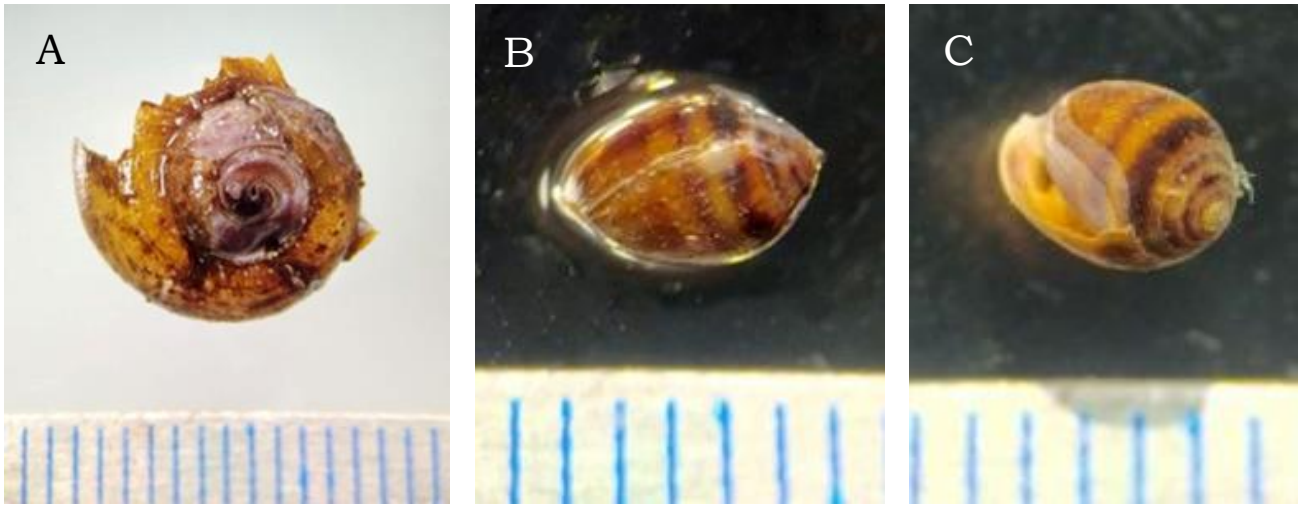

Figure 2. Native limnic/freshwater pulmonate snail Chilinidae *Chilina rushii* Pilsbry, 1896 specimens found in lentic aquatic environments at two urban sites in the Joinville city and Municipal district. A. - apical shell fragment; B and C - two views of the complete shell.

References:

Agudo-Padrón, A.I. 2018. Revised and updated systematic inventory of non-marine molluscs occurring in the state of Santa Catarina/SC, central southern Brazil region. *Advances in Environmental Studies*, 2(1):54-60. Available online at: https://scholars.direct/Articles/environmental-studies/aes-2-007.pdf?jid=environmental-studies&fbclid=IwAR0jVKm3aMwsKV0gxiV_CuJd2HT1pxo4xFjf4Y91atMhChKfmIYYqd9Ww3z4

Agudo-Padrón, A.I. 2019. Confirmed record of the Neotropical freshwater primitive snail *Chilina rushi* Pilsbry, 1896 (Pulmonata: Chilinidae) in the Caí River Basin, Canela, Rio Grande do Sul State/ RS, Southernmost Brazil. *Ellipsaria,* 21(1):25-27.

Agudo-Padrón, A.I. and Carneiro, F. 2021. First confirmed record of the native limnic/ freshwater operculate snail Cochliopidae *Heleobia* (- *Littoridina*) *cuzcoensis* (Pilsbry, 1911) in Santa Catarina State/ SC, Central Southern Brazil region. *Ellipsaria*, 23(2):31-32.

First Confirmed Record of the Native Operculate Apple Snail Ampullariidae *Pomacea* (- *Asolene*, *Pomella*) *megastoma* (Sowerby, 1825) in the Chapecó River Basin, Western Santa Catarina State, Central Southern Brazil

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The town of Carlos Dahne (~ 26°73'33"S & 52°63'33"W, see Figure 1), not far south of the Salto Saudades, a prominent local waterfall (Figure 2), is located in the Quilombo Municipal District, at an average altitude of 425 meters above sea level (~ 26°43'34"S & 52°43'14"W, bordering with the Municipality of São Domingos). The Chapecó River is an important tributary of the Upper Uruguay River Basin, in the Western Malacological Region, Region 3, in Santa Catarina State/ SC, Central Southern Brazil (Agudo-Padrón 2018 a: 58-Fig. 1). The mollusks present in this region of the State have been very poorly studied so far, with only some scarce and local records of malacofauna (see Agudo-Padrón 2012:21-22 and Agudo-Padrón 2017, besides Agudo-Padrón and Lisboa 2013).

On September 05, 2021, during a technical inspection of a recreational fishing area in the in the town of Carlos Dahne, professional Military Firefighter Saida Lina Agudo-Blondell (a AM Project field collaborator) found two complete dead shells of an operculate gastropod (Figure 3) that he forwarding to us for recognition and taxonomic determination. These shells were found among rocks in the middle of the riverbed, an area exposed during a strong drought period. Accompanying malacofauna observed in the area included "absurdly abundant" shells, disarticulated valves, and live specimens of the exotic invasive freshwater Asian clam *Corbicula largillierti* (Philippi, 1844) (Figure 3).

Figure 1. Location of Quilombo Municipal District (Map – red color), and the Carlos Dahne collection site and the nearby Salto Saudades waterfall (Google map -- blue and red dots, respectively), all in the Western region of Santa Catarina State/ SC, Central Southern Brazil.

After examination and analysis, the the two shells were identified as the apple snail Ampullariidae *Pomacea* (- *Asolene*, *Pomella*) *megastoma* (Sowerby, 1825), a native limnic/freshwater operculate snail endemic and representative of the Uruguay River hydrographic basin (Agudo-Padrón 2013, 2014). This is the first confirmed record of this species from this location on the Chapecó River.

So far, only six species of limnic/freshwater molluscs (two native operculate gastropods and four bivalves) have been documented to occur in the upper part of the Chapecó River watershed. The gastropods are Ampullariidae *Pomacea megastoma* (Sowerby, 1825) and Tateidae (= Hydrobiidae) *Potamolithus* sp. The bivalves are two exotic invasive clams [Cyrenidae *Corbicula fluminalis* (Müller, 1774) and *Corbicula largillierti* (Philippi, 1844)], and two native naiads [Hyriidae *Diplodon* (*Rhipidodonta*) *koseritzi* (Clessin, 1888) and *Rhipidodonta rhombea* (Wagner, 1827)].

Two other invasive exotic bivalves also may be present in the Upper Chapecó River. Recent reports -- not yet confirmed by specimens or photographs -- indicate that the invasive Asian golden mussel Mytilidae *Limnoperna fortune* (Dunker, 1857) now occurs around hydropower plants and in the main channel upstream in this river. And the invasive freshwater Asian clam Cyrenidae *Corbicula fluminea* (Müller, 1774) also is likely to be present in the river system (Agudo-Padrón 2017).

Figure 2. Views of the Upper Chapecó River Basin near the town of Carlos Dahne (upper photographs) and the Salto Saudades waterfall (lower photograph), all in the Quilombo Municipal District in the Western region of Santa Catarina State/ SC, Central Southern Brazil. All location and shell photographs by Saida Lina Agudo-Blondell.

Figure 3. Native operculate apple snails Ampullariidae *Pomacea* (- *Asolene*, *Pomella*) *megastoma* (Sowerby, 1825) and exotic invasive freshwater Asian clam *Corbicula largillierti* (Philippi, 1844) found in the Upper Chapecó River in the town of Carlos Dahne, Quilombo Municipal District in the Western region of Santa Catarina State/ SC, Central Southern Brazil.

References:

Agudo-Padrón, A.I. 2012. Two new freshwater mussel records from the Upper Uruguay River Basin region in Santa Catarina State/ SC, Central Southern Brazil. *Ellipsaria*, 14(3):21-24.

Agudo-Padrón, A.I. 2013. New geographical record of the Neotropical apple snail *Asolene* (*Pomella*) *megastoma* (Sowerby, 1825) in the Upper Uruguay River Basin, Southern Brazil. *Ellipsaria*, 15(1):21-24.

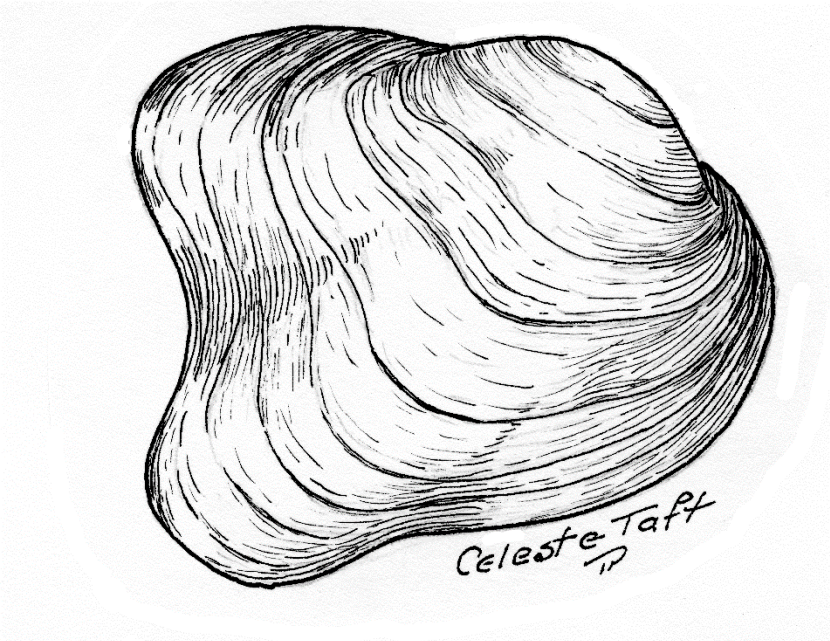
Agudo-Padrón, A.I. 2014. Confirmed occurrence of the freshwater snail *Pomella megastoma* (Sowerby, 1825) in the "Arapey Chico River", Oriental Republic of Uruguay, South America. *Ellipsaria,* 16(3):15-16.

Agudo-Padrón, A.I. 2017. Another invader among us: first confirmed record of the invasive non-native Asian clam *Corbicula fluminalis* (Müller, 1774) in Santa Catarina State, Southern Brazil. *Ellipsaria,* 19(3):28-30.

Agudo-Padrón, A.I. 2018a. Revised and updated systematic inventory of non-marine molluscs occurring in the state of Santa Catarina/SC, central southern Brazil region. *Advances in Environmental Studies*, 2(1):54-60. Available online at: https://scholars.direct/Articles/environmental-studies/aes-2-007.pdf?jid=environmental-studies&fbclid=IwAR0jVKm3aMwsKV0gxiVCuJd2HT1pxo4xFjf4Y91atMhChKfmIYYqd9Ww3z4

Agudo-Padrón, A.I. 2018b. About the spatial advancement of the invasive Asiatic golden mussel *Limnoperna fortunei* (Dunker, 1857) in Santa Catarina State/ SC, Central Southern Brazil: a new geographical record. *Ellipsaria,* 20(4):54-55.

Agudo-Padrón, A.I. and Lisboa, L. K. 2013. First record of the freshwater mussel/ naiad *Rhipidodonta rhombea* (Wagner, 1827) (Unionoida: Hyriidae) from Upper Uruguay River Basin region in Santa Catarina State, Central Southern Brazil. *Ellipsaria*, 15(2):33-35.



Epioblasma flexuosa (Rafinesque, 1820).

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

Articles contributed to *Ellipsaria* should be preliminary or initial observations of note (e.g., natural history observations, meaningful new distribution records, interesting finds, etc.) concerning freshwater mollusks, their habitats, and/or their conservation. Articles that include quantitative analyses, draw conclusions based on analyses, or propose taxonomic revisions should not be submitted to *Ellipsaria* and, instead, should be submitted to a peer-reviewed journal such as *FMBC*. Please limit the length of contributed articles to about one page of text (i.e., excluding pertinent tables, figures, and references).

Information for possible inclusion in *Ellipsaria* should be submitted via e-mail to the editor, John Jenkinson, at jjjenkinson@hotmail.com. 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, but the editor may be able to convert other formats. Graphics should be in a form that can be manipulated using PhotoShop. Note that submissions are not peer-reviewed but are edited for clarity and checked for appropriateness for posting in this freshwater mollusk newsletter. Feel free to contact the editor with questions about possible submissions or transmission concerns.

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

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Parting Shot

A long-standing FMCS tradition has been for the outgoing President to hand over "The Horns" of his or her office to the incoming President during our biennial Business Meeting. More recently, each outgoing President has added to the "decoration" on The Horns as a reminder of her or his tenure. In 2019, Heidi Dunn added a Kansas University Jawhawk to The Horns before presenting them to Jeremy Tiemann (a KU alumnus) and, during our virtual Symposium in April 2021, Jeremy added a face mask for the Jawhawk. Because of COVID-19 concerns, Jeremy was not able to physically hand The Horns over to Stephen McMurray (on the right in this picture) until later in the summer. Regardless of the smile on his face, it is not at all clear that Stephen (a University of Kentucky alumnus/supporter working in Missouri) will be able to keep the still-Kansas-promoting Horns anywhere except in a dark closet until he can pass them on to the next President. [Football rivalries can lead to deep-seated feelings even among professional malacologists and their coworkers.] Photograph by Carter Tiemann.

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