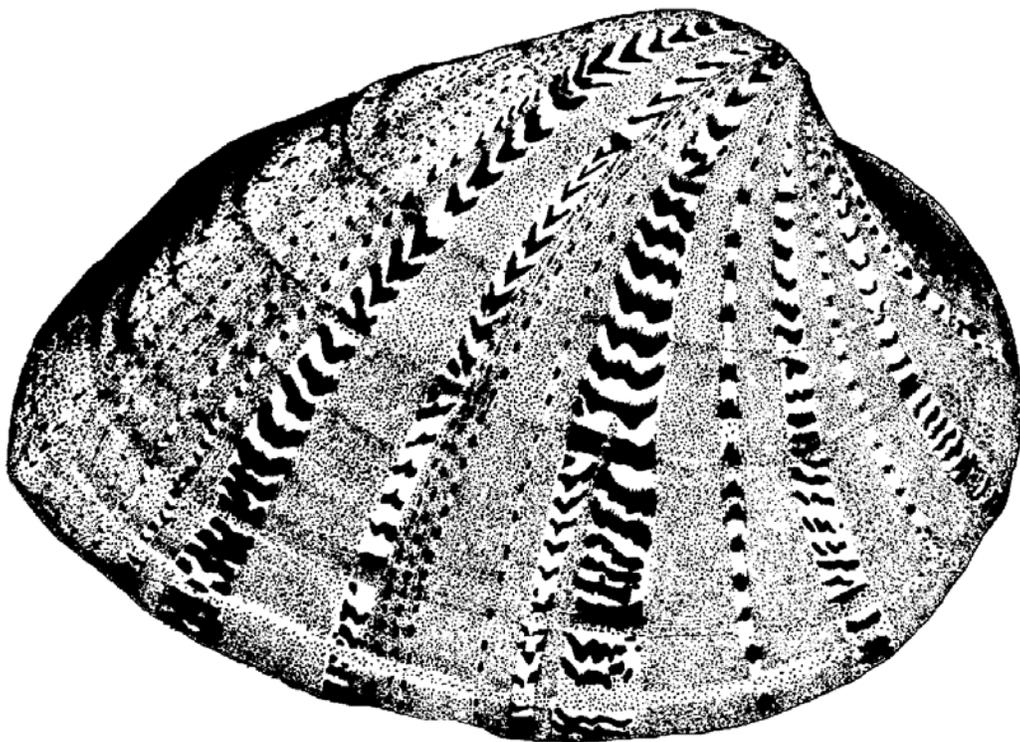


Ellipsaria

The Newsletter of the Freshwater Mollusk Conservation Society

Volume 11 - Number 3

December 2009



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Submissions for the April 2010 issue of *Ellipsaria* may be sent to the editor at any time but are requested by **March 19, 2010**. Anyone may submit an article but you must be a member of FMCS to receive *Ellipsaria*. Please limit submissions to about one page. Categories for contributions include news, new publications, meeting announcements, current issues affecting mollusks, job postings, contributed articles (including ongoing research projects), abstracts, and society committee reports. Electronic submissions are preferred; contact the editor with any questions. Note that submissions are not peer reviewed, but are checked for content and general editing.

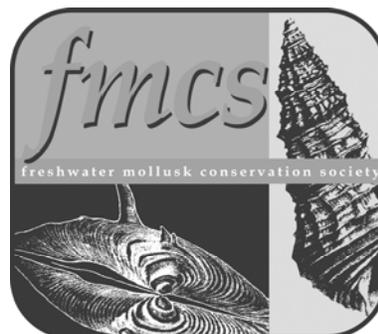
Please send change of address information to the Secretary.

Ellipsaria

NEWSLETTER OF THE FRESHWATER MOLLUSK CONSERVATION SOCIETY

Volume 11, No. 3 <http://ellipse.inhs.uiuc.edu/FMCS/> December 2009

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President's Message

Foster the Momentum

Symposia and workshops of the FMCS are our life blood of personal and professional interactions as a Society. Our meetings for me are like a great big family reunion of sorts where I can re-connect with friends and colleagues, meet new members, and learn about the latest research findings. I always return to my daily job duties energized, enthusiastic, and positive in the outlook that we as a Society and as individuals are making a real difference in the protection and conservation of our molluscan resources here in North America and world-wide. I sincerely hope that you as members feel and believe much the same as I. It's hard to believe, but it has been seven months (probably eight by the time this newsletter gets to your mailbox) since we were together for the 6th Biennial Symposium in Baltimore, Maryland. As we all have gotten back into our daily routines with the many pressures and deadlines, it's often easy to lose sight of the enthusiasm, good intentions, and promises that we made to ourselves (and perhaps to others) while we were at the Symposium riding the good wave. Fortunately, this Society is blessed with many members who foster the momentum from the symposia and workshops and accomplish the real work of the Society while balancing their other duties and obligations; these are our Committee Co-Chairs and Members. This is especially true now, and over the next two years, as we transition toward greater efficiency and member services in our organizational structure and operation and make real positive impacts for the natural resources we value. Just to highlight a few of these activities, plans are in place and moving forward to offer a "new and improved" web presence to the public and a secure section for members that will include the ability pay dues, register for meetings, and access our newsletter and our new scientific journal, also a major undertaking that is taking shape. Of course, planning for the 2010 Workshop on regional identification and sampling in St. Louis Missouri and the 2011 Symposium in Louisville, Kentucky are also in full swing. I encourage you to read more about these plans and opportunities elsewhere in the newsletter and to do your part to keep the momentum going by making time to help accomplish the business of the Society through a Committee of your choosing. ---All the best, Greg



**Freshwater Mollusk Conservation Society
2010 Workshop – Regional Fauna
Identification and Sampling**

'Show-Me' your umbones!

The 2010 workshop of the Freshwater Mollusk Conservation Society will be held October 19 – 21, 2010 in Kirkwood, Missouri. The workshop will focus on regional fauna identification and sampling techniques. A panel of regional fauna experts representing Texas, Gulf Coast, upper Ohio Basin, Southeast U.S., Mobile Basin, Atlantic Slope, Cumberlandian, Interior Basin, Western U.S., and the Ozark regions has been assembled. The experts will give presentations on mussels unique to their area, common species shared with other regions that “just look different here”, and the ever popular “problem children”. They will also give tips and pointers on unique collecting methods used in the region. Additional experts will give presentations on general freshwater mussel identification and sampling techniques. In addition to presentations, there will be ample time to view representative specimens from the regions, and time to spend discussing characters with the experts.

The workshop will be held at Missouri Department of Conservation’s Powder Valley Conservation Nature Center (<http://www.mdc.mo.gov/areas/cnc/powder>), located in a 112 acre oak-hickory forest just southwest of St. Louis, Missouri in the lower Meramec River watershed. In addition to 2 floors of exhibits, a large aquarium, and 3 hiking trails, the center has 3 classrooms and a 250 seat auditorium. Powder Valley is located at the intersection of Interstates 270 and 44 just southwest of St. Louis, Missouri, and is easily accessible from multiple Interstates and Lambert-St. Louis International Airport. We have secured a block of rooms for workshop attendees at the Holiday Inn Southwest Viking Conference Center (www.stlouis.com/holiday-inn-southwest). Registration will include box lunches for Tuesday and Wednesday and a social on Tuesday night. There are numerous nearby dining and entertainment options and downtown St. Louis is reasonably accessible.

Following the workshop, field trips to the nearby Meramec River, Mississippi River and the U.S. Geological Survey’s Columbia Environmental Research Center are planned.

Be sure to register early, as we will have to limit the workshop to 200 attendees.

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

**FMCS Board Meeting
Conference Call
December 7, 2009**

9:30-Noon Eastern Time (8:30-11:00 Central)

Call to Order and List of attendees:

Gregory Cope (President / Awards Committee)
Steve Ahlstedt (Past President)
Caryn Vaughn (President – Elect)
Heidi Dunn (Treasurer)
Greg Zimmerman (Secretary)
Paul Johnson (Gastropod Status & Distribution Committee)
Steve McMurray (Environmental Quality & Affairs Committee)
Tom Jones (Outreach Committee)
Art Bogan (Mussel Status & Distribution Committee)
Teresa Newton (Awards Committee)
Emy Monroe (Awards Committee / Genetics Committee)
Andy Roberts (Outreach Committee)
Jeff Powell (Gastropod Status & Distribution Committee)
Ryan Evans (Environmental Quality & Affairs Committee)
Rachael Mair (Propagation, Restoration, & Introduction Committee)
Tom Watters (Information Exchange Committee)

A quorum is present for the official meeting of the Board of Directors of FMCS.

BOARD MEETING AGENDA

Call to Order and Roll Call for Attendance

Approval of 04-19-2009 Board Meeting Minutes (see April 2009 Ellipsaria)

Treasurer Report - Heidi Dunn

Revision to membership term and dues (2 year membership, renew at symposium)

Secretary Report – Greg Zimmerman

Committee Reports

2010 Workshop Update – Steve McMurray, Heidi Dunn, others

2011 Symposium Update – Leroy Koch, Monte McGregor

Outreach Committee – Andy Roberts, Tom Jones
Status of FMCS Web Site Revisions

Information Exchange – Tom Watters, John Jenkinson
Status of Journal: Pricing for old *Walkerana* volumes—discount to move – Greg Cope for Kevin Cummings

Awards Committee – Teresa Newton, Emy Monroe, Greg Cope
Status of best paper judging form revision

Environmental Quality and Affairs - Ryan Evans, Steve McMurray

Gastropod Status and Distribution - Paul Johnson, Jeff Powell

Genetics - David Berg / Emy Monroe

Guidelines and Techniques - Chuck Howard, Janet Clayton

Mussel Status and Distribution - Arthur Bogan, Jim Williams

Propagation, Restoration, and Introduction - Tony Brady, Rachel Mair

Ad Hoc National Strategy Update - Rachel Muir

Other

- Need ideas and sponsors for 2012 FMCS workshop (topics, location, sponsor)
- Need ideas and sponsors for 2013 FMCS symposium
 - Guntersville State Park, Alabama (Paul Johnson)?
- Transition to electronic newsletters-pdf, send e-mail, post to web site for viewing

[End of Agenda]

04-19-2009 Baltimore Board Meeting Minutes – The minutes were reviewed and found to be in order. Heidi Dunn made a motion to approve the minutes, Steve Ahlstedt seconded. The motion carried.

12-07-2009 Board Meeting Summary – We investigated whether the bylaws would need to be adjusted for bi-annual dues and found that they did not need to be amended. A motion was proposed by Steve McMurray and seconded by Teresa Newton to change the membership to a 2-year system, with dues payable at the biannual symposium and the motion carried. Based on expected Walkerana costs per issue, a dues increase from \$30 to \$50 was proposed for regular members, which would take effect at the 2011 symposium. An Ad Hoc Committee was proposed to post the bylaws on the website.

The details of the **2010 Workshop** in MO were discussed. The workshop will have taxonomic experts from various regional fauna's and be held at a wildlife center approximately 35 miles from the St. Louis Airport. A shuttle service is being arranged and FMCS members can coordinate their flights with shuttle volunteers. Technical details to the workshop attendance application were reviewed so that the flyers could go in the next Ellipsaria and be incorporated into an interactive form that will be on the website

The Outreach Committee has been working on bringing the **new website** up and incorporating the elements of the existing INHS site into the new site. Andy Roberts through USFWS funding donated a beautiful new website worth well over 100K. Paul Johnson will work with the website developers, Andy Roberts, and Tom Jones to incorporate Gastropods into the new site, and Gastropods will have a dedicated page. The website will be hosted at Marshall University on its state-of-the-art server for free, with site maintenance performed by Marshall students under an annual stipend (\$1500 per year). The server has nearly unlimited capacity for files, photos, and video. The website will allow members to self-service their addresses and pay for memberships via PayPal. Heidi is working with PayPal to get set up. We are getting a reduced overhead rate from PayPal due to our non-profit status. One issue is the new banking and credit card rules are causing

everything to change but a PayPal Account manager is working with Heidi to get everything set up.

The **Information Exchange Committee** has been working on bringing the *Walkerana* journal to life (see committee report). The journal will be in electronic form only. While this will preclude the listing of new taxa, the advantages outweighed the cons. We are going to look into services such as BioONE or other electronic services. Per Heidi Dunn - for BioONE, we will need to renew our AIBS membership. Heidi will contact AIBS / BioONE and look into membership issues and fees. A motion was approved to provide 10K to start up *Walkerana* (see New Business). Tom Watters will be the Journal Editor and he is currently taking nominations for members of the Editorial Board, who will assist with reviewing manuscripts, please contact Tom Watters or John Jenkinson for more information.

The **Awards Committee** proposed improvements to the judging forms following feedback from the Baltimore Symposium. They asked other professional societies how they judged student poster and platform presentations. Several of the surveyed societies use a ranking system to try to reduce some of the inherent variability in how individual judges score presentations. We will try such a system at the 2011 annual meeting.

The **Environmental Quality and Affairs Committee** has been active in writing and submitting letters in comments pertinent to the protection and conservation of molluscan and aquatic resources.

Paul Johnson from the **Gastropod Status and Distribution Committee** requested a list of its committee members. Greg Zimmerman will provide Paul with a list of what he has to date. Paul indicated that it was unfortunate that no Gastropod Status and Distribution meeting was held in Baltimore because due to a scheduling error the meeting was scheduled for before Jeff Powell could arrive.

The efforts of the **Guidelines and Techniques Committee** were discussed per Chuck Howard / Janet Clayton's status report. The committee is investigating certifications similar to AFS or other models. The topic of liability with a true certification program was discussed and examples of problems with the AFS system and turn-around. It was again suggested that in the interim the FMCS could develop a suggested level of standards for mollusk collectors.

The **Mussel Status and Distribution Committee** reported that Art Bogan and Jim Williams will be meeting the first week in January to review the Canadian distribution of unionids.

The **Propagation, restoration, and Introduction Committee** noted they have completed no new activities since the Baltimore meeting but were working on compiling a list of propagation facilities in 2010.

The **Ad Hoc National Strategy Update Committee** was discussed. It was noted that the document does not include snails and the document is beginning to get dated. The original plan was to have all the committees work on their

respective sections. Greg Cope will work to get the initiative up and running again and it was added as an action item.

Treasurer's Report –
Submitted by Heidi Dunn

Treasurer's Report December 2009

As of December 2009	Checking	\$2,561.16
	Savings	\$79,819.86
	Petty cash	\$120.00
	Total	\$82,501.02
Year to Date	Income	
	Interest	\$365.34
	Memberships	\$7,370.00
	Raffle/Auction	\$4,673.92
	Symposium	\$20,047.68
	SBC workshop (2008)	\$3,822.00
	Total income	\$36,278.94
Expenses	Office supplies (cash box)	\$29.12
	T-shirts (all sold)	\$521.52
	Ballot mailing	\$172.81
	Newsletters	\$4,587.28
	Annual registration fee	\$10.00
	Checks	\$106.44
	Credit card fees	\$463.49
	Hats	\$1,518.40
	Symposium	
	Student awards	\$3,780.16
	Other expenses	\$3,494.01
	Total expenses	\$14,683.23
	Net Income	\$21,595.71

Net income of \$21,595.71 was basically income from Baltimore symposium and auction. We broke even on other expenses and income. The total of Checking, savings, and petty cash is what we have in the bank. \$82,501.02

Outstanding issues-a potential dues cost increase will be the considered next year after the initiation of *Walkerana*.

Secretary's Report –
Submitted by Greg Zimmerman

I will work to get the most recent Society's bylaws added to the excellent new website that is in the works. Hopefully, upcoming website improvements will minimize these problems and help keep the society growing, and improve communication between committee members.

In an effort to reduce redundancy and get all of the information in the same place, some of the Board Meeting discussions have been appended to the Committee reports below.

Committee Reports

All members are encouraged to join and be active in FMCS committees. Are you in a committee? Why not, it's free! If you are not in a committee, please consider joining one. If you are in a committee, consider contacting your committee chair to find out how you can help. Each Committee should be working on compiling information for revisions to the next Mollusk National Strategy. You don't have to wait until the next meeting! See the FMCS website for the respective committee chair's contact information or contact the Secretary.

Awards Committee –

Submitted by Teresa Newton, Emy Monroe and Greg Cope

(Note: Dr. Emy Monroe has agreed to co-chair the Awards Committee in addition to Greg Cope and Teresa Newton.)

Based on feedback from judges at the 2009 FMCS meeting in Baltimore, MD, the awards committee is revising their student judging forms. We have examined student judging forms from other professional societies and have tentatively selected a revised form. The revised judging forms (one for student platform presentations and one for student poster presentations) will use a ranking system that we hope will reduce the inherent variability in how judges score presentations and still be easy to implement and tally. Abstracts will be judged on both platform and poster presentations. However, abstracts DO NOT need to be present on posters, as judges can review the abstract in the FMCS program book.

Environmental Quality and Affairs –

Submitted by Ryan Evans

2008-2009 Synopsis

The Environmental Quality and Affairs (EQA) Committee has worked on the following activities in 2009:

- 1) Developed 3 public comments for the society:
 - Section 7 consultation letter (**for** supporting the reinstatement of formal consultation)
 - Revision of the NW21 law under SMCRA (**against** the use of NW 21 permits under SMCRA)
 - Support letter for the Texas mussel listings (**for** the listing of several rare mussels by the state)
 - Reviewed, but did not comment on, Nonnative Wildlife Invasive Species Act. FMCS will redress issue if bill makes it out of committee.
 - Upcoming – Letter to comment on upcoming SMCRA revisions and letter to State of North Carolina and City of Raleigh to oppose activities in the Little River Basin (reservoir development, wastewater treatment plant)
- 2) Organized a number of public comments and placed them on the FMCS website; please send Chris Mayer any older public comments you might have done on behalf of FMCS (comments posted under EQA section of website)
- 3) Met at the Baltimore Meeting

Gastropod Status and Distribution Committee –

Submitted by: Paul D. Johnson, Committee Chair

AFS / FMCS Gastropod Conservation Status Checklist:

A review of the database was completed by the committee in the summer of 2009. The revised committee includes several Canadians in addition to US reviewers. Jeff Garner and I have compiled the comments from the reviewers into a final draft. As of today, 702 species across 16 different families are currently recognized in the database. The revised database will be sent to the committee for a final review, but only with a draft of the final article. Members from both the gastropod and mussel review committees will meet in early January to continue drafting the articles to accompany each database. It is the goal of both committees to have an article and database submitted to ASF by the end of the year.

The purpose of the database will be the completion of an AFS Status Review for North American Freshwater Gastropods. The status review will be similar to the Taylor et al. and Jelks et al. articles recently published for crayfishes and fishes, respectively. The list will rank known conservation status of currently recognized species of North American gastropods (U.S. and Canada). The list excludes exotic species but includes native introductions. Lists comprised for each state and province are historic, and do not reflect current distribution patterns.

The conservation database and other general information will finally be more easily disseminated to interested members on the improved FMCS website. A revised website is currently under development and additional information can be posted at that site.

Listings:

There are 2 Coosa River Basin snails currently proposed for listing as endangered by the US Fish and Wildlife Service, under the endangered species act. These species are the Rough Hornsnail, *Pleurocera foremani*, and the Interrupted Rocksnail, *Leptoxis foremani*. A proposed rule has been drafted and the initial public comment period has closed. A public meeting should be held sometime next February. In addition to the snails, the rule also proposes listing of the Georgia Pigtoe, *Pleurobema hanleyianum*, also a Coosa River Basin endemic, as endangered. A final rule is expected to be complete by June 2010.

Members interested in commenting on the webpage or database should contact Paul Johnson at: paul.johnson@dcnr.alabama.gov

Genetics Committee –

Submitted by David Berg

The Genetics Committee met at the FMCS meeting in Baltimore. At that time, we discussed priorities for the committee and ways in which the committee might work with the Propagation Committee to better inform captive management of freshwater mollusks. We agree to continue this discussion electronically. At this point, we have not yet begun such discussions.

Guidelines and Techniques Committee –

Submitted by Chuck Howard and Janet Clayton

We will be sending out assignment tasks for two committee initiatives to committee/interested members over the next couple weeks:

1. Mollusk Taxonomy Education / Certification Program, and;
2. Mollusk Field Survey Methods Education / Certification Program

Several people will be assigned to each working group for evaluating and defining each task that supports the above initiatives. Tasks include things like Program Format, Certification Level, Geographic Criteria, Oversight Committee, Testing, Funding, etc. I'll have some time off in December, which will give me some time to get these actions rolling. We ask that we send out another general call-out to members interested in working on these initiatives that were not able to make it to the committee meetings at the last meeting. They can email me directly (copy Janet Clayton). We also think creation of a SharePoint site for coordinating and posting/reviewing parts of these initiatives would really facilitate the development and communication process. We cannot create one for outside use at our agencies, but I ask if anyone can provide some insight / support on this, it would be very much appreciated.

Following the board meeting Chuck Howard clarified via email that “while we’ve considered the idea of ‘certification’, including models by AFS and NABS, I would not say that we’ve ever seriously considered the AFS model of ‘professional certification’ as a viable path for our group. [The] NABS model of a taxonomic identification testing program is, I think, a viable proposition. I agree with the concerns regarding certification and the notion that we should strive for more of an educational format; however, I think some sort of regional evaluation on taxonomic skills and general field / collection methods is acceptable and would be quite valuable for regulators evaluating permittees without the potential legal implications (and perhaps burden) of a formal certification process.”

Mussel Status and Distribution Committee –

Submitted by Art Bogan

Distribution Committee:

The distribution atlas committee has not been able to attract any funding to support the required museum visits to document the historical distribution of the freshwater mussels of North America. We are exploring new avenues to fund the work necessary to compile the data necessary to complete the atlas. John Alderman and I, in collaboration with about 12 others, have taken a new approach to examine the modern distribution of the freshwater mussels of the south Atlantic Slope. This region includes the Atlantic Coast rivers from Maryland south to north Florida. We have gathered together information from the state agencies for most of the five included states. We have worked with the state agencies to donate their survey data on freshwater mussels and are in the process of incorporating this data as layers in ArcGIS. All species distribution maps will be published at the 8 digit HUC units and no dot maps will be provided. This project can be used as a new focus to bring together the first cut of

information on a particular state through the cooperation of agencies responsible for collecting distribution data. I work for a state agency and have agreed to host the various state’s data on a secure server with no external access or third party access. We are suggesting the South Atlantic Slope Atlas might be a first step to gathering regional data to work toward a national atlas. However, you still have to be careful of the identifications.

The AFS Committee on the status of freshwater mussels of North America chaired by Jim Williams is nearing completion. This committee includes participation of members from Canada and Mexico. We have initiated a preliminary list of the freshwater mussels of Mexico. This committee is meeting the first week of January, 2010 to finalize the report and it will be sent to Fisheries in February. It would be good if we are able to place Freshwater bivalve conservation assessment on the FMCS website.

PLEASE NOTE MY NEW EMAIL ADDRESS
arthur.bogan@ncdenr.gov

Outreach Committee –

Submitted by Andy Roberts

Co Chairs: Tom Jones and Andy Roberts

We are working with Sophie Binder Designs to create a new website for FMCS. Our goal is to create a website that is attractive, interesting, and informative to the public while announcing current events of the society and serving members. The site will eventually replace the current FMCS web page that has served our members so well. However, no information from our current site will be lost.

The new FMCS web site features a new, digitally remastered logo and many pages of exciting photos (donated by FMCS members) and information on mussel/snail biology and conservation. The new site will soon be capable of handling financial transactions related to new memberships, membership renewal, and registration for workshops and symposia. Our goal is to have the site online by February 2010. At that time the site will be transferred to Dr. Tom Jones at Marshall University, WV where it will be maintained and developed further.

Propagation Committee –

Submitted by Tony Brady and Rachel Mair

There has been no activity in the committee due to the field season. We are planning a conference call with the rest of the committee after the first of the year to start generating names and facilities that are actively producing mussels. Please contact Tony Brady if you would like more information.

2011 Symposium Committee –

Monte McGregor Chair

No report submitted.

2010 Workshop Committee –

Submitted by Steve McMurray

FMCS is pleased to host a workshop on regional fauna identification and sampling October 19-21, 2009 in Kirkwood, MO. Please see the announcements in *Ellipsaria* and register today. Space may be limited.

Information Exchange Committee / *Walkerana* Journal –

Submitted by G. Thomas Watters and John J. Jenkinson

We make the following recommendations for *Walkerana*.

1. Maintain the name *Walkerana* (at least for now).

a. Reasons.

- i. Name established and known to malacologists.
- ii. Name already has ISBN number. A new name would require reapplying for a new number.
- iii. Add “Journal of the Freshwater Mollusk Conservation Society” as a subheading during at least first two years.

b. Suggestions.

- i. Ask Dr. Burch to supply a foreword to the new journal with a brief history of *Walkerana*'s original genesis.
- ii. Follow this with a foreword from the new Editor.

2. Scope of content.

a. Original research relating to any and all aspects of the lives of freshwater mollusks.

- i. Reports of survey allowed but must have heuristic value. Must include pertinent ecological and/or historical background, and make comparisons with other survey results.
- ii. Host identifications but must compare with other work.

b. FMCS Symposia and workshop proceedings.

c. Content not acceptable.

- i. *Ellipsaria*-related items.
 1. Announcements.
 2. Membership lists.
 3. Brief notes of a parochial nature.
 4. Minutes and reports of committees.
- ii. Material unrelated to freshwater mollusks.
- iii. Descriptions of new taxa (see below).

3. Issues.

- a. Twice-yearly, at least initially. Expanded to three or more times yearly depending on success and number of submissions.

4. Electronic format only.

a. Benefits.

- i. Minimal cost.
 1. No cost for shipping.
 2. No cost for printing.
 3. No cost for storage of back issues.
 4. Little or no increase in membership dues.
- ii. Portable operation.
- iii. Green.
- iv. Rapid turn-around of issues.

b. Costs.

- i. No hard copies placed at libraries.
- ii. Members without computers will be left out.
- iii. No new taxa may be published in purely electronic formats (ICZN 9.8).

c. Access.

- i. Full PDF of complete number or individual papers to paid FMCS members only.
- ii. Access controlled by password through an FTP site. Several software packages are available for this task. [FMCS web site?]

iii. Suggestions.

1. Make abstracts available to anyone. This may generate new memberships.

d. Submission.

- i. Manuscripts may be submitted on removable media – no purely hard copies allowed.
- ii. Manuscripts may be uploaded directly to journal web site.
 1. Software used for downloading can be used to upload.

e. Maintenance.

- i. Journal and software should be maintained on a remote server with proper firewall protection. [FMCS web site?]
- ii. All numbers should be backed up to removable media and stored in a protected place.

5. Staff.

a. Editor with at least one assistant, serving at his/her pleasure.

i. Tasks.

1. Distributes submitted manuscripts to relevant reviewers.
2. Makes final decisions on acceptance based on reviewers' suggestions.
3. Communicate with authors to resolve issues and make corrections.
4. Make final compositional changes to manuscripts.
5. Posts completed number to website.

b. Panel of reviewers.

- i. At least two panel members per subject area.
- ii. Reviewers may seek additional reviews from outside the panel.
- iii. Potential subject areas.
 1. Conservation.
 2. Phylogenetics.
 3. Survey methodology.
 4. Ecology.
 5. Basic biology (reproduction, morphology, etc).
 6. Toxicology.

c. Graphic designer / compositor.

- i. Paid position on “as needed” basis.
- ii. Original setup of journal.
 1. One time cost.
 2. Design template, cover, etc. for journal.
- iii. Composition of numbers.
 1. Paid per issue.
 2. Takes edited, copy-ready manuscripts and graphics from editor and adds to template to form complete number.
- iv. Suggestion.
 1. Graphic designer / compositor staff should be located physically near the Editor for best efficiency.

6. Budget.

- | | |
|--------------------------------------|---------|
| a. Software for hosting site. | > \$500 |
| b. Journal setup | \$5,250 |
| c. Composition per number of journal | \$2,750 |

OLD BUSINESS

National Strategy – Status? In 2007 it was agreed to have committees take their piece of conservation strategy and revise and present in March 08, with Rachel Muir to take the lead. To date this has not been accomplished. We also need a synopsis of what has been accomplished to date; this could be included as an appendix. We also still need electronic version of the original document in word format. The Tennessee / Cumberland mussel conservation strategy is basically complete and can be used as a template as well.

FMCS Chapters – This item was tabled due to the potential legal issues with FMCS being represented by or liable for other group's actions. This was tabled again until the current pressing issues of *Walkerana* and the new website have been resolved.

NEW BUSINESS

Walkerana – A motion to provide \$10,000 for the start of the Walkerana Journal was proposed and seconded. All were in favor.

Membership Fees – Starting in 2011, dues will be paid once every two year. Students will have the added benefit of an additional year at the student rate one year following graduation. Dues will remain the same until the new journal is up and running to determine if fees needed to be increased. The cost of the journal is expected to be relatively low but there may be unforeseen costs.

ACTION ITEMS

- National Strategy (needs to be Revised)
- FMCS Chapters (look at NABS model)
- PDF Past Ellipsarias to be accessed via the new website
- FMCS Recommendations for Collector Qualifications

Motion to adjourn seconded and, all in favor.

Submitted by Greg Zimmerman, FMCS Secretary

Membership Renewals

Membership dues are collected annually at the beginning of each year. Please complete the enclosed renewal form and return it with your dues to Heidi. Additional forms are available on the FMCS website.

Announcements & News

Maryland Mussel Workgroup Meeting January 14th, 2010, Annapolis, Maryland

We will be holding the second meeting of the Maryland Mussel Workgroup on January 14th, 2010 at the Maryland Department of Natural Resources, Tawes Building in Annapolis, Maryland. Past participants have included state, federal, and regional biologists interested in and working on freshwater mussels in the state, but the meeting is open to anyone interested. This year the meeting is centered around a seminar on population estimates and ecological services of freshwater mussels in the Upper Delaware River presented by Dr. Bill Lellis of the U.S. Geological Survey, Wellsboro, PA. Topics reported on by agency representatives include updates to the distribution and status of Maryland's mussels, recently completed and ongoing work, research and conservation priorities, and ways to collaborate. For further information on the meeting, contact Matt Ashton: mashton@dnr.state.md.us or (410) 260-8604.

MSc Student Opportunity in Aquatic Ecology, River Studies Center, University of Wisconsin-La Crosse

Graduate student support is available for a graduate student (MSc) interested in working on a multidisciplinary research project entitled "Modeling the response of imperiled freshwater mussels to anthropogenically induced changes in water temperature, habitat, and flow in streams of the southeastern and central United States". The successful applicant will be expected to develop an independent research project to explore the thermal thresholds of juvenile and adult mussels based on physiological traits. This is a joint project between the U.S. Geological Survey and the University of Wisconsin-La Crosse. The student would work jointly with Dr. Teresa Newton (who studies mussel ecology) and Dr. Roger Haro (who studies the biology of benthic invertebrates).

The University of Wisconsin-La Crosse recognizes and appreciates the importance of water to the competing forces of agriculture, business, recreation, and nature. Consequently, freshwater is a focus of teaching and research in the Department of Biology. At the graduate level, the Department offers an Aquatic Science Concentration to prepare students for exciting and challenging careers in the study and management of freshwater resources. Many graduate students in the program are associated with the River Studies Center (Center) at the University of Wisconsin-La Crosse which was established in 1972 to facilitate the University's scientific involvement with environmental and resource management issues pertinent to the Upper Mississippi River. The Center has become nationally recognized for its investigations of non-point source pollutants in rivers, streams, lakes, and wetlands.

Selection will be based on undergraduate grades (GPA), GRE's (minimum combined score of 1100 on v-GRE & q-

GRE), and letters of reference from at least three persons with sufficient knowledge of the applicant's potential for research. Students with proven experience in measurement of physiological rates are encouraged to apply.

All applicants must be United States citizens. Under regulations contained in the Immigration Reform and Control Act of 1986, employment in this position is limited to those persons who are authorized to work in the U.S. Verification of employment eligibility will be required at the time of appointment.

Prior to or at the time of appointment, male applicants born after December 31, 1959, will have to certify that they have registered with the Selective Service system in order to be appointed to a position with the U.S. Geological Survey, unless legally qualified for an exception.

Selection for this position will be based solely on merit, fitness, and qualifications without regard to race, sex, color, religion, age, marital status, national origin, non-disqualifying handicap conditions, sexual orientation, parental status, or any other non-merit factors.

Support: In-state (Wisconsin) tuition and an annual stipend, renewable for an additional year.

Starting Date: January 2010 (preferred), June 2010 (acceptable)

Interested students should contact:

Dr. Roger Haro
River Studies Center
University of Wisconsin-La Crosse
La Crosse, WI 54601, USA
email haro.roge@uwlax.edu

or
Dr. Teresa Newton
U.S. Geological Survey
Upper Midwest Environmental Sciences Center
La Crosse, WI 54603, USA
email newton@usgs.gov

M.S. Research Assistantship in Freshwater Mussel Climate Change Ecology and Toxicology, North Carolina State University

Location: North Carolina State University, Raleigh, NC. Depending upon the candidate's interests and career objectives, the appointment may be in the Department of Biology or the Department of Environmental & Molecular Toxicology, both within the College of Agriculture and Life Sciences at NC State University. An appropriate degree major may be selected from Biology, Environmental Toxicology, or Fisheries and Wildlife Sciences.

Responsibilities: The research will examine the relative sensitivity of juvenile native freshwater mussels to a range of common and extreme water temperatures that may be encountered during summer periods in streams in the southeastern and central United States in laboratory tests, develop a method for conducting temperature sensitivity tests

with juvenile mussels and aquatic sediments, and then use the method developed to evaluate the relative sensitivity of juvenile native freshwater mussels to a range of common and extreme sediment temperatures that may be encountered during summer low flow periods or in dewatered streams. The selected candidate will participate as a team member of a larger multidisciplinary research project modeling the responses of imperiled freshwater mussels to anthropogenically induced changes in water temperature, habitat, and flow in streams of southeastern and central United States, and as such will have extensive opportunities for professional development and collaboration with numerous state and federal researchers. The candidate will be co-advised by Drs. Greg Cope and Tom Kwak.

Qualifications: B.S. degree in biology, fisheries, ecology, or related environmental science field; 1100 GRE score (Verbal + Quantitative); 3.2 undergraduate grade point average; and physical ability to travel and conduct field and laboratory research. Desired qualifications include knowledge or interest in stream ecology and management; mussel biology, life history, or physiology; good writing, communication, and interpersonal skills; and a strong work ethic.

Salary (stipend): \$18,000/year (12 months) for at least two years (contingent upon satisfactory academic and research progress), health insurance, full tuition and fees paid.

Starting Date: Available June (summer) or August (fall semester) 2010. June starting date preferred.

Contacts: Please send (via regular mail rather than e-mail) a letter of interest, resume, unofficial copies of GRE scores and college transcripts, and contact information for three references. The selected applicant will apply to the appropriate graduate program through the NC State Graduate School for admission (<http://www.ncsu.edu/grad/>). Women and minority candidates are encouraged to apply.

Materials should be sent to Dr. Cope or to Dr. Kwak, but not both.

Dr. Greg Cope
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North Carolina State University
Box 7633
Raleigh, NC 27695
919-515-5296 or greg_cope@ncsu.edu

Dr. Tom Kwak
USGS, NC Cooperative Fish and Wildlife Research Unit
Department of Biology, Box 7617
North Carolina State University
Raleigh, NC 27695
919-513-2696 or tkwak@ncsu.edu

Related web sites:

Department of Biology, NCSU
<http://harvest.cals.ncsu.edu/biology/>

Dept. of Environmental & Molecular Toxicology
<http://service004.hpc.ncsu.edu/toxicology/>

Tom Kwak
<http://www4.ncsu.edu/~tkwak/>

Greg Cope
<http://service004.hpc.ncsu.edu/toxicology/faculty/cope/index.htm>

NC Cooperative Fish and Wildlife Research Unit
<http://www.ncsu.edu/nccoopunit/>

Fish and Wildlife Program, NCSU
<http://harvest.cals.ncsu.edu/biology/index.cfm?pageID=1222>

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Contributed Articles

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

Discovery of another copy of Thomas Say's *American Conchology* and *A glossary to Say's Conchology*

Arthur E. Bogan, Jamie M. Smith and Cynthia M. Bogan
North Carolina State Museum of Natural Sciences, Raleigh, NC

Recently, the North Carolina State Museum of Natural Sciences received a donation of the library of the late Dr. Edward Wilbur Berry (1875-1945), a paleobotanist who had been in the Department of Geology, Johns Hopkins University, Baltimore, Maryland. While organizing and inventorying the collection, Vince Schneider, research curator of paleontology, discovered a bound copy of Thomas Say's *American Conchology* (1830-1834). This volume contains 6 sections and 60 hand colored plates published by Say before his death. This is one of 65 copies in institutional libraries reported to still exist out of approximately 250 copies printed. Bound in the back of this volume is a copy of *A glossary to Say's Conchology* (1832) attributed to Thomas Say. Only 24 copies of the glossary appear to be extant. *American Conchology* and *A glossary to Say's Conchology* were printed on the School Press in the utopian community at New Harmony, Indiana. This volume is now housed in the rare book collection of the H.H. Brimley Memorial Library, North Carolina State Museum of Natural Sciences, Raleigh.

Say, T. 1830a–1834, 1838. *American Conchology, or descriptions of the shells of North America. Illustrated by coloured figures from original drawings executed from nature*. School Press, New Harmony, Indiana. Part 1 (1830) 31 unnumbered printed pages, hand colored plates 1-10; Part 2 (April 1831) 35 unnumbered printed pages, hand colored plates 11-20; Part 3 (September 1831) 38 unnumbered printed pages, hand colored plates 21-30; Part 4 (March 1832) 31 unnumbered printed pages, hand colored plates 31-40; Part 5 (August 1832) 34 unnumbered printed pages, hand colored plates 41-50; Part 6 (April 1834) 44 unnumbered printed pages, hand colored plates 51-60; Part 7 (1838, published after Say's death, edited by T.A. Conrad) 14 unnumbered printed pages, hand colored plates 61-68, plate 65 unnumbered.

[Say, T.] 1832. *A glossary to Say's Conchology*. New Harmony, Indiana. Printed by Richard Beck & James Bennett. 25 pages.

Current distribution of the Salamander Mussel, *Simpsonaias ambigua* (Say, 1825), in Pennsylvania

Arthur E. Bogan

North Carolina Museum of Natural Sciences, Research Laboratory, Mail Service Center 1626, Raleigh, NC 27699-1626

Douglas D. Locy

Aquatic Systems, Inc., 4621 Baptist Rd, Pittsburgh, PA 15227

A.E. Ortmann commented in his monograph on the freshwater mussels of Pennsylvania (1919:325-326) that *Simpsonaias ambigua* had been reported from the West Fork River, a headwater tributary of the Monongahela River in Lewis County, West Virginia and from the Mahoning River in eastern Ohio. He never was able to find any specimens of this species in any rivers of western Pennsylvania in spite of intensive searches. The lack of specimens may be attributed to the early impacts of pollution and acid mine drainage on the fauna of rivers of western Pennsylvania (Ortmann, 1909).

A.H. Clarke (1985) monographed the tribe Alasmidontini, including *Simpsonaias*, reporting only two records from the Allegheny River in Pennsylvania (OSUM 22295, OSUM 26309).

A search of ten museum mollusk collections was conducted as well as a query of a private collection. This resulted in 25 lots of *Simpsonaias ambigua* that had been collected from Pennsylvania: Carnegie Museum of Natural History [CMNH] (19 lots); Ohio State University, Museum of Biodiversity [OSUM] (2); North Carolina State Museum of Natural Sciences [NCSM] (1); G.R. Dinkins [GRD], personal collection (2).

Distribution of these lots provides an overview of the current distribution of this animal in the upper Ohio River basin in Pennsylvania: **Dunkard Creek**, Greene County, tributary to the Monongahela River (3 lots, CMNH 47388 – 1994; CMNH 95561 – 2005; NCSM 30607 – 2005); **Allegheny River Pool 3**, Armstrong County (1 lot: GRD 158- 2001), **Allegheny River Pool 5**, Armstrong County (11 lots: OSUM 22295 – 1969; OSUM 26309 - 1970, CMNH 88113 – 2007; CMNH 98347 – 2008; CMNH 98349 – 2008; CMNH 98354 – 2008; CMNH 98356 – 2008; CMNH 98365 – 2008; CMNH 101895 2009; CMNH 101906 – 2009; CMNH 101907 – 2009); **Allegheny River Pool 6**, Armstrong County (3 lots: CMNH 72917 – 2005; CMNH 72919 - 2005; CMNH 75697 – 2005); **Allegheny River Pool 7**, Armstrong County (6 lots: GRD 162 – 2001; CMNH 101896 – 2009; CMNH 101899 – 2009; CMNH 101903 – 2009; CMNH 101908 – 2009; CMNH 191903 - 2009).

Survey work by EnviroScience in 2007 documented a number of live animals in an area near Ford City, Allegheny River Pool 6 (G. Zimmerman Pers. Comm. November, 2009).

Pennsylvania Department of Environmental Protection funded a survey performed by Dr. Thomas G. Jones, Marshall

University, who found seven live animals under a single rock in Allegheny River Pool 5 (Pers. Comm. November, 2009).

Our Salamander Mussel surveys conducted in 2009 in Allegheny River Pools 5 and 7 located 43 live specimens of *Simpsonaias*. All were collected in less than 30 feet of water.

Western Pennsylvania Conservancy provided two records of *Simpsonaias* from French Creek, Crawford County collected by Charles Bier (C. Bier, Pers. Comm. 22 October 2009).

These records document our current understanding of the distribution of the Salamander Mussel in western Pennsylvania. It was unknown in the rivers of western Pennsylvania in the early 1900's but expected to have occurred historically in the state. The first documented occurrence of this species in Pennsylvania is from 1969 and 1970 from Allegheny River Pool 5. It was next documented from Dunkard Creek in southwest Pennsylvania on the West Virginia border in 1994. *Simpsonaias ambigua* was collected from Allegheny River Pool 3 in 2001, Pool 5 in 1969, 1970, 2007, 2009; Pool 6 in 2005 and 2007; Pool 7 in 2001, 2009. An increasing number of live animals have been found.

Total shell length of live animals encountered during survey work the summer 2009 range from 12mm to 46 mm. Clarke (1985) reported maximum total shell length as 48 mm for the species.

This enigmatic mussel species is unusual in that it uses the Mudpuppy, *Necturus maculosus* (Rafinesque), an aquatic salamander with external gills, as its host instead of a fish. *Simpsonaias* is found living under flat rocks with its host.

Simpsonaias was observed living under flat rocks with a maximum diameter from 12-36 inches and thickness ranging from 2 to 10 inches. Substrates under rocks occupied by *Simpsonaias* have a combination of silt and clay overlying cobbles and gravel. Flat rocks with granular substrates or sand, lacking the silt and clay were found not to support *Simpsonaias* during recent survey work.

Ortmann (1919) noted collecting *Simpsonaias* in a tributary of the Monongahela River in West Virginia "buried deeply in sand and gravel held together by the rhizomes and roots of *Dianthera*." We found dead shells in *Justicia americana* beds in Allegheny River Pool 7. Is this another overlooked habitat for this illusive, cryptic species?

Simpsonaias ambigua has reinvaded rivers of western Pennsylvania some time before 1969 with the Mudpuppy and has continued to reproduce and expand its range into at least four Allegheny River Pools where it is now found. Other species of freshwater mussels are likewise currently expanding their ranges into Pennsylvania. This species has reinvaded its supposed former range and continues to expand its range and increase its population size.

Pennsylvania Fish and Boat Commission listed *Simpsonaias ambigua* as Pennsylvania state endangered in October 2009.

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Recent mussel surveys in the Susquehanna River, below Conowingo Dam, Maryland.

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Monitoring and Non-tidal Assessment Division
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Little information has been published on freshwater mussels from the Susquehanna River below Conowingo Dam, Maryland except an account by Marshall (1930). This stretch of river is approximately 1.25 km wide and extends for approximately 6.5 Rkm where it then becomes tidally influenced by Chesapeake Bay. Habitat is primarily cobble, boulder, and bedrock with gravel shoals around numerous islands and the shoreline. Two 4th order tributaries (Deer and Octoraro creeks) have their confluence with the Susquehanna in this reach. Below head of tide, the river becomes deeper and sand-silt substrates increases substantially along with beds of submerged aquatic vegetation and continues another 8.9 Rkm until reaching the Chesapeake Bay. Surveys conducted further upstream in the river basin and unpublished records indicate that 13 species (Table 1) potentially occur downstream of the dam (Marshall 1930, Sepkoskie and Rex 1974, Bogan and Proch 1997, Strayer and Fetterman 1999), though some may be unlikely given the habitat present. We discounted *Alasmidonta marginata susquehannae* as potentially occurring because it has never been reported from Maryland.

Three sampling events since the summer of 2008 have provided recent lists of freshwater mussels found in the Susquehanna River, below Conowingo Dam (Table 1). In August 2008, benthic trawling and scuba diving were conducted over from Rkm 6.5 to Rkm 11.5 by Dr. Tom Jones of Marshall University and the Maryland Department of Natural Resource's Monitoring and Non-tidal Assessment Division (MANTA). In August 2009, MANTA biologists snorkeled (3 total hours) over a gravel shoal (30 km²) along the left descending bank near Rkm 13 during low flow conditions. In November 2009, benthic trawls were again used by MU and MANTA in the Susquehanna River from the confluence with Octoraro Creek (Rkm 13.8) to downstream of Port Deposit, MD (Rkm 8). Over the course of each survey, we collected live and dead individuals of four species (Table 1). During 2008 and 2009, benthic trawling in deeper (≥ 2 m) habitat with silty bottoms was able to detect individuals of *Elliptio*

complanata and *Leptodea ochracea* < 25 mm long. Lengths of live *E. complanata* found while snorkeling in August 2009 ranged from 25 mm to > 150 mm and *Anodonta implicata* from 50 mm to 200 mm.

Table 1. Freshwater mussels potentially occurring in the Susquehanna River below Conowingo Dam, Maryland and recent accounts of their presence or absence. "L" indicates live individuals, "D" indicates spent valves were collected, and "N" indicates none were collected.

Species	2008	2009
<i>Alasmidonta undulata</i>	N	N
<i>Alasmidonta varicosa</i>	N	N
<i>Anodonta implicata</i>	L, D	L, D
<i>Elliptio complanata</i>	L, D	L, D
<i>Elliptio fisheriana</i>	N	N
<i>Elliptio lanceolata</i>	N	N
<i>Lampsilis cariosa</i>	N	N
<i>Lampsilis radiata radiata</i>	N	N
<i>Lasmigona subviridis</i>	N	N
<i>Leptodea ochracea</i>	L, D	L, D
<i>Ligumia nasuta</i>	N	N
<i>Pyganodon cataracta</i>	L, D	L, D
<i>Strophitus undulatus</i>	N	N

While we did not encounter the other nine potentially existing species, *Lampsilis r. radiata* was collected in 1998 and 1990 by DNR's Natural Heritage Program and *Strophitus undulatus* has been recently collected from several localities in Deer Creek and one in Octoraro Creek. *Elliptio fisheriana* was last observed in the Conowingo Dam pool in 1961. More rigorous, quantitative surveys may be necessary to verify absence presumed by these results, which includes three state endangered, two state rare, and three status unknown (MD DNR 2007). The results we present may be a component of the first quantitative survey of mussels in the lower Susquehanna River (Jones unpublished data) and represent the most recent qualitative efforts. Our survey efforts in the lower Susquehanna River and its tributaries will likely continue in the near future as we expand our monitoring efforts to non-wadeable streams and because the Conowingo Dam is currently in the FERC relicensing process.

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**Additional Information Concerning the
Conquest of Europe by the Invasive Chinese
Pond Mussel *Sinanodonta woodiana*.
20. News from Belgium**

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On 20th January 2009 Carine Richerzhagen posted a photograph of a large freshwater mussel on the website <http://waarnemingen.be/>, a popular site for reporting interesting observations dealing with the fauna and flora of Belgium. She had found the mussel in a pool in the nature reserve and protected landscape "De Maten" near Genk, Belgium. The photograph was supposed to represent *Anodonta cygnea* (Linnaeus, 1758). However, the size of the specimen (length over 20 cm), the general form of the shell, and the bulbous umbonal area showed we were dealing with a perfect specimen of the invasive species *Sinanodonta woodiana* (Lea, 1834).

The recognition of that fact has led to the publication of two short notes and a poster dealing with finds of the Chinese Pond mussel in Belgium (Richerzhagen & Van den Neucker, 2009; Packet et al., 2009a-b).

According to the new observations and previously published data (Sablon, 2002; Keppens & Mienis, 2003 & 2004) this invasive mussel is now known in Belgium from at least four different localities in Flanders: Diest (1999), Zonhoven (2001), Oud-Heverlee (2001) and De Maten near Genk (2009). In Diest these mussels were found in a recreational pool, at all other localities in former fish farms. This mussel species may turn up easily at additional localities in Flanders because all the pools are connected in one way or another with streams.

References

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**Amphibious and Aquatic Molluscs from
Drainage Ditches in the Dunes near
Oosterend, Terschelling, the Netherlands**

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A herd of Hereford cattle is being used on the Dutch Wadden Sea island Terschelling in order to graze excess growth of grasses in the dunes NE of the village Oosterend. This area has a size of about 1.5 km² and is rather flat in its northern part, which is partly covered with heath, while the southern part consists of steep, well vegetated dunes with a maximum height of about 20 m.

The flat northern part, which has the form of an upside-down triangle, is bordered in the west by a rather deep ditch running in a NW-SE direction and in the east by a much shallower N-S ditch. These ditches come together west of the bicycle path to the European Nature Reserve "De Boschplaat", where the water leaves the grazed area through a large iron conduit, which forms the passage under the bicycle path, and where it enters a deep trench from where it flows through a number of shallower ditches south of the "Kooipad" to the Wadden Sea.

The water level in these ditches differs not only locally from more than 1.5 meter in the NW-corner to about 0.5 meter in the deep trench during a rainy year (2008), but also annually like in 2009 when only a few shallow, interrupted puddles ranging in depth from 1-25 cm were left in the NW-SW ditch, while the shallow eastern ditch was completely dry. Interestingly even in the shallowest puddle, with a water depth of less than 2 cm, specimens of the Ninespine stickleback *Pungitius pungitius* were encountered in numbers.

The malacological importance of this drainage system is formed by the local presence of *Gyraulus laevis*, which is considered an endangered species in the Netherlands (de Bruyne et al., 2003).

Material and Methods

The area has been investigated for the presence of amphibious and aquatic molluscs in the autumns of 1999, 2005, 2008 (Mienis, 2001 & 2009) and especially 2009. The molluscs were collected by means of a kitchen-sieve with a mesh-size of 1 mm (all species living in the area are larger than 2 mm) connected to a broomstick of 150 cm.

The following localities were sampled:

1. deep trench on the south and north side of the "Kooipad" (Amersfoort grid: 156.0/602.6) 1a. 4 October 2005; 1b. 22 September 2008; 1c. 30 September 2009;
2. deep trench, east of the point where it passes the bicycle path to the Nature Reserve "De Boschplaat" (Amersfoort grid: 156.2/602.7) 2a. 24 September 1999; 2b. 22 September 2008; 2c. 30 September 2009;
3. shallow ditch west of the beginning of the "Roosenaantje" (Amersfoort grid: 156.3/602.8) 22 September 2008 (on 30

- September 2009 this ditch was completely dry and overgrown by *Phragmites*);
4. deep ditch running from NW to SE (Amersfoort grid: 156.1/602.9) 30 September 2009;
 5. deep ditch running from NW to SE (Amersfoort grid: 156.0/602.9) 1 October 2009;
 6. deep ditch running from NW to SE including a cattle watering hole in it (Amersfoort grid: 155.5/603.4) 1 October 2009;
 7. deep ditch running from NW to SE (Amersfoort grid: 155.4/143.55) 1 October 2009;
 8. deep ditch running from NW to SE, just south of bicycle path \pm 100m east of the "Badweg" (Amersfoort grid: 155.3/603.6) 8a. 22 September 2008; 8b. 1 October 2009;
 9. shallow ditch just south of the bicycle path \pm 325 m from T-crossing with bicycle path to Nature Reserve "De Boschplaat" (Amersfoort grid: 156.15/603.7) 22 September 2009 (on 1 October 2009 this ditch was completely dry and overgrown by *Phragmites*).

Results

The largest number of localities was sampled in 2009 when nine different spots along the drainage ditches were investigated for the presence of amphibious land snails and freshwater molluscs. In the previous years the number of localities ranged from one in 1999 to four in 2008. About 45 years ago I had also a look at the molluscs occurring at the localities 1 and 2; however, these records were lost when I moved from the Netherlands to Israel.

A total of 16 different taxa was encountered: one amphibious land snail, eleven freshwater snails and four freshwater bivalves (Table 1).

Discussion and Conclusion

The number of molluscs encountered in the drainage ditches varied from place to place. Although 16 different taxa were encountered throughout the drained area, the highest number found in a single locality amounted only to ten, in the deep trench at station # 1, followed by nine species at the nearby station # 2. The number of species collected at the five stations situated along the NW-SW deep ditch ranged from five to eight, while the sampling at the two localities in the eastern, shallow ditch resulted only in 3-4 species.

Bithynia tentaculata was only found at the most southern locality (Stat. 1) while another prosobranch *Potamopyrgus antipodarum* was encountered exclusively in the deep trench (Stat. ## 1 and 2). This part of the drainage system also harbours *Gyraulus laevis*. The third prosobranch gastropod *Bithynia leachii* was collected only at four localities in the deep NW-SE running ditch.

In 2009 more bivalves were collected, both in quality and quantity, than in all the previous years together. Without doubt this was a direct result of the fact that for the first time the upper layer of the bottom could be sampled in an adequate way.

For next year, another survey is planned in order to get a better estimation of the population size of the endangered *Gyraulus laevis* in this interesting drainage system.

Table 1: Amphibious land snails and freshwater molluscs encountered in the sampled drainage ditches in the dunes NE of Oosterend, Terschelling, the Netherlands. A number followed by a different letter denotes the presence of a species during a certain year.

Species	Locality	1	2	3	4	5	6	7	8	9
<i>Bithynia leachii</i>		-	-	-	4	-	6	7	8ab	-
<i>Bithynia tentaculata</i>		1c	-	-	-	-	-	-	-	-
<i>Potamopyrgus antipodarum</i>		1bc	2b	-	-	-	-	-	-	-
<i>Physa fontinalis</i>		1abc	2abc	3	4	5	6	7	-	-
<i>Galba truncatula</i>		-	-	-	-	-	-	-	-	9
<i>Radix balthica</i>		1bc	2abc	3	4	5	6	7	8ab	9
<i>Stagnicola palustris</i>		-	-	-	-	-	-	-	-	9
<i>Anisus vortex</i>		1ac	2abc	-	4	5	6	7	8ab	-
<i>Gyraulus albus</i>		1bc	-	-	4	5	-	7	-	-
<i>Gyraulus laevis</i>		1b	2ac	-	-	-	-	-	-	-
<i>Planorbis planorbis</i>		1abc	2c	3	4	-	6	7	8ab	9
<i>Oxyloma elegans</i>		1b	2a	-	-	-	-	-	-	-
<i>Pisidium milium</i>		1c	-	-	4	5	-	-	-	-
<i>Pisidium obtusale</i>		-	2ab	-	-	-	-	-	-	-
<i>Pisidium subtruncatum</i>		-	-	-	-	5	-	-	-	-
<i>Sphaerium corneum</i>		-	2c	-	4	5	-	7	8b	-
Total		10	9	3	8	7	5	7	5	4

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First registration of wild rocky coast mussels *Perna perna* (Linnaeus, 1758) infested by boring bivalves in the "Moleques do Sul" Island, Serra do Tabuleiro Ecological State Park, Palhoça Municipal District, Santa Catarina State, SC, Southern Brazil

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The invasive marine bivalve species that bores shells of other mollusks, *Lithophaga bisulcata* (d'Orbigny, 1842) (native) and *Myoforceps aristatus* (Dillwyn, 1817) (exotic), family MYTILIDAE Rafinesque, 1815, are moderated infesting mussels *Perna perna* (Linnaeus, 1758) – species of high commercial value for consumption – here for the first time in wild life condition located in natural banks of the "Moleques do Sul" Island (Fig. 1), Serra do Tabuleiro Ecological State

Park - PEST, Palhoça Municipal District of the Great Florianópolis, Santa Catarina State - SC, Southern Brazil region (Agudo-Padrón & Bleicker 2009), obtained during manual capture by dive in Spring (October) of 2009, may come to cause great damages in the regional mariculture activities and the wild mollusk fauna diversity.



Figure 1. Aerial view of the "Moleques do Sul" Island, Serra do Tabuleiro. Ecological State Park insular portion, Santa Catarina State, Southern Brazil

Particularly, the exotic invasive bivalve *Myoforceps aristatus* has been collected recently so much in the Brazilian coast strips of the Southeast, States of Rio de Janeiro - RJ and São Paulo - SP (Simone & Gonçalves 2006), as of the South, in maricultural enterprises of Japanese or Pacific exotic oysters *Crassostrea gigas* (Thunberg, 1795) and native scallops *Nodipecten* (= *Lyropecten*) *nodosus* Linnaeus, 1758 located in the area of the "Great Florianópolis", in the State of Santa Catarina - SC (Silveira Jr. et al 2007 a-b). This last occurrence has been interpreted as an invasion of this species, originally from the Caribbean.

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First confirmed record of the exotic slug *Milax gagates* (Draparnaud, 1801) in the Southernmost Brazil region

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On April (Autumn) 2009 three lots of 12 specimens (3, 5 and 4 animals) of *Milax gagates* (Draparnaud, 1801), exotic invasive European slug of the family MILACIDAE Ellis, 1926, were collected by us for first time in the city and Municipal District of Cachoeirinha (Agudo-Padrón & Lenhard 2009a, 2010), Great Porto Alegre metropolitan region, Rio Grande do Sul State - RS (Agudo-Padrón 2007, 2009 a-d; Agudo-Padrón & Oliveira 2008, Agudo-Padrón & Silveira 2008, Agudo-Padrón *et al* 2008), Southernmost Brazil region (Figure 1). Preserved in liquid, they were deposited in the condition of "testimony material" on the Malacological collection (Invertebrates Lab.) of the "Natural Sciences Museum" belonging to the "Lutheran Brazilian University" (MCNU), Canoas city, RS.

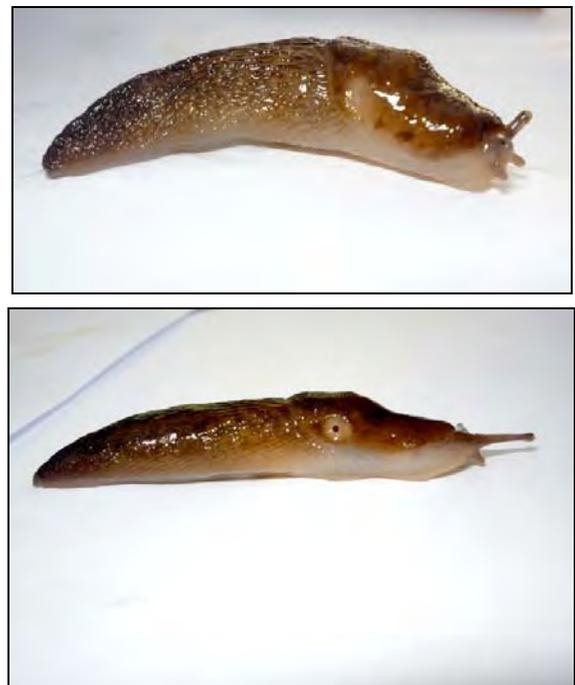


Figure 1. *Milax gagates* (Draparnaud, 1801), new record of invader exotic continental mollusk from the Southernmost region (RS State) of the Brazilian country (Photos: Paulo Lenhard / Agudo-Padrón).

The present report characterizes the first confirmed record of this species for the Southern Brazil region, and second confirmed occurrence case of the genus *Milax* Gray, 1856 and family MILACIDAE in the Brazilian territory, close to the species *Milax valentianus* Férussac, 1821 (Agudo-Padrón 2008, Agudo-Padrón & Lenhard 2009 b), this last one with registrations in the regional Southern States of Rio Grande do Sul (RS) and Santa Catarina (SC) (Agudo 2004: 15, Agudo & Bleicker 2006: 6, Agudo-Padrón & Lenhard 2010).

The confirmation of new occurrences of continental exotic snails and/or slugs in subtropical Brazil, mainly in the Mediterranean ways that they prefer lukewarm environments, capable to adjust feeding to sources of different food, it doesn't surprise before his adaptation and survival out of her native original distribution. They constitute important pests in plantations and it is been conditioned in gradual and alarming form by the crescent/intense global commercialization (Agudo- Padrón & Lenhard 2010), that it involves the transport of vegetable products, such as fresh fruits, vegetables, seedlings, ornamental plants, etc.

In general, today 42 exotic species of mollusk have been reported for Brazil (Simone 2006: 306-312, Thomé *et al* 2007, Agudo- Padrón & Lenhard 2010): 4 freshwater mussels/clams, 6 freshwater gastropods, 5 marine and estuarine bivalves, 19 terrestrial snails and 8 slugs. A specific relationship of freshwater and terrestrial forms of introduced and invading exotic mollusks up to now confirmed for the Southern Brazil region (Agudo & Bleicker 2006, Agudo- Padrón & Lenhard 2010), including 18 species, among them 4 freshwater bivalves (1 mussel & 3 clams) and 14 gastropods (1 freshwater snail & 13 terrestrial forms – 6 slugs and 8 snails).

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Confirmation of glochidia host for spike (*Elliptio dilatata*) from the Clinch River

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The spike (*Elliptio dilatata*) is a common species that occurs in the upper Tennessee River watershed, as well as the Ohio and Mississippi river systems (Parmalee & Bogan 1998). Previous research has shown glochidial transformation on several host species, including the gizzard shad (*Dorosoma cepedianum*), yellow perch (*Perca flavescens*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis nigromaculatus*), flathead catfish (*Pylodictis olivaris*), sauger (*Stizostedion canadense*), rainbow darter (*Etheostoma caeruleum*), banded sculpin (*Cottus carolinae*) and rock bass (*Ambloplites rupestris*) (Watters 1995). Unfortunately, our literature review was unable to uncover any information regarding transformation percentage or number of juveniles recovered per fish for these hosts. Furthermore, only a few of these species occur in the upper Tennessee River watershed in numbers to serve as an ecological host for the spike.

In previous years we tried to propagate the spike unsuccessfully, merely to add to our production list. Trial hosts included largemouth bass, whitetail shiner and channel catfish, all of which yielded either no juveniles or low numbers that were deemed unsuitable for production work. However, in 2008, spike became a target species for a particular restoration project, thus requiring a more intensive effort. Upon researching host work for the spike, we decided that rock bass and sculpin were most likely to be effective hosts, so we began trials with these two species.

Infestation procedures for spike mirrored those of other species on like host fish. Infestations were conducted between May and August. This host trial showed that for Clinch River spike sculpin were an ideal host for propagation, while the rock bass is a marginal host (Table 1).

Table 1. AWCC host fish trials for spike (*Elliptio dilatata*) glochidia.

Year	Trial host	# Hosts used	# Adult mussels used	# Juveniles recovered
2006	Largemouth bass (<i>Micropterus salmoides</i>)	10	2	147
2007	Whitetail shiner (<i>Cyprinella galactura</i>)	200	4	0
2008	Channel catfish (<i>Ictalurus punctatus</i>)	32	2	0
2009	Rock bass (<i>Ambloplites rupestris</i>)	15	2	552
2009	Holston sculpin (<i>Cottus spp</i>)	65	3	10,629
2009	Holston sculpin (<i>Cottus spp</i>)	69	2	11,876
2009	Holston sculpin (<i>Cottus spp</i>)	66	2	7,629
2009	Holston sculpin (<i>Cottus spp</i>)	82	2	4,982

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Freshwater Drum Confirmed as a Suitable Host for *Leptodea*, *Potamilus*, and *Truncilla* Species

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Freshwater drum (*Aplodinotus grunniens*) is a known or presumed suitable host for species of *Ellipsaria*, *Leptodea*, *Potamilus*, and *Truncilla*. To examine this association further, we inoculated freshwater drum and 21 to 31 additional fish species with glochidia of *Leptodea fragilis*, *Potamilus alatus*, and *Truncilla truncata*. *Potamilus ohiensis*, *Truncilla donaciformis*, and *Ellipsaria lineolata* glochidia were tested on drum only. We also collected drum from the St. Croix River when these mussels were gravid in an effort to retrieve naturally infested juveniles. Fish were held in aquaria at 22-24°C, and siphoned twice weekly for transformed juvenile mussels.

In laboratory trials, all mussel species transformed successfully on drum but were sloughed from other fishes within 3-6 days (Table 1). Size of *L. fragilis*, *P. ohiensis*, *T. donaciformis*, and *T. truncata* juveniles increased substantially while encapsulated on fish (Figure 1). DNA barcoding of juveniles recovered from naturally infested drum were identified as *E. lineolata*, *L. fragilis*, and *P. ohiensis* (Boyer et al. in preparation).

These results corroborate previous work that has shown drum to be a suitable laboratory host for *Leptodea leptodon* (Barnhart et al., 1998), *P. alatus* (Brady et al., 2004), *P. capax* (Barnhart and Roberts 1997), and *E. lineolata* (Howard 1914, Coker et al., 1921, Rudh et al., 2007), and a suspected host for *L. fragilis*, *Potamilus inflatus*, *P. purpuratus*, *P. ohiensis*, *T. truncata* and *T. donaciformis* based on identification of naturally infested glochidia (Surber 1913 and 1915, Howard 1914, Howard and Anson 1922, Roe et al., 1997). It appears likely that freshwater drum is the sole suitable host for *Ellipsaria*, *Leptodea*, *Potamilus*, and *Truncilla*.

We thank the Minnesota Pollution Control Agency for use of lab space and equipment.

Table 1. Mussels that successfully transformed on freshwater drum.

Mussel Species	Trial	No. drum	No. juveniles recovered	Juvenile recovery period (d)
<i>Ellipsaria lineolata</i>	I (2 June*)	1	43	7-30
<i>Ellipsaria lineolata</i>	II (1 Oct)	1	169	18-32
<i>Leptodea fragilis</i> ^a	I (16 June)	1	539	13-27
<i>Potamilus alatus</i> ^b	I (2 June)	1	136	9-27
<i>Potamilus alatus</i>	II (1 Oct)	1	264	11-28
<i>Potamilus ohiensis</i>	I (30 June)	1	447	13-48
<i>Truncilla donaciformis</i>	I (13 June)	2	346	23-33
<i>Truncilla truncata</i> ^c	I (2 June)	1	20	17-23

Fishes that did not facilitate metamorphosis - *Ameiurus melas* b,c; *Ambloplites rupestris* b,c; *Carpoides carpio* b,c; *Carpoides cyprinus* a,b,c; *Catostomus commersoni* a,b,c; *Culaea inconstans* b,c; *Cyprinella spiloptera* a,b,c; *Etheostoma flabellare* a; *Etheostoma nigrum* a,b,c; *Fundulus olivaceus* a; *Ictalurus punctatus* b,c; *Lepomis cyanellus* b,c; *Lepomis gibbosus* b,c; *Lepomis humilis* a,b,c; *Lepomis macrochirus* a,b,c; *Micropterus dolomieu* b,c; *Micropterus salmoides* b,c; *Moxostoma macrolepidotum* a,b,c; *Nocomis biguttatus* b,c; *Notemigonis crysoleucas* a,b,c; *Notropis blennioides* a,b,c; *Noturus exilis* a,b,c; *Noturus gyrinus* b,c; *Oncorhynchus mykiss* a,b,c; *Percina caprodes* a,b,c; *Percina maculata* a,b,c; *Percina phoxocephala* a,b,c; *Percina shumardi* a,b,c; *Pimephales notatus* a,b,c; *Pimephales promelas* a,b,c; *Rhinichthys atratulus* a,b,c; *Rhinichthys cataractae* a,b,c; *Semotilus atromaculatus* b,c

*Trial initiation

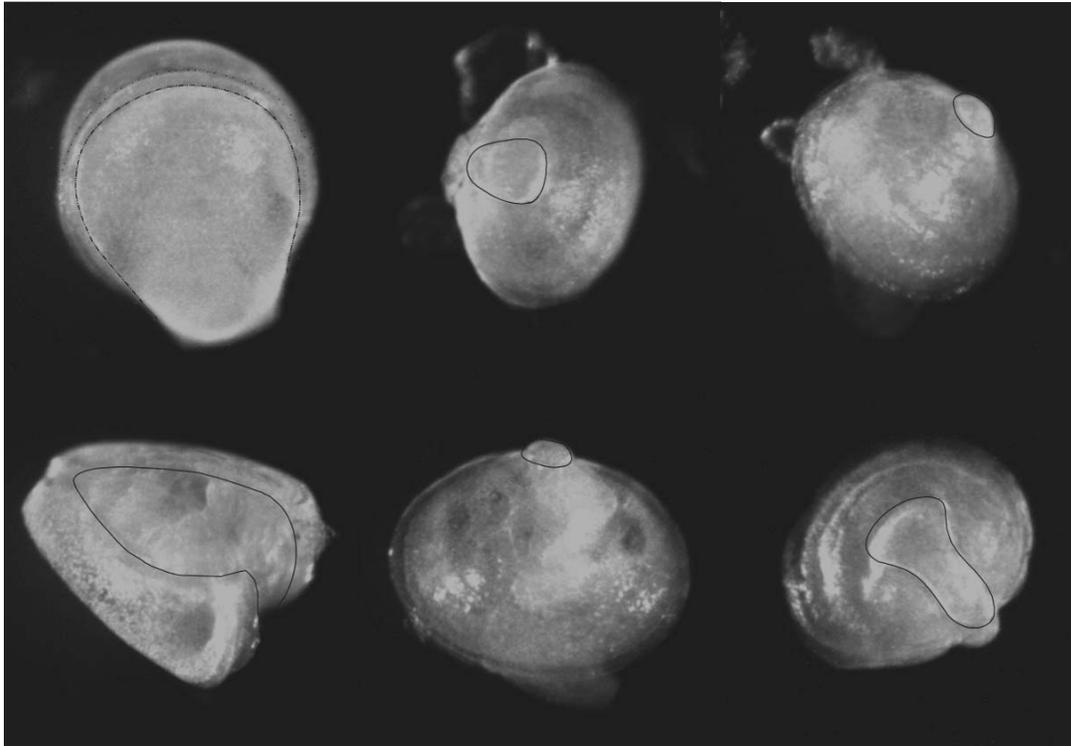


Figure 1. Juvenile mussels recovered from freshwater drum. Clockwise from upper left: *E. lineolata*, *L. fragilis*, *T. truncata*, *P. ohiensis*, *T. donaciformis*, *P. alata*. Glochidial shells traced for definition.

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Twenty-four species identified as potential hosts for sheepnose (*Plethobasus cyphus*)

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The sheepnose (*Plethobasus cyphus*) is suffering a steep decline, having been eliminated from two-thirds of its historical range (Butler 2002). Research shows that sauger may be naturally infested with sheepnose (Surber 1913) and central stonerollers are suitable hosts in the laboratory (Watters *et al.*, 2005).

In efforts to further our understanding of sheepnose life history traits and improve conservation of this species, we conducted host suitability trials at water temperatures between 22-25°C between July-August 2009. Ninety-six fish species were infested with sheepnose glochidia using standard procedures (Neves *et al.*, 1985), and juvenile mussels were recovered from 24 species (Table 1).

Table 1. Suitable hosts for sheepnose. Juvenile mussels were recovered over periods between 7-25 days.

Fish Species**	No. Fish Inoculated	Juveniles Recorded	Fish Species	No. Fish Inoculated	Juveniles Recorded
blackspotted topminnow	4	1	Ozark minnow (Trial 1)	5	10
blacktail shiner (Trial 1)	1	58	Ozark minnow (Trial 2)*	6	51
blacktail shiner (Trial 2)	10	26	pearl dace	5	10
bleeding shiner (Trial 1)*	4	8	red shiner	3	7
bleeding shiner (Trial 2)	17	72	river shiner	7	24
bleeding shiner (Trial 3)	7	11	silver chub (Trial 1)	2	79
bluntnose minnow (Trial 1)	4	5	silver chub (Trial 2)	3	5
bluntnose minnow (Trial 2)	7	1	southern redbelly dace	6	1
brassy minnow	2	4	spotfin shiner (Trial 1)	5	16
bullhead minnow	2	11	spotfin shiner (Trial 2)	7	121
central stoneroller	5	57	steelcolor shiner	3	8
common shiner	7	7	striped shiner	8	74
eastern blacknose dace	5	2	suckermouth minnow	1	4
fathead minnow	13	18	western mosquitofish	10	4
longnose dace	4	86	whitetail shiner (Trial 1)	2	3
mimic shiner	5	6	whitetail shiner (Trial 2)	1	20

*test subjects died before end of study ** Fish nomenclature follows Robins *et al.*, 1991

In future studies we plan to focus on recovering juvenile sheepnose from naturally infested fishes identified as potential hosts in the laboratory.

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***Corbicula* and *Dreissena* in Beach Drift of the IJsselmeer, the Netherlands**

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Like in North America, two species each of the genera *Corbicula* and *Dreissena* have managed to settle in the Netherlands. Three of these invasive freshwater mussels: the Asian clam *Corbicula fluminea*, the Zebra mussel *Dreissena polymorpha* and the Quagga mussel *Dreissena bugensis*, are known to have established populations in the IJsselmeer, a large freshwater lake in the centre of that country. Although I am visiting my native the Netherlands each year during autumn for one month so far I had encountered in beach drift of the lake only shells of the Zebra mussel, which has by far the longest history in Holland (present since 1826!).

During my recent visit, which lasted from 15 September until 16 October 2009, I took the opportunity to carry out a survey for the presence of the Asian Clam, the Zebra mussel and the Quagga mussel in beach drift of the IJsselmeer along the central part of the east coast of the province North-Holland. In addition I visited a single locality in the province Flevoland: Urk.

I used a bicycle as means of transportation in North-Holland. In this way I could follow the dike along the IJsselmeer, which allowed me to locate easily all the tiny, often well-hidden beaches. At each site I stopped for 5-15 minutes and looked for the wanted species among the beach drift. Most of the shells (> 95%) turned out to be of marine origin, reminders of the time when the IJsselmeer was still called Zuiderzee. The latter stood in open contact with the North Sea by means of the Wadden Sea. In 1932 the opening between the Zuiderzee and the Waddenzee was closed by a huge dam: the Afsluitdijk (Enclosure-dike), and from that moment on the marine habitat turned slowly but steadily into a freshwater one. At each locality the presence or absence of the three invasive species was registered. I arrived in Urk by car, but otherwise the same procedure was carried out. Altogether I managed to visit 23 beaches and the results are given in Table 1.

Most commonly encountered was the Zebra mussel *Dreissena polymorpha*. It was found at all 23 stations. That is quite understandable because it is known to live in the lake at least since 1936 (van Benthem Jutting, 1954). The Asian clam *Corbicula fluminea* and the Quagga mussel *Dreissena bugensis* are relatively newcomers, which arrived in the lake respectively in ±1993 (Bij de Vaate, 1994) and 2007 (Bij de Vaate & Jansen, 2009). The Asian clam was encountered at 11 stations, while the Quagga mussel was seen only at 4 stations.

The most interesting specimens were found on the beach called Enhuizerzand at the northern outskirts of Enkhuizen. Almost every Asian clam carried a mixture of both *Dreissena* species attached to its valves.

Although I did not register the presence of the autochthonous mussel species: the Painter's mussel *Unio pictorum*, the Swollen river mussel *Unio tumidus*, the Duck mussel *Anodonta anatina*, the Swan mussel *Anodonta cygnea* and the Depressed or Compressed river mussel *Pseudanodonta complanata*, I got the strong impression that they were represented in the shell drift by very few valves. In the past, 40-50 years ago, when I visited some of these beaches (Marken, Hoorn) rather frequently, these native species were washed ashore in much larger numbers. If that impression turns out to be correct then I do not rule out the possibility that the population sizes of the native species have suffered markedly from the presence of the three allochthonous species in the IJsselmeer.

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Table 1: Presence of three invasive species of freshwater bivalves in drift on beaches of the IJsselmeer in North-Holland and Flevoland. The localities in North-Holland are arranged from south to north.

Locality	Date	<i>Corbicula fluminea</i>	<i>Dreissena bugensis</i>	<i>Dreissena polymorpha</i>
NORTH-HOLLAND				
Corner Markerdike and IJsselmeerdike North of Uitdam	21.09.2009	-	-	+
Marken, near the lighthouse	21.09.2009	-	-	+
Marken, east coast	21.09.2009	-	-	+
Marken, begin of Markerwaarddike	21.09.2009	+	-	+
Marken, west of harbour	21.09.2009	-	-	+
South of Monnickendam, opposite road to Zuiderwoude	21.09.2009	+	-	+
Monnickendam, between Hemmeland and the sluice	21.09.2009	+	-	+
Monnickendam, Hemmeland, Mirror-beach	21.09.2009	-	-	+
Monnickendam, Hemmeland, Waterlandbeach	21.09.2009	+	-	+
Monnickendam, Hemmeland, Sailboatbeach	21.09.2009	-	-	+
Monnickendam, Hemmeland, opp. Monnickendammergat	21.09.2009	+	-	+
Volendam, south end of the village	14.10.2009	-	-	+
Volendam, north end of the village	14.10.2009	-	+	+
Warder	23.09.2009	-	-	+
Hoorn, beach near theatre	18.09.2009	-	-	+
Schellinkhout, beach	18.09.2009	-	-	+
Wijdenes, harbour	18.09.2009	-	-	+
Venhuizen, center	18.09.2009	+	-	+
Venhuizen, north	18.09.2009	+	-	+
Venhuizen, Grootslag 2	18.09.2009	+	-	+
Broekerhaven, north	18.09.2009	+	+	+
Enkhuizen, beach Enkhuizerzand	18.09.2009	+	+	+
FLEVOLAND				
Urk, beach opposite lighthouse	06.10.2009	+	+	+
Total		11	4	23



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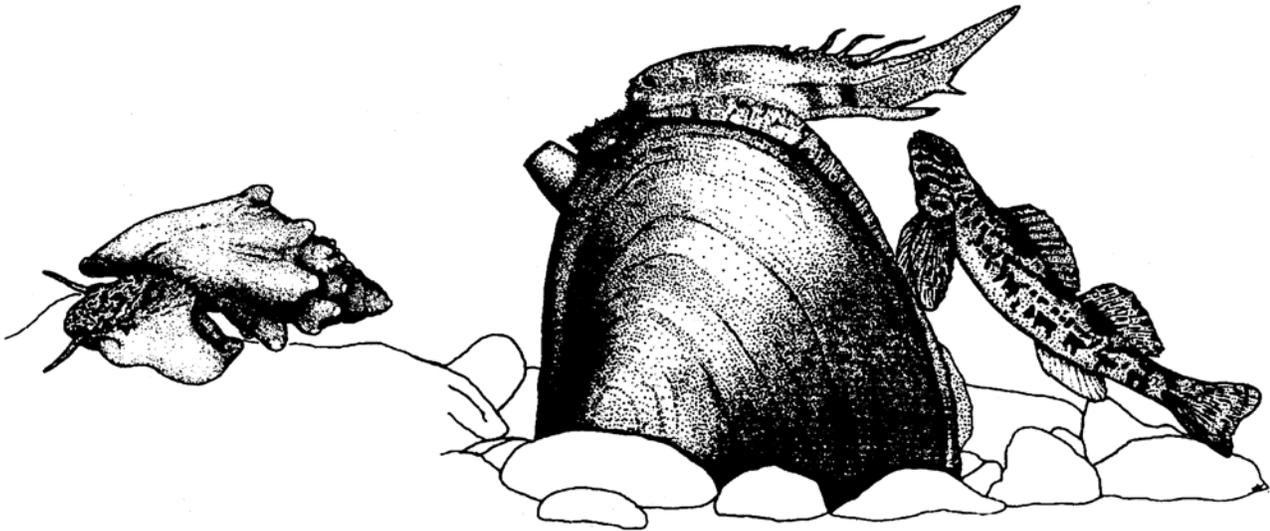
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