

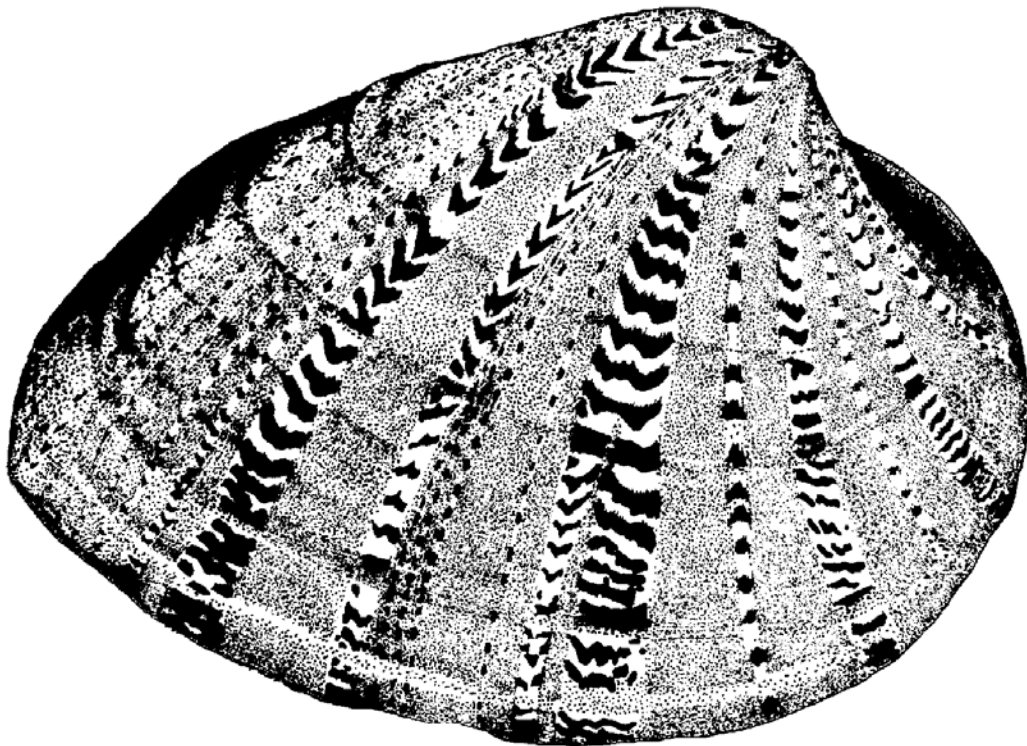
# *Ellipsaria*

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The Newsletter of the Freshwater Mollusk Conservation Society

Volume 6 - Number 2

August 2004



*In this issue:*

2005 Symposium Announcement and Call for Papers

Genetics Workshop Review

2003 Mollusk Bibliography

2004 Membership List

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Submissions for the December 2004 issue of *Ellipsaria* may be sent in at any time but are due by Nov. 1, 2004. Anyone may submit an article but you must be a member of FMCS to receive *Ellipsaria*. 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; please send submissions to the editor.

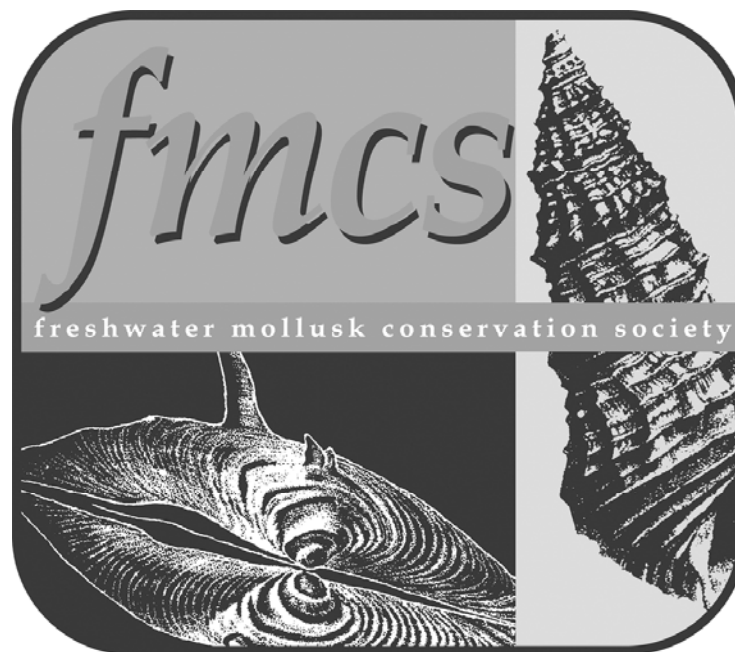
Submissions to *Ellipsaria* are not peer reviewed, but are checked for content and general editing.

Please send change of address information to the Secretary, Rita Vilella.

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## FMCS Reports

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### 2005 FMCS Symposium Announced!

St. Paul Minnesota, here we come! Plans are set for the 4th FMCS Symposium on May 15-19, 2005 at the Radisson Riverfront Hotel. We return to the Midwest in spring and join our Mississippi River brethren to rekindle old friendships, establish new relationships, and spend 3 days talking shell. Our theme will center on exotics and threats to the fauna but will be inclusive enough to draw papers in from all parts of the mussel spectrum. *Indeed – the first call for papers is in this very edition of Ellipsaria...imagine that!*

**WE NEED YOUR HELP!** Consider how you can lend a hand and contact the committee chair of your choice...but do it! Many hands make light work and this is a great opportunity to make a significant contribution to the Society. An organizational framework with committee chairs has been established and is posted on the FMCS web site. Or, contact the general chair, Kurt Welke @ 608-273-5946 and we'll find a home for your talents.

More information including a call for papers follows in the next article. Other details will be included in the December newsletter, member mailings, and postings on the Unio server.

Fire Up! St. Paul is a great town with exceptional resources only a stone's throw away. This promises to be an outstanding meeting so grease your skids now and plan on Minnesota in May!

*Submitted by Kurt Welke, Symposium Chair*

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### FMCS 2005 Symposium May 15 - 19, 2005 Radisson Riverfront Hotel St. Paul, Minnesota

Minnesota is pleased to host the 2005 Symposium of the Freshwater Mollusk Conservation Society. The symposium will be held at the Radisson Riverfront Hotel in St. Paul, Minnesota. As time allows, we welcome you to explore the area's rich natural resource, cultural, and culinary delights.

The 2005 meeting will be co-hosted by the Upper Mississippi River Conservation Committee (UMRCC). Members of the UMRCC's ad hoc mussel team are working on FMCS committees to bring a strong local flavor to the discussion and information exchange. As many as three field trips to sample local river mussel communities and to see the results of endangered species recovery efforts are being planned.

### Theme

## ***“Are Your Natives Restless? Holistic Strategies for Conserving Freshwater Mollusks during Exotic Species Invasions”***

### Rationale

The invasion of exotic species into the freshwaters of North America and elsewhere in the world has placed additional stress on an already imperiled freshwater mollusk fauna. Vital ecosystems for preserving freshwater mollusks like the Mississippi, Ohio, Tennessee, and other large rivers unfortunately also serve as conduits for the rapid dispersal and colonization of exotic species, where they often have adverse effects on native species. Scientists from a variety of disciplines including ecology, fisheries biology, malacology, conservation biology, engineering, hydrology, and others are working together to help mitigate the potential spread and negative effects of exotic species. These folks need your help! The 2005 symposium will provide an opportunity for biologists and others to share ideas, exchange information, and engage in the interpersonal networking needed to support the conservation of our native freshwater molluscan resources.

Think critically about your own research, and its association with other research projects, and its implications relative to the following interrelated topics:

- Native Species Relocation
- Artificial and Natural Refugia
- Native Species-Exotic Species Interactions
- Population Biology
- Alteration of Ecological Conditions
- Influence on Nutrient and Food Resources
- Parasites and Contaminant Flux

...and other topics related to exotic species interactions with native species.

### Instructions for Authors – Call for Abstracts

We are requesting abstracts associated with the above theme and others associated with the following topics: Habitat and Conservation, Range-wide Status and Distribution (co-authorship is encouraged), Life History and Ecology, Evolution and Phylogenetics, Outreach and Education, Propagation and Reproduction, Recovery, and Contaminants and Water Quality.

**ABSTRACTS MUST BE RECEIVED BY  
DECEMBER 17, 2004**

### Instructions for Abstract Preparation and Submittal

**Submittal form:** Abstracts should be submitted as an email attachment in Microsoft Word® or Rich Text format to Greg Cope (greg\_cope@ncsu.edu). File name should include presenter's last name and initials (e.g., jonesjm.doc). Acknowledgment of abstract receipt, if requested, will be provided by e-mail.

Limit abstracts to 300 words or less (including title, authors and affiliations). Abstracts with greater than 300 words will be edited.

**Submittal format:** The abstract should contain the title in **BOLD, CAPITAL** letters, followed by the author(s), and address(es). Underscore the presenter's name. Skip one line and begin the text (see example below) including a clear summary of presentation including objectives, results, and conclusions.

**PROPAGATION OF FRESHWATER MUSSELS IN A CLOSED RECIRCULATING SYSTEM, Shane D. Hanlon<sup>1</sup>, Jay F. Levine<sup>2</sup>, Lori Gustafson<sup>2</sup>, and Chris Eads<sup>2</sup>.** <sup>1</sup>U.S. Fish and Wildlife Service, Southwestern Virginia Field Office, 330 Cummings Street, Abingdon, VA 24210; <sup>2</sup>College of Veterinary Medicine, North Carolina State University, Raleigh, NC 27606.

We renovated a preexisting wet laboratory located at North Carolina State University for purposes of propagating . . .

At the bottom of the page, type:

1. The name, address, telephone, fax, and e-mail of the presenting author
2. Preference for Platform or Poster presentation and willingness (yes or no) to convert from one format to another
3. Regular or Student\* attendee

\*Note: All students submitting abstracts, provided they meet eligibility requirements (see accompanying newsletter article), will be judged for the best student platform or poster presentation, unless otherwise indicated.

**ABSTRACTS MUST BE RECEIVED BY  
DECEMBER 17, 2004**

#### **Oral Presentation Requirements**

Not to exceed 20 minutes (15 minutes for talk and 5 minutes for questions and answers). Slides and LCD projector visual aids only (no overheads).

#### **Poster requirements**

The poster should be readable from 5 feet, titles from 10 feet; and the poster should not exceed a size of 4 feet high by 8 feet wide. Authors must be present at the designated poster session.

#### **Accommodations**

The Radisson Riverfront Hotel rate is \$100 per night, single or double occupancy. Rooms must be booked by **April 15, 2005** to guarantee this rate. Please call 651-292-1900 or 800-333-3333 for reservations. Check-in time is 4 p.m., and check-out time is 12 noon. The Radisson Riverfront is located along the Mississippi River on Kellogg Boulevard in downtown St. Paul, Minnesota.

*\*\*\* Please plan to book your room with the Radisson Riverfront. FMCS meeting room rental costs are based upon the number of hotel rooms booked by members. We need to book at least 100 rooms each night to ensure reasonable meeting room costs. Also, please remember to tell the hotel receptionist you are attending the FMCS symposium when making your reservations so the society will receive credit for the rooms reserved. \*\*\**

#### **Travel**

The Radisson Riverfront Hotel does not provide complementary shuttle service from the airport. However, the SuperShuttle will provide transportation to and from the Radisson Riverfront for \$12 one way or \$22 round trip. Call 612-827-7777 for reservations. The hotel parking ramp is \$12.50/day for registered hotel guests.

*Submitted by Greg Cope, Symposium Program Chair*

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## **Workshop Wrap-Up: Conservation Genetics Workshop on Imperiled Freshwater Mollusks and Fishes**

The Conservation Genetics Workshop on Imperiled Freshwater Mollusks and Fishes was a success! This two-day event sponsored by the FMCS, USFWS, and Department of Fisheries and Wildlife Sciences, Virginia Polytechnic Institute and State University, was held at the National Conservation Training Center, Shepherdstown, West Virginia in June 2004. The workshop provided resource managers and biologists with an opportunity to learn about conservation genetics issues as applied to recovery of imperiled freshwater mollusks and fishes. The workshop included 22 platform presentations and 17 poster presentations. Nationally recognized experts spoke on topics concerning quantitative genetics, molecular genetics, phylogenetics, species concepts, taxonomic analysis, cryptic species, hybridization, and genetic management guidelines for captive propagation and releases of endangered species. The evening poster presentation session provided participants with an opportunity to learn about ongoing genetics projects and interact with people from around the country in a festive and informal setting. The workshop was successful at bringing together conservation professionals with different backgrounds to share their expertise with natural resource managers. Biologists from National Marine Fisheries Service in Seattle, Washington, shared their experiences with conservation genetics of Pacific salmon, many of which directly parallel our own experiences and challenges with trying to protect freshwater mollusks and non-game fishes in other parts of the country. The program and abstracts can be viewed and downloaded from the FMCS website at <http://ellipse.inhs.uiuc.edu/FMCS/> Additionally, the program abstracts likely will be published in an upcoming issue of *Walkerana*, the Journal of the Freshwater Mollusk Conservation Society.

Approximately 110 people attended the workshop, with more than 30 of these registrants becoming new FMCS

members. Extra programs are available (\$20.00) to those interested in having a bound original copy, as are t-shirts (\$15.00). The t-shirts are white and have a black and white event logo on the front with a small fish, and a color logo on the back with various fish and mussels contained in an underwater scene; sponsor logos also are the back. Both the program and t-shirts can be obtained by contacting Jess Jones or Dick Neves at Virginia Tech. Revenues for the workshop were approximately \$15,000.00; once all revenues and expenses have been tabulated, an expense report will be submitted to the FMCS Treasurer for inclusion in a subsequent issue of *Ellipsaria*.

The Organizing Committee would like to thank the staff at the National Conservation Training Center for coordinating local arrangements and making the event go smoothly. Robert Butler was the USFWS representative for the workshop, which allowed the society to receive discounts on facilities charges. A special thank you goes to all of the speakers and poster presenters, who traveled from all parts of the country to share their work and made the workshop interesting and informative. The FMCS continues to be at the forefront of emerging issues and promote science-based conservation of species, streams, and rivers. The society also continues to extend its hand to other institutions, societies, and aquatic biologists in an effort to gain new members and to work toward common goals to protect mollusks, fishes and their habitats.

*Submitted by Jess Jones*

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## FMCS Treasurer Election Results

Heidi Dunn was unanimously re-elected as FMCS treasurer in April 2004. She will serve for 2 years. We owe Heidi many thanks for the work she has done and will continue to do for FMCS.

*Leroy Koch, Nominations Committee*

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## FMCS Board Meeting National Conservation Training Center Shepherdstown, West Virginia June 28, 2004

### Treasurer Report

The snail workshop generated an income of \$9165 (including a \$500 donation) and expenses were \$8827.92. Jess Jones reported that the genetics workshop has generated an income of about \$14,000 as of June 28<sup>th</sup>, with expenses running about \$7,000.00. A commitment was received from the Fish and Wildlife Dept at Virginia Tech for a \$1000 donation. There are quite a few new members this year and overall expenses have been minimal. Major expenses for the current year include the workshops, the newsletter mailings, and \$1000 for the FMCS booth at the upcoming AFS meeting. Total assets of the society are about \$48,119 with about \$15,000 yet to be deposited. The board voted not to rejoin AIBS. This spring ended our probation period as a

charitable nonprofit organization. FMCS is officially classified as a nonprofit under section 501 (c) (3).

### Committee Reports

#### **Symposium Committee**

Kurt Welke held a conference call earlier in June to establish committees for organizing the 2005 symposium. Committees and committee chairs include:

- Budget (bills, accounting, solicitations, registration) – Heidi Dunn
- Registration (advertisement of symposium, tracking) – Jennifer Sauer
- Local Arrangements (hotel, catering, etc.) – Susan Rogers and Mark Hove
- Communications (call for papers, moderators, assist with program) – Ken Lubinski
- Program (abstracts, scheduling, program production) – Greg Cope
- Plenary (coordination of keynote speakers) – Kevin Cummings
- Awards/Students (announcement, judging, etc.) – Catherine Gatenby

TVA has been contacted for sponsorship (hopefully \$2000), and other sponsors are needed (including private industry and government). The dates for the symposium are May 15-19, 2005. Action item requested from the symposium committee: FMCS adopt a registration policy and have a theme discussion. So far we have waived registration fee for plenary speakers and for speakers attending from other countries. The board decided to continue the policy of waiving fees for symposium plenary speakers but to leave the decision to waive other fees to the organizers of each meeting. Kurt also solicited help from the board – Heidi will do the pre-registration form and help in getting sponsors. Exotics was put forth as a potential symposium theme. The board had no problem with this theme as long as the focus of the symposium remains on native freshwater mussels. In an effort to put a more positive spin on this theme, several examples were presented: areas of possible refugia for native mussels; invasives – can we work with them or against them; fighting back against invasives. The symposium committee needs to keep this from becoming an invasives conference; the program committee will play a large role.

#### **Awards Committee**

The committee did a good job outlining each award, how to apply, the nomination process, and selection of recipients. The issue of waiving fees for award recipients was put forth. The board approved giving lifetime achievement recipients lifetime membership.

#### **Outreach Committee**

Trade show booth update: Set up is Sunday August 22<sup>nd</sup>, noon to 6 p.m.; trade show floor opens Monday August 23<sup>rd</sup> from noon to 8 p.m. The trade show social is on the 23<sup>rd</sup> from 5:30 to 8 p.m. and staffing of the booth is needed. The display will remain open on Tuesday and Wednesday and staffing of the booth those days is needed. There will be

shells on display, some publications including tools for outreach, membership brochures, etc. Kurt requested prices for the FMCS publications so he can print order forms to have at the booth. Can send T-shirts and sell for \$10 a piece, Ohio River mussel posters for \$3 apiece or \$2 each or 2 for \$5. **Kurt needs folks to man the display.** The board was asked whether FMCS could pay or offset some of the costs for attending the AFS meeting for those asked to make presentations. Several speakers will talk about mussel life history and introduction/background on mussels. Heidi suggested giving each organizer and each FMCS committee a pot of funds to use as they need with the caveat that each committee present a small proposal for spending funds to the board for approval. The board should retain oversight on how committees plan to spend funds. Committee should prepare a small proposal for the board to review.

### **Information Exchange Committee**

*Walkerana* – Dr. Burch is completing the series (2 numbers remaining) on the subject of unionids and would like FMCS to postpone publishing at least until 2005. Kevin Cummings suggested FMCS pay for printing these 2 numbers or at least the unionid issue and send to the membership without raising dues to get things rolling. Potential printing cost is \$3000. Paul Johnson has a supplement on the mussels and snails of Georgia and possibly the funds to help publish. The board agreed to fund the printing of the unionid number for *Walkerana* for up to \$3000. The board would like to have Kevin submit a proposal outlining the editorial board structure and slate of folks for these positions for the board to review. Tom will get back with Kevin.

### **Environmental Affairs Committee**

The Powell River is overrun with coal fines. Two black water events have occurred in the Clinch River recently. There was discussion on writing a letter to be sent through the committee to the congressman from this district and cc to the FWS field office and other environmental organizations. Dick Biggins would sign the letter.

### **Unionid Status Committee**

The mussel atlas will be published in serial form either in or as a supplement to *Walkerana*. We have 70-80 species covered, with about a half dozen folks working on accounts. We are still looking for others to write species accounts. A suggestion was made to put several accounts on the FMCS website – this may generate interest in volunteers to develop additional species accounts. Kevin Roe will contact Kevin Cummings and the authors about publishing current accounts on the website. Once published will this be copyrighted? The suggestion was made to have John van Hassel check on how an organization can copyright material. Also need to check on copyright of the FMCS logo and the name of the newsletter.

### **Propagation/Restoration Committee**

Registration desk is being set up Monday June 28, 2004 for the genetics workshop; about 103 registered to date. Poster session is Tuesday evening 7-9 p.m. with the social held

concurrently and an open bar. All participants receive a free t-shirt. Do we need a policy for registration fee charges for workshops and symposiums? Heidi will check on expenses and profits from the symposia and workshops. Should make more of an effort to get sponsors for workshops.

FMCS needs to begin soliciting ideas from the membership for a theme for the next workshop. Ideas include: stream/habitat restoration with presentations on what has been tried to see what does and doesn't work; health issues and sampling; pharmaceutical chemicals in the active form are showing up in streams; endocrine disruptors and how they apply to mollusks; human health and mussel health workshop.

### **Nominations Committee**

Tom will contact Leroy to draft a nomination policy. An additional person is needed to serve on the committee.

### **MOA with FWS and FMCS**

DOI employees are to get a waiver to serve as an officer in professional societies. This used to be signed in the regional office, now has to go to the director. FWS wants to encourage employees to be liaisons to committees and not serve as officers. Ethics counselor for DOI signs for USGS folks. MOA itself is not an issue but the waiver is.

### **Change in president/president-elect terms**

Since the term for president of FMCS changed from 1 year to 2 years, the board needed to determine how to get our elections back on track. Two options were proposed:

1. Tom (current president) serves a 2 year until May 2005.
2. Bob Anderson (current president-elect) begins serving as president now and the board appoints a president-elect; vote for president, president-elect, and secretary this fall.

The board decided to have Tom serve a 2-year term and have Bob take the reigns in May 2005 at the symposium. Leroy will post a call for nominations for president-elect and secretary in *Ellipsaria*. Tom has appointed an executive assistant.

The FMCS business meeting will be held on Tuesday evening.

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## **FMCS Committee Reports**

### **Awards**

The primary activity of the Awards Committee during 2004 has been to draft formal descriptions of the three Professional Level Society Awards (Lifetime Achievement, William J. Clench Memorial Award, and Meritorious Service Award). The descriptions were completed and approved by the FMCS Executive Board in June 2004. The descriptions and call for nominations for these awards are presented elsewhere in the newsletter and are on the Awards Committee web page. In addition, preparations have been

made to announce the 2005 Student Travel and Best Student Platform and Poster awards that will be given in conjunction with the 2005 Symposium in St. Paul, Minnesota. Students and their advisors are encouraged to see the Award Announcements and Eligibility Requirements in this newsletter or on the web. For the upcoming Symposium, a cash award of \$500 will be presented by the Society to a student making the best platform and poster presentation. Up to \$3000 will be available to qualified students for Student Travel Awards to help defer the costs of attending the 2005 Symposium. It is anticipated that 10 to 30 travel awards of \$100 to \$300 (actual number and amount depends on the number of qualified applicants) will be presented during this cycle.

*Submitted by Greg Cope, Chair*

### **Environmental Quality and Affairs**

No report.

### **Gastropod Status and Distribution**

No report.

### **Guidelines and Techniques**

Nothing new to report.

### **Information Exchange**

Nothing new to report.

### **Mussel Status and Distribution**

The progress on the Mussel Atlas continues to move at a glacial pace. Any interested members are encouraged to sign up for a particular species by emailing the chair [kroe@delmnh.org](mailto:kroe@delmnh.org) and begin working on a species account. A list of available accounts can be obtained at the FMCS web site or by contacting the committee chair. A proposal was floated at the most recent board meeting to publish some accounts on the web site as a means of generating interest and is being pursued.

*Submitted by Kevin Roe, Chair*

### **Outreach**

Outreach has been busy! Understatement City, friends. Yes, the little group of mussel apostles have been hard at it in preparation for our biggest venue yet...AFS 2004. If you have been beneath the proverbial rock, here's the skinny. The American Fisheries Society annual meeting (its 134<sup>th</sup>) is August 22-26, in lovely Madison Wisconsin. Our session, titled "Mussels in America: shells of their former selves", will be held on August 24<sup>th</sup>. Details can be had by following this link: <http://www.afs2004madison.org/> This meeting is an outstanding opportunity to teach, inform and convert fisheries professionals to a new sensitivity towards mussels. These are the folks with direct jurisdiction over the rivers, streams, and lakes our beloved Unionids inhabit. To that end, we are planning the following:

1. **The FMCS Trade Booth.** We have space on the trade show floor in a prime, highly visible location. We have purchased a 10' x 8' "pop-up" that highlights the Society, its products, and the beauty and intrigue

of the fauna. The display is welcoming, tasteful, and will hopefully lure fish folks into a new appreciation. Look for pictures on the FMCS web site and the newsletter this fall. And...this is available to all members for their venues. The display can be easily customized to any audience.

2. **FMCS Mussel Symposium.** Jeremy Tiemann has put together a stellar cast to spread the word. FMCS heavy hitters will present at the Tuesday AFS symposium with talks on status, life history, threats, recovery efforts, and how to get involved. We will lure (more like bribe!) participants to attend by raffling off original Dick Biggins' carvings. This promises to edify the rank and file and hopefully pull in some new society members.
3. **New Tools for Outreach.** New contributions were solicited this spring and we have collated them into a new offering with updated contacts and resources. A copy will replace the current net-based .pdf files in the near future. This is one of the products to be rolled out in Madison as well.

The April 2004 newsletter mentioned that if you can swing a few days in Madison to help out with the booth, we welcome all takers. It will have to be on your dime and it is a spendy meeting. However, it is a great chance to talk fish and mussels and interact with a group our Society needs to embrace.

*Submitted by Kurt Welke*

### **Propagation, Restoration, and Introduction**

See page 3 for workshop summary.

### **Symposium**

See page 1.

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## **FMCS Awards**

### **Statement of Organization and Purpose**

FMCS Awards are divided into two categories; Professional Awards (3 total) and Student Awards (2 total). Each award category is evaluated by separate guidelines but maintains the intent of the Society's award process. **Unless an award specifies otherwise**, candidates may: 1) be self-nominated or nominated by an individual or group; 2) may be from North America or any other geographical area; and 3) be FMCS members or non-members. Recipients of these awards are announced every two years at the FMCS Biennial Symposium, during the awards ceremony.

The FMCS Awards Committee is responsible for the administration and oversight of all FMCS awards, but award approval, unless otherwise stated, is granted by the FMCS Executive Board. The duties of the Awards Committee are to: (1) solicit nominations and to recommend recipients for each award given by the Society; (2) administer awards to students, including selecting the awardees in conjunction with a panel of independent judges; and (3) coordinate all award activities with the FMCS Treasurer and Executive



Board to ensure the timely and smooth implementation of award programs.

### Lifetime Achievement Award

The Lifetime Achievement Award was established by FMCS in 1998 and is given every two years (in conjunction with the biennial symposium), if warranted, to an individual for singular accomplishments or long-term contributions that have advanced the conservation and science of freshwater mollusks at a national or international level. The recipient of this award must have had (1) activity in one or more aspects of freshwater mollusk research and/or conservation for a substantial period of time, with a recommended minimum guideline of 20 years and (2) made substantial contributions to the scientific understanding of freshwater mollusks and/or their conservation.

**Nomination Process:** The candidate may or may not be an active member of FMCS. However, nominations for this award must be made by an active FMCS member and should clearly and thoroughly document the accomplishments of the nominee.

**Application Instructions:** An application package containing the following materials must be submitted to the Chair, FMCS Awards Committee and must contain all of the material requested to be considered for the Award.

1. Letter of Nomination
2. A curriculum vitae
3. Documentation of contributions to the field
4. Three letters of recommendation from active members of the Society. The letters should explain how the candidate has excelled among colleagues in the field with regard to duration and extent of contributions.

**Selection of Recipient:** The FMCS Awards Committee will receive and evaluate nomination packages for completeness and eligibility. Packages will be forwarded with recommendations to the Executive Board of the Society for majority approval. Announcement of the Award will be made at the Biennial Symposium. The recipient of this award will be granted free lifetime membership in the Society

Completed applications must arrive by **30 November** of the year preceding the Biennial Symposium. Send to:  
Chair, FMCS Awards Committee

#### Past Lifetime Achievement Award Recipients

Year	Name
1999	John B. Burch W. D. Russell-Hunter David H. Stansbery Paul W. Parmalee
2001	Richard I. Johnson William H. Heard
2003	Richard G. Biggins

### William J. Clench Memorial Award

The William J. Clench Memorial Award was established by FMCS in 2000 to recognize outstanding contributions to the field of malacology, including significant collections. William J. Clench was born on October 24, 1897 and later served as Curator of Mollusks at the Harvard University Museum of Comparative Zoology from 1926 to 1966. He worked toward having a well-balanced worldwide research collection, through exchanges, collecting trips, and acquiring collections from small private museums or individuals which could no longer afford to care for them. He remained active in this regard until his death on February 22, 1984.

This award is given every two years (in conjunction with the biennial symposium), if warranted, to an individual for singular accomplishments or long-term contributions that have advanced the natural history and understanding of freshwater mollusks at an academic or non-academic level. The recipient of this award must have had (1) activity in one or more aspects of freshwater mollusks for a substantial period of time, with a recommended minimum guideline of 20 years and (2) made substantial contributions to the field of freshwater malacology.

**Nomination Process:** The candidate may or may not be an active member of FMCS. However, nominations for this award must be made by an active FMCS member and should clearly and thoroughly document the accomplishments of the nominee.

**Application Instructions:** An application package containing the following materials must be submitted to the Chair, FMCS Awards Committee and must contain all of the material requested to be considered for the Award.

1. Letter of Nomination
2. A curriculum vitae
3. Documentation of contributions to the field
4. One letter of recommendation from an active member of the Society. The letter should explain how the candidate has excelled among colleagues in the field with regard to duration and extent of contributions.

**Selection of Recipient:** The FMCS Awards Committee will receive and evaluate nomination packages for completeness and eligibility. Packages will be forwarded with recommendations to the Executive Board of the Society for majority approval. Announcement of the Award will be made at the Biennial Symposium.

Completed applications must arrive by **30 November** of the year preceding the Biennial Symposium. Send to:  
Chair, FMCS Awards Committee

#### Past William J. Clench Memorial Award Recipients

Year	Name
2001	Herbert C. Athearn Frieda H. Schilling
2003	Marian E. Havlik W. Henry McCullagh

## Meritorious Service Award

The Meritorious Service Award was established by FMCS in 2000 and is given every two years (in conjunction with the biennial symposium), if warranted, to an individual for singular accomplishments or long-term contributions to the Society. The recipient of this award must be a past or present FMCS member who has performed long-term, exceptionally high-quality service to the Society.

**Nomination Process:** The candidate must have been an active member of FMCS to qualify. Nominations for this award may be made by the candidate or by a past or present FMCS member. The nomination must be accompanied by documentation of service made to the Society.

**Application Instructions:** An application package containing the following materials must be submitted to the Chair, FMCS Awards Committee and must contain all of the material requested to be considered for the Award.

1. Letter of Nomination
2. A curriculum vitae
3. Documentation of service to the Society
4. One letter of recommendation from an active member of the Society. The letter should explain how the candidate has excelled among colleagues with regard to duration and extent of service to FMCS.

**Selection of Recipient:** The FMCS Awards Committee will receive and evaluate nomination packages for completeness and eligibility. Packages will be forwarded with recommendations to the Executive Board of the Society for majority approval. Announcement of the Award will be made at the Biennial Symposium.

Completed applications must arrive by **30 November** of the year preceding the Biennial Symposium. Send to:  
Chair, FMCS Awards Committee

### Past Meritorious Service Award Recipients

Year	Name
2000	Alan C. Buchanan

## Best Student Presentation Awards

The Best Student Presentation Awards were established by FMCS in 2002 and are given every two years (in conjunction with the biennial symposium) to an individual for the Best Platform (oral) and Best Poster Presentations at the symposium.

### Eligibility Requirements:

All students submitting abstracts, provided they meet the eligibility requirements, will be judged for the best student platform or poster presentation unless otherwise indicated on the abstract submittal form.

1. Must presently be a student or graduated after March in the year preceding the Biennial Symposium
2. Must be a first author and present the paper

3. The presentation must be from research conducted as a student and not as a post-graduate
4. The FMCS encourages students to give presentations on preliminary stages of their research prior to any data having been collected; however, only presentations that contain data (i.e., results) will be considered for awards
5. Student status must be indicated on the abstract

### Past Best Student Platform Award Recipients

Year	Name
2003	Constance L. Rogers Lora L. Zimmerman

### Past Best Student Poster Award Recipients

Year	Name
2003	Ashley S. McBride

## Student Travel Award

The Student Travel Award was established by FMCS in 2002 and is a monetary award given to students to facilitate their participation and attendance at the biennial symposium.

### Student Travel Award Criteria:

Each applicant must

1. be a student member of the society or
2. have included dues for membership in their application for the travel award.

Applicants must be making a platform or poster presentation at the biennial symposium of the society (written acceptance of abstract from FMCS is not required as long as an abstract was submitted).

### Application Materials:

1. A completed application form
2. A copy of the applicant's abstract that was already submitted through the application submission process
3. A one-page curriculum vitae of the applicant
4. A letter of recommendation and statement of financial need (why travel funds are not available from the home institution) from the applicant's research advisor (one page maximum)

### Evaluation Procedure:

Because the number of awards is limited by available funds, applicants will be ranked on the basis of the following criteria:

1. Completeness and timeliness of application package
2. Quality of the abstract, and
3. Letter of recommendation and statement of financial need

### Past Student Travel Award Recipients

Year	Name
2003	Jennifer E. Buhay Ariel Capili Elizabeth A. Neal Josh H. Seagraves Daelyn A. Woolnough

*Submitted by Greg Cope*

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## Call for 2005 FMCS Professional Award Nominations

Do you know someone who has made worthwhile contributions to mussel conservation or to the Society either through donating their professional time or expertise or through their scientific endeavors? Consider nominating them for one of the FMCS Professional Awards. Nominations and supporting documentation are due on 30 November 2004. See the preceding article in this newsletter or go to Awards Committee web site for more details. Contact Dr. Greg Cope, [greg\\_cope@ncsu.edu](mailto:greg_cope@ncsu.edu) or 919.515.5296, for more information.

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## Mississippi Mussel Guide

Each current FMCS member has received a copy of "Freshwater Mussels of the Upper Mississippi River" with this newsletter. This booklet was produced by the Wisconsin Department of Natural Resources and funded in part by FMCS. It is a revision of the popular 1985 booklet.

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## Publications

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### New Guide to the Freshwater Mussels of the New York Metropolitan Region and New Jersey

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02111 *and*  
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Due to the overwhelming positive response and instructional value to the American Museum of Natural History's Center for Biodiversity and Conservation (CBC) annual identification workshops (butterflies and moths, dragonflies and damselflies, freshwater mollusks, bees), the CBC has developed a web handbook as a short-course to the freshwater mussels occurring within 75 miles of New York City (including southwestern Connecticut) and throughout New Jersey. It was based on a 2000 taxonomic workshop on freshwater mollusks taught by Dr. David Strayer and myself and is designed for naturalists, biologists, and resource managers working to conserve local freshwater ecosystems. The handbook includes a section on mussel identification morphology, a photo illustrated guide to 14 species plus

three species of invasive freshwater bivalves, a dichotomous key, conservation status assessment, habitat guide, glossary, bibliography of print and web resources, and essays on freshwater mussel taxonomy, diversity and distribution, biology, ecology, threats, conservation, and study methods, including a guide to local regulations. Keys and resources about other invertebrate taxa are also available. The handbook is generously illustrated with color photographs of specimens from multiple viewpoints, morphological shell features, county level distribution maps, and sample habitat photographs for each taxon. All information is freely available online at: <http://cbc.amnh.org/mussel/>

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## Conservation Plan for Freshwater Mussels of the UMR System

The *Conservation Plan for Freshwater Mussels of the Upper Mississippi River System* (revised May 2004), prepared by the Mussel Ad Hoc Committee of the UMRCC, is available at: <http://www.mississippi-river.com/umrcc/>

This is intended to be a "living document" that will be revised periodically as new information becomes available and new strategies are developed. The authors welcome any comments and suggestions that would help enhance short- and long-term mussel conservation goals.

Gary Wege, U.S. Fish and Wildlife Service Biologist  
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## New Internet Publication: History of Malacology

The American Malacological Society has recently posted *2,400 Years of Malacology* by Eugene V. Coan, Alan R. Kabat, and Richard E. Petit on their website: [http://erato.acnatsci.org/ams/publications/2400\\_malacology.html](http://erato.acnatsci.org/ams/publications/2400_malacology.html)

This is a comprehensive catalog of biographical and bibliographical papers on malacologists, conchologists, paleontologists, and others with an interest in mollusks. At present, the catalog is over 600 pages and indexes over 5,000 individuals. This catalog is a work in progress, and updated versions will be posted periodically.

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Thorsen, W. A., W. G. Cope, and D. Shea. 2004. Bioavailability of PAHs: Effects of soot carbon and PAH source. *Environmental Science and Technology* 38 (7): 2029-2037.

Article includes information on native freshwater (e.g., *Elliptio complanata*) and marine bivalves. Contact Greg Cope ([greg\\_cope@ncsu.edu](mailto:greg_cope@ncsu.edu)) for a reprint.

Peeples, G.E. 2004. Dick Biggins, recovery hero. *Endangered Species Bulletin* 28(4):24-25.

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## Contributed Articles

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### Ohio Pigtoe Host Suitability Trials

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and

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Yokley (1972) identified Redfin Shiner as a host for the Ohio Pigtoe, *Pleurobema cordatum* (Rafinesque, 1820); Fuller (1974) added Bluegill. No work seems to have been done on that mussel species since. Specimens of the Ohio Pigtoe, an Ohio endangered species, were collected in August, 2003, in the Muskingum River at Devola, Ohio. They have been kept in captivity at the Columbus Zoo and Aquarium Freshwater Mussel Conservation and Research Facility since that time. On 19 May 2004 numerous (~50) conglomerates were released by one or more mussels. (Additional conglomerates were sporadically released into mid-June). Conglomerates were 10-15 mm in length, white, composed of two longitudinal bodies connected by ladder-like rungs. Most of the conglomerate was composed of unfertilized, structural eggs in which were embedded functional glochidia. Conglomerates were fed to fish on 19 May. Fish were obtained from a nearby reservoir and a local bait store and maintained at 18-20°C in isolated AHAB tanks. Typically, many of the cyprinids were lost before completion of the tests.

Fish that facilitated metamorphosis:

Creek Chub, Guppy, Brook Stickleback. The encystment period was 27-46 days, with most juveniles collected over days 43-45. Juveniles newly metamorphosed had nearly doubled in length from their glochidial size. Brook stickleback was the best host; a single fish produced >40 juveniles. Guppy was a marginal host. Neither Guppy nor Brook Stickleback co-occur with Ohio Pigtoe in Ohio.

Fish that did not facilitate metamorphosis:

Bluegill, Goldfish, Green Darter, Green Sunfish, Stonecat, White Crappie.

Fuller's identification of Bluegill as a host was not substantiated.

#### Reference

Fuller, S.L.H. 1974. Clams and mussels (Mollusca: Bivalvia). Pp. 215-273 in C.W. Hart & S.L.H. Fuller (eds.), *Pollution Ecology of Freshwater Invertebrates*. Academic Press, New York. 389 pp.

Yokley, P. 1972. Life history of *Pleurobema cordatum* (Rafinesque, 1820) (Bivalvia: Unionacea). *Malacologia* 11: 351-364.

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### A first attempt towards a compilation of a list of predators of freshwater molluscs in Israel and Palestine

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Freshwater molluscs play an important role in the food chain of many other animals, yet little information has been published about this subject in the Levant. For example, most records of predation on aquatic molluscs have appeared in the form of short faunistic notes, often in journals hardly available to the general public. This is a first attempt to summarize the published and unpublished information dealing with predation on freshwater molluscs in Israel and Palestine. Only records of prey species identified at least at the generic level have been included in the list. I hope sincerely that it will lead to a stream of additional records.

In the near future a similar list will be published dealing with the parasites recorded so far from freshwater molluscs in the same region. These parasites exploit the molluscs often as an intermediate station in order to reach their final host: often a predator of the aquatic molluscs.

#### Predators of freshwater molluscs in Israel and Palestine

Family NERITIDAE

*Theodoxus (Neritaea) jordani jordani* (Sowerby, 1836)

Starling – *Sturnus vulgaris* (Mienis, unpublished).

*Theodoxus (Neritaea) karasuna* (Mousson, 1874)

Damascus barbel – *Capoeta damascina* (Mienis, unpublished).

*Theodoxus (Neritaea) michonii* (Bourguignat, 1852)

Rainbow trout – *Oncorhynchus mykiss* (Mienis, unpublished);

Levantine dace – *Pseudophoxinus kervillei* (Mienis, unpublished);

Josephus cichlid – *Astatotilapia flavijosephi* (Mienis, unpublished);

Mediterranean Hooded Crow – *Corvus corone sardonius* (Aharoni, 1938).

Family BITHYNIIDAE

*Bithynia phialensis* (Conrad, 1852)

Rainbow trout – *Oncorhynchus mykiss* (Mienis, unpublished);

Damascus barbel – *Capoeta damascina* (Mienis, unpublished);

Josephus cichlid – *Astatotilapia flavijosephi* (Mienis, unpublished);

Starling – *Sturnus vulgaris* (Mienis, unpublished).

#### Family THIARIDAE

*Melanoides tuberculatus* (Müller, 1774)

Leech – *Helobdella punctatolineata*\*\* (Mienis, 1986a);

Levant freshwater crab – *Potamon potamios*\* (Mienis, unpublished);

Damascus barbel – *Capoeta damascina* (Mienis, unpublished);

Glossy ibis – *Plegadis falcinellus* (Mienis, 1997);

Starling – *Sturnus vulgaris* (Mienis, unpublished);

Mediterranean Hooded Crow – *Corvus corone sardonius* (Aharoni, 1938 as *Melania*).

#### Family MELANOPSIIDAE

*Melanopsis buccinoidea* (Olivier, 1801)

Levant freshwater crab – *Potamon potamios*\* (Mienis, 2003);

Rainbow trout – *Oncorhynchus mykiss* (Mienis, unpublished);

Damascus barbel – *Capoeta damascina* (Mienis, unpublished);

Starling – *Sturnus vulgaris* (Mienis, unpublished);

Brown-necked raven – *Corvus ruficollis* (Aharoni, 1938 as *M. praemorsa*).

*Melanopsis cerithiopsis* Bourguignat, 1884

Levant freshwater crab – *Potamon potamios*\* (Mienis, unpublished);

Starling – *Sturnus vulgaris* (Mienis, unpublished).

*Melanopsis costata costata* (Olivier, 1804)

Levant freshwater crab – *Potamon potamios*\* (Mienis, unpublished);

Josephus cichlid – *Astatotilapia flavijosephi* (Mienis, unpublished);

Starling – *Sturnus vulgaris* (Mienis, unpublished).

*Melanopsis costata jordanica* Roth, 1839

Levant freshwater crab – *Potamon potamios*\* (Mienis, unpublished);

Yellow-vented bulbul – *Pycnonotus xanthopygos* (Mienis, 1994b as *M. praemorsa jordanica*).

*Melanopsis lampra* Bourguignat, 1884

Levant freshwater crab – *Potamon potamios*\* (Mienis, unpublished);

#### Family VALVATIDAE

*Valvata (Cincinna) saulcyi* Bourguignat, 1853

Rainbow trout – *Oncorhynchus mykiss* (Mienis, unpublished);

Starling – *Sturnus vulgaris* (Mienis, unpublished).

#### Family PHYSIDAE

*Haitia acuta* (Draparnaud, 1805)

Leech – *Helobdella punctatolineata*\*\* (Mienis, 1986a as *Physella acuta*);

Banded newt – *Triturus vittatus* (Mienis, unpublished);

Rainbow trout – *Oncorhynchus mykiss* (Mienis, unpublished);

Levantina frog – *Rana levantina* (Mienis, 1996 as *Physella acuta*);

Lapwing – *Vanellus vanellus* (Mienis, 1985 as *Physella acuta*);

Black-winged stilt – *Himantopus himantopus* (Mienis, 1994a as *Physella acuta*);

Green sandpiper – *Tringa ochropus* (Mienis, 1986b as *Physella acuta*).

#### Family PLANORBIDAE

*Bulinus (Isidora) truncatus* (Audouin, 1826)

Green Sandpiper – *Tringa ochropus* (Mienis, 1986b).

*Gyraulus (Gyraulus) piscinarum* (Bourguignat, 1852)

Rainbow trout – *Oncorhynchus mykiss* (Mienis, unpublished).

*Planorbella duryi* (Wetherby, 1879)

Leech – *Helobdella punctatolineata*\*\* (Mienis, 1986a as *Helisoma duryi*).

*Planorbis* species

Green Sandpiper – *Tringa ochropus* (Cockburn, 1946).

#### Family LYMNAEIDAE

*Pseudosuccinea columella* (Say, 1817)

Leech – *Helobdella punctatolineata*\*\* (Mienis, 1986a);

Moorhen – *Gallinula chloropus* (Mienis, 1987);

Green sandpiper – *Tringa ochropus* (Mienis, 1990).

#### Family UNIONIDAE

*Unio mancus eucirrus* Bourguignat, 1857

Moorhen – *Gallinula chloropus* (Mienis, unpublished).

*Unio terminalis delicatus* Lea, 1863

Kingfishers – either *Halcyon smyrnensis* or *Ceryle rudis* (Ashkenazi and Mienis, unpublished).

*Unio terminalis terminalis* Bourguignat, 1852

Moorhen – *Gallinula chloropus* (Mienis, unpublished);

Mediterranean Hooded Crow – *Corvus corone sardonius* (Mienis, unpublished).

#### Family CORBICULIDAE

*Corbicula consobrina* (Cailliaud, 1823)

Levant freshwater crab – *Potamon potamios*\* (Mienis, unpublished).

*Corbicula fluminalis* (Müller, 1774)

Levant freshwater crab – *Potamon potamios*\* (Mienis, unpublished).

\* So far only one species of freshwater crab has been reported from Israel and Palestine (*Potamon potamios* s.l.); however, according to Dr. Sh. Ashkenazi (pers. com.) two morphological types seem to occur among these crabs.

\*\* *Helobdella triserialis* seems to be an older name for this North-American species (Bromley, 1994).

#### Acknowledgements

I like to thank Dr. Sh. Ashkenazi (Hebrew University of Jerusalem) and Mr. Shalom Hayat for donating large quantities of freshwater mussels that were probably predated upon by a species of Kingfisher to the National Mollusc Collection of the Hebrew University of Jerusalem. Likewise I wish to thank the students of Prof. Menachem Goren (Tel Aviv University) for regularly showing me the molluscs found in the intestines of freshwater fishes.

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- Mienis, H.K., 2003. Molluscs from the excavation of Tel Kabri (with an appendix dealing with Crustaceans found at that site). *Triton* 7:28-37.

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## Survey of the Freshwater Mussels of the Channelized Missouri River

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Investigations conducted at 67 sites along the channelized Missouri River and its floodplain lakes and sloughs in Missouri, Kansas, Iowa, and Nebraska primarily between 1988 and 1990 documented the presence of 15 unionid species. The most common unionids collected from the Missouri River were *Anodonta suborbiculata*, *Leptodea fragilis*, *Potamilus alatus*, *P. ohioensis*, and *Pyganodon grandis*. Other species documented for the channelized reach of the Missouri River were: *Lampsilis teres*, *Lasmigona c. complanata*, *Leptodea leptodon*, *Obliquaria reflexa*, *Obovaria olivaria*, *Quadrula quadrula*, *Toxolasma parvus*, *Truncilla donaciformis*, and *Utterbackia imbecillis*.

The bivalve *Corbicula fluminea* was found to be common in the reach extending from the confluence of the Missouri

River above St. Louis to about 50 miles east of Kansas City. This bivalve was not recovered in any other reach of the river.

The location of unionid populations in the Missouri River almost always coincided with the presence of stable substrates and relatively slow currents. The most productive habitats were as follows: areas immediately downstream and along the inside bank of river bends; behind wing dams; and along rock lined banks where the gaps between rocks had filled with sediment. Mussels were rare or absent along banks immediately adjacent to rapid currents.

Floodplain lakes and sloughs contained a less diverse fauna comprised of the following eleven species: *Anodonta suborbiculata*, *Lampsilis teres*, *Lasmigona c. complanata*, *Leptodea fragilis*, *Potamilus alatus*, *P. ohioensis*, *Pyganodon grandis*, *Quadrula quadrula*, *Toxolasma parvus*, *Uniomermis tetralasmus*, and *Utterbackia imbecillis*.

A paper on this survey is nearing completion and will be submitted for publication in the near future.

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## Problems with dating freshwater snails from extinct populations in Israel

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Israel is situated in an area suffering from increasing desertification. At many widely separated locations you can come across deposits showing a rich assortment of freshwater shells, while on the map you will look in vain for a spring, a stream, or any other aquatic biotope in the vicinity. If such shells are found within the context of a historical site, then the mollusc remains can be dated with the help of a coin, a pottery shard, or another item to which a precise date can be fixed. In cases that easily datable artifacts are not available, then we have to look for other means to get a reliable date for these extinct mollusc populations. Such dates can be obtained by estimating the age with the help of radiocarbon dating techniques carried out at the Weizmann Institute of Science in Rehovot. In most cases, especially with charcoal, pieces of wood, bones, ostrich egg-shells, and marine molluscs, this technique seems to work perfectly; however, in the case of freshwater molluscs, we have come across some unexpected anomalies in the results.

**Some examples of anomalies in dating freshwater shells**  
 Numerous areas in the south of Israel - the Negev desert and the Arava Valley - show evidence of former much wetter

periods than today. At many places intensive farming with the help of ingenious irrigation methods have been discovered. Most of these farms have one thing in common: they were deserted towards the end of the Byzantine period or the beginning of the Early Islamic period (6<sup>th</sup>-7<sup>th</sup> Century C.E.). One such farm was situated near 'En 'Avrona in the Arava Valley, north of Elat. Samples taken from an irrigation pool, which stopped functioning during the Early Islamic period, contained numerous specimens of *Melanoides tuberculatus* (Müller, 1774), *Melanopsis buccinoidea* (Olivier, 1801) and what seems to be an undescribed species of *Heleobia*. Specimens belonging to *Melanopsis* were submitted for radiocarbon dating and this resulted in a <sup>13</sup>C value of 6575±90 BP (BP=before present) (Segal & Carmi, 1996: 98), i.e. about 5000 years older than it was supposed to be.

Near Tel Goded, in the Judean lowlands, an interesting water system which provided water to the ancient settlement of Bet Guvrin during historic times has been excavated (Sagiv et al., 1997). This water system consisted of a man-made pool and a stone-hewn canal running from Tel Goded to Bet Guvrin. At the bottom of the pool, more exactly in the south-eastern corner of it, a rich assortment of freshwater molluscs was discovered, showing that the pool was fed with running water year round (Mienis, in preparation). Today you will look in vain for a spring or streamlet on the map of that area. That part of the pool had been built during or after the reign of Constantius II (337-361 C.E.); a coin dating back to that period was found pressed into the plaster at the base of its inner wall. A batch of snails belonging to *Melanopsis buccinoidea* was also submitted for radiocarbon dating, which resulted in a <sup>13</sup>C value of 5615±60 BP (Segal & Carmi, 1996: 91-92), i.e. about 4000 years too old.

#### **How can we explain these anomalies?**

According to Segal & Carmi (1996: 92) these anomalies are caused by the incorporation of water carbonate into the shells by the snails as seen from the <sup>13</sup>C value. In my opinion it is much more likely that *Melanopsis* picks up old carbonate particles while scraping algae from the submerged limestone rocks and other objects in its aquatic environment. A part of this material is being incorporated in the shell and this results in a mixing of old and contemporary carbonates (i.e. from the time the snail actually lived) within the shell matrix. Since such a mixture is highly environmentally dependant and may vary from place to place, it is probably impossible to find a tool for calibrating the <sup>13</sup>C values. At the Weizmann Institute they are now looking for a method to separate organic particles from freshwater shells and to restrict the radiocarbon dating process to these fractions in order to obtain more reliable dating results.

#### **References**

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## **Mussel Studies**

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### **Clinch and Powell Rivers, TN/VA**

Every five years since 1979, mussels in the Clinch and Powell Rivers are quantitatively evaluated (quadrade sampling). This has established long-term trend monitoring for mussel populations in both drainages. It was determined that only 12 sites would be evaluated in 2004 (6 each in both rivers). Sampling in the Powell River is completed. Mussel densities and species composition continue a downward trend. The Powell suffers from high concentrations of coal fines mined and released from settling lagoons in Virginia. Four of the six sites in the Clinch are finished and sites in Tennessee (3) show a continued upward trend in mussel densities and species composition. Many juvenile T & E species, especially *E. capsaeformis* and *E. brevidens*, were noted along with *C. stegaria* and *P. plenum*. Of concern is the amount of coal fines showing up in Tennessee from mining operations in Virginia. Black-water events from coal mining operations are a serious problem and unless it is stopped, the Clinch will look like the Powell.

### **Powell River, TN/VA**

Gravid *P. cyphus* and *L. fasciola* were collected from the Powell River for culture and propagation at Virginia's Buller hatchery and Virginia Tech's mussel culture facility. This is a joint effort between Virginia Department of Fish and Game, VPI, FWS, and USGS. Goals are to restore mussel populations in the Powell River.

### **Cumberland Plateau – Upper Caney Fork, TN**

Survey efforts in the upper Caney Fork drainage found some new populations of *Pleurobema gibberum* and *Venustachoncha sima*. No *P. fabula* or *L. diversa* were found. Survey will continue this fall.

### **Big South Fork Cumberland (TN), Clinch River (TN), Paint Rock River (AL), Mobile River Basin**

Continue assisting with the collection of gravid T & E mussel species for culture and propagation at Virginia Tech's mussel culture facility and Tennessee Aquarium Research Institute's mussel culture facility located in Cohutta, Georgia. Gravid *E. capsaeformis*, *E. brevidens*, *E. walkeri*, *V. perpurpurea*, *T. cylindrellus*, *P. greenii*, and *L. attilus* were found for culturing.

### **Duck River Report and Juvenile Mussel Habitat Study**

Final report to The Nature Conservancy is just about completed. Will be starting a juvenile mussel habitat study related to increased flows in the Duck River. Increased minimum flows in the last 10 years from TVA's Normandy

Dam has created nursery areas along the shoreline of the river that previously went dry. Efforts will be concentrated at two sites. Work is expected to begin in August or September and was funded by the FWS Cookeville, Tennessee field office.

### Recovery Plan Development for Tennessee and Cumberland River Basins

Efforts are underway to develop a recovery plan for mussels in the Tennessee and Cumberland River basins. This is a joint effort at identifying the most critically rare species and prioritizing which species to concentrate on first that are recoverable or offer the best chances for success. Some species are at critical low levels and may not survive the next ten years. State and federal agencies involved with this process include TN, KY, VA, NC, USGS, and FWS.

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## Additional new records of freshwater mollusks (Gastropoda & Bivalvia) from Santa Catarina State, Southern Brazil, with complementary observations about mollusks fauna from the Mampituba river basin

A. Ignacio Agudo

Projeto Naiade (Naiade Project)

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Keywords: Freshwater mollusks; Gastropoda; Bivalvia; Continental malacological fauna survey; Mampituba river basin; Santa Catarina state; Southern Brazilian country

The malacological inventory recently conducted in the Santa Catarina's state continental territory (Agudo 2004b) included new reports of freshwater mollusks species and other observations from the Mampituba river basin region (Agudo 2004a). Seven new records of native mussels/naiades and 1 freshwater snail were included from the State, elevating the known number of freshwater species to 47 (27 Gastropoda and 20 Bivalvia: 15 Unionoida & 5 Veneroida) (Agudo 2004b).

### Systematic Species List: new records

Class GASTROPODA

Subclass Prosobranchia

Family HYDROBIIDAE (1)

*Potamolithus catharinae* Pilsbry, 1911

Class PELECYPODA = BIVALVIA

Order Unionoida

Family MYCETOPODIDAE (2)

*Anodontites iheringi* (Clessing, 1882)

*Anodontites lucidus* (Orbigny, 1835)

Family HYRIIDAE (4)

*Diplodon aethiops* (Lea, 1860)

*Diplodon martensi* (Ihering, 1893)

*Diplodon pilsbryi* Marshall, 1928

*Diplodon rhuacoicus* (Orbigny, 1835)

Order Veneroida

Family SPHAERIIDAE (1)

*Sphaerium observationis* (Pilsbry, 1911)

From the Mampituba River Basin, the boundary between the states of Santa Catarina and Rio Grande do Sul (Agudo 2004a), only four short contributions were found in the literature: Pereira (1993) from the freshwater snail *Chilina* sp, and Guterres & Guterres (1997 a, b, c) from the estuarine snail *Melampus coffeus* (Linnaeus, 1758), with particular reference to other two local species (Guterres & Guterres 1997 b): *Heleobia piscium* (= *australis*) (Orbigny, 1835) and *Littorina flava* King & Broderip, 1832.

The malacological inventory also included one regional new species record of invasive exotic mussel or naiade:

Class PELECYPODA = BIVALVIA

Order Veneroida

Family CORBICULIDAE (1)

*Corbicula fluminea* (Müller, 1774)

...and one native terrestrial snail: *Punctum (Toltecia) pilsbryi* (Scott, 1957).

For a general visual of the zoogeographical records in this Brazilian territory, see Agudo (2004c).

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Malacologia – XV EBRAM, Julho 21 a 25 de 1997, p. 59.

Guterres, Patrícia Macedo de Castro & Luís Fernando dos Reis Guterres. 1997c. Crescimento de *Melampus coffeus* (Linnaeus, 1758) (Pulmonata, Ellobiidae) no Rio Mampituba, Torres, Rio Grande do Sul, Brasil. Florianópolis, SC: Resumos XV Encontro Brasileiro de Malacologia – XV EBRAM, Julho 21 a 25 de 1997, p. 59.

Pereira, Paulo Antonio Cypriano. 1993. Sobre o encontro de formas albinas em uma população de *Chilina Gray*, 1828 (Mollusca; Gastropoda; Chiliniidae), no canhão do Malacara, Praia Grande, Santa Catarina. Rio de Janeiro, RJ: Programa e Resumos XIII Encontro Brasileiro de Malacologia – XIII EBRAM, Julho de 1993, p. 81.

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## A review of the United States distribution of *Melanoides tuberculatus* (Müller, 1774), an exotic freshwater snail

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### INTRODUCTION

*Melanoides tuberculatus* (Müller, 1774), the red-rim melania, is native to Africa, the Middle East, and southeast Asia (Pilsbry and Bequaert 1927), but is now common in tropical to semi-tropical areas around the globe. The species is live-bearing and generally considered to be parthenogenetic, although evidence exists for sexual reproduction in some populations (Livshits and Fishelson 1983; Heller and Farstey 1990). *M. tuberculatus* is a secondary host of several parasites that affect various species of fish and birds.

*Melanoides tuberculatus* has invaded many areas of the globe with varying effects on the local gastropods. Abbott (1973) noted its spread into Puerto Rico, Mexico, and central America in the 1970s. *M. tuberculatus* may have a competitive advantage over native snails due to its ability to reach high densities (Pontier *et al.* 1991). In Mexico, the arrival of *M. tuberculatus* coincided with decreases in native gastropod populations (Contreras-Arquieta *et al.* 1995, as cited in Contreras-Arquieta 1998). Several studies in the Caribbean also showed negative impacts on *Biomphalaria glabrata* (Pontier and McCullough 1989; Pontier *et al.* 1989; Pontier 1993). *M. tuberculatus* may also have contributed to the decline in *B. glabrata* in Venezuela (Pontier *et al.* 1994). In Africa, however, *M. tuberculatus* does not appear to displace freshwater pulmonate snails (Mkoji *et al.* 1992). Due to the potential effects on the aquatic community, the distribution of this species is important to track.

### METHODS

In July 2001, I surveyed aquatic mollusks in Bridal Veil Falls and portions of Cascade Creek, Cool Creek, and the Cheyenne River on The Nature Conservancy's Whitney Preserve and adjacent properties in southwestern South Dakota. An informal sampling design allowed baseline information to be gathered with a minimum effort. The substrate at eleven points was sampled using a net and sieve bucket.

In addition to my own survey results in South Dakota, I used available literature sources to research locations of *Melanoides tuberculatus*. Through the internet, I found records of occurrence at the Florida Natural History Museum, the Philadelphia Academy of Natural Sciences, and the Smithsonian Institution. Database searches at the Illinois Natural History Museum, the Bailey-Mathews Shell Museum, and the National Museums and Galleries of Wales failed to yield any U.S. records for *M. tuberculatus*. I visited the Field Museum of Natural History in Chicago and searched their collections in person. Contacts at the Delaware Museum of Natural History, the University of Michigan, and the Santa Barbara Museum of Natural History provided records from those collections. Personal communications with others who had recent field observations resulted in additional location information.

### RESULTS

Shells of *Melanoides tuberculatus* were collected from one point in Cascade Creek. The water temperature at the collecting site was 21°C. The shells measured from 5.3 mm to 13.8 mm in length. Robert Herschler confirmed the identification of the samples (pers. com.). Voucher specimens were deposited at the Field Museum of Natural History in Chicago (Voucher #296306).

The known current distribution of *Melanoides tuberculatus* is summarized in Figure 1 and Table 1\*. The distribution discussed here is limited to museum records, published literature reports, and personal communications with other scientists known to be

sampling in the field. More locations are likely along the same drainages in the south (especially in Texas and Florida), but are not plotted unless specific evidence exists for the presence of *M. tuberculatus*.

*Melanoides tuberculatus* has been in the United States for almost half a century, although the exact date of the first incidence is unclear. Records exist for locations in Arizona in the 1950s. The original Arizona population was apparently absent by the 1970s (Murray 1971), although another population may have been present (Dundee 1974). Further investigation is necessary to clarify these early reports because no Arizona records appear later. Certainly the species was in Florida and Texas by the early 1960s (Clench 1969; Murray 1964). In the 1970s, the known U.S. distribution included Florida, Texas, Louisiana, Arizona, and Oregon (as summarized by Dundee 1974; Dundee and Paine 1977; Burch and Tottenham 1980). Museum records and published monographs revealed *M. tuberculatus* was present in Colorado, California, and Hawaii in the 1980s. A compilation of more recent, unpublished sources show additional isolated populations exist throughout the western United States in Idaho, Montana, Wyoming, Nevada, and Utah.

Cowie (1997) stated that *M. tuberculatus* likely was present in Hawaii many years before he recorded it. The lack of earlier records in Hawaii illustrates that first records are the result of a combination of when a species reaches an area and whether anyone is looking for it. It is unknown whether the increased number of known locations reflects recent expansions of the species or a recent increase in mollusk surveys in the western U.S.. The latter might be the case for springs in remote areas of the Great Basin and northern Rocky Mountains. However, recent sightings in North Carolina indicate that the range is probably still increasing, at least in some areas.

## DISCUSSION

As with any invading species, it is important to understand the mechanisms that contribute to the spread of the species. Factors influencing the dispersal and restrictions to its expansion of *Melanoides tuberculatus* are discussed below.

### Method of Dispersal

The pet trade is blamed for the introduction of these animals into Florida and Texas (Murray 1971). Escape or release from personal aquariums is the speculated method of dispersal to many isolated springs. The presence of tropical fish in all of the springs where the snails are found in Montana, Idaho, and Wyoming (D. L. Gustafson, pers. com.) supports this theory.

Not all populations are permanent. A population in Phoenix was reported present in 1955, but not present by the 1970s (Dundee 1974). A 1963 Oregon record appears at the University of Michigan Museum (L. Appleton, pers. com.). In recent surveys of Oregon springs (T. Frest, pers. com.) no *Melanoides tuberculatus* were located, although it is unclear if the exact location was revisited. The reasons for these "disappearances" are unknown, but could represent introductions in areas where temperature tolerances were exceeded.

### Further Expansion of Range

Further range expansion is currently limited by temperature constraints. Most, if not all, of the western localities are in isolated thermal springs. The warmer water can insulate the snails from the cold winters in the area. Murray (1971) states *Melanoides tuberculatus* has a temperature tolerance of 18 to 25°C. Mitchell and Brandt (unpublished data) suggest water temperatures between 18°C and 32°C could support populations, which indicates the potential geographical range is less restricted than previously thought. Global warming may also increase the suitable habitat for the species. Food availability and water velocity may secondarily affect the distribution of the species, at least at the local level (Laamrani *et al.* 1997). The malacological community should continue to track the range of *Melanoides tuberculatus* in order to determine if the species is having an impact on the native fauna.

## ACKNOWLEDGEMENTS

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**\*Table 1.** Known records for *Melanooides tuberculatus* (Müller, 1774) in the United States. [Table 1 is too long to be included in this newsletter. Please email Tamara at tamander@onewest.net to request a copy (Excel format, ~32K)]

**Figure 1.** Map of known occurrences of *Melanoides tuberculatus* (Müller, 1774) in the United States. Counties with occurrences are colored according to the first report of the species in that county.

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## **Phase I of Pennsylvania Aquatic Community Classification Complete**

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Pennsylvania Natural Heritage Program biologists have recently completed the pilot phase of a statewide classification of aquatic communities. In this preliminary classification, a variety of methods were used to classify stream communities of macroinvertebrates, fish and mussels in eight Pennsylvania watersheds. The complete Phase I report is available online (<http://www.paconserve.org/rc/acp.html>), and a summary of the mussel community classification results is provided here.

Mussel and physical habitat data (adjacent land use, water chemistry, habitat quality, and stream hydrology) for Pennsylvania streams were acquired from more than 30 sources, principally from PA DEP, EPA EMAP, and The Nature Conservancy Freshwater Initiative. Data were also acquired from universities, museums, conservation groups, and individuals. Cluster Analysis, Indicator Species Analysis, and Nonmetric Multidimensional Scaling were used to classify communities of mussels, and Canonical Correspondence Analysis (CCA) was used to examine relationships among community types and physical habitat characteristics.

Eight mussel community types were found in the pilot watersheds (Table 1). Four groups were specific to the Ohio River drainage, three specific to the Atlantic Drainage, and one (creeper community) had a small number of sites in both drainages. Generally, CCA did not show strong relationships between the occurrence of communities and physical habitat characteristics. However, some patterns were evident. The yellow lampmussel and creeper communities appeared to be weakly associated with increasing forest cover, and the Ohio lacustrine group showed a slight association with higher wetland coverage. There also appeared to be relationships between the occurrence of communities and water chemistry (alkalinity, dissolved oxygen, and pH), as well as stream characteristics (gradient and stream order).

We continue to evaluate our methods as we look towards expanding our aquatic community classification statewide. We are still in the process of gathering feedback from reviewers, and welcome all comments and suggestions.

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**Table 1.** Mussel Communities found in the pilot classification.

Mussel Community	Significant Indicator Species	Drainage	Habitat Type
Eastern Elliptio community	Eastern <i>Elliptio</i> ( <i>Elliptio complanata</i> )	Atlantic	Found in 2 <sup>nd</sup> to 7 <sup>th</sup> order streams across a range of land use types, stream orders, and temperatures
Yellow lampmussel community	Yellow lampmussel ( <i>Lampsilis cariosa</i> ); Triangle floater ( <i>Alasmidonta undulata</i> )	Atlantic	These species are often found in silt, sand, cobble, and gravel substrates in medium streams to large rivers (Nedeau et al. 2000).
Brook floater community	Brook floater ( <i>Alasmidonta varicosa</i> )	Atlantic	Only two occurrences within the pilot watersheds; found in 3 <sup>rd</sup> & 4 <sup>th</sup> order streams; species may be associated with soft waters (Strayer 1993)
Ohio Backwater community	Giant floater ( <i>Pyganodon grandis</i> ); White heelsplitter ( <i>Lasmigona complanata</i> )	Ohio	Found in 3 <sup>rd</sup> and 4 <sup>th</sup> order streams along margins, backwaters, and reservoirs in sand, mud, and silt; both species pollution tolerant
Fatmucket community	Fatmucket ( <i>Lampsilis siliquoidea</i> )	Ohio	Found in 2 <sup>nd</sup> to 5 <sup>th</sup> order streams in sand, gravel and mud substrates
French Creek Mainstem community	15 significant species	Ohio	Found in 3 <sup>rd</sup> to 5 <sup>th</sup> order low-gradient streams, only in French Creek; shallow riffle and run areas with mixed cobble/gravel and sand substrates
Ohio Lacustrine community	Spike ( <i>Elliptio dilatata</i> ); cylindrical papershell ( <i>Anodontoides ferussacianus</i> )	Ohio	Only found in 2 <sup>nd</sup> to 4 <sup>th</sup> order streams in the French Creek watershed
Creeper community	Creeper ( <i>Strophitus undulatus</i> )	Atlantic/ Ohio	Strayer (1993) found this species to occur in hydrologically stable streams; We found only a weak correlation increasing forest cover.

# Zoogeographical distribution on the freshwater mussels/naiades (Bivalvia: Unionoida & Veneroida) in Santa Catarina State's territory, Southern Brazil

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Keywords: Freshwater mussels – naiades; Unionoida; Veneroida; Continental malacological fauna survey; Santa Catarina state; Zoogeographical distribution; Southern Brazilian country.

Starting from our first field registrations (Agudo 2002) to today with 20 registered species (18 natives, 2 invasive exotics), freshwater mussels/clams or naiades now represent 19% of the known mollusk continental fauna in the State of Santa Catarina (Agudo 2004b), and 43% of the regional freshwater representation (Agudo 2004 a, f). The distribution in the State's territory includes 28 hydrographical points in the Atlantic Coastal Plains (with 12 species for 16 localities) and the Uruguay River (with 16 species for 6 localities) (Agudo 2004 b, c), with just 8 species occurring in both systems of basins (Agudo 2004 b, e).

## Bibliographical Antecedents

### 1.- Sudamerican River Basins

Parodiz & Bonetto (1963, pp. 188, 196) present the distribution of the Naiade families Mycetopodidae and Hyriidae in South América, including the geographical Brazilian territory of Santa Catarina's State.

Bonetto (1964) revised the distribution of genus *Diplodon* Spix, 1827 in the southern Atlantic coastal plains basin systems, into Brazil (State of Rio de Janeiro) and the country of Uruguay.

### 2.- Atlantic Coastal Plains Basin System

Poli et al. (1978, pp. 40-41) mention the occurrence of *Leila* sp from the South area of "Lagoa (Pond) of Peri", in the Santa Catarina's Island.

Simone (1994, pp. 173-174, 180) mentions *Anodontites trapesialis* (Lamarck, 1819) from Joinville, Rio Itapoçu and "President Vargas" (?).

Agudo (2002) relates *Anodontites* sp., *Leila blanvilliana* (Lea, 1834), *Mycetopoda legumen* (Martens, 1888), and *Eupera klappenbachi* Mansur & Veitenheimer, 1975 from the hidrographical portion corresponding to Atlantic coastal plain.

### 3.- Uruguay River Basin System

Callil & Mansur (2002, pp. 154-155) mention the exotic *Corbicula largillierti* (Philippi, 1844) for the Municipal Districts of Joaçaba & Piratuba (Rio do Peixe), Marcelino Ramos (Uruguay River), and *Corbicula fluminea* (Müller, 1774) for the Municipal District of Concórdia (Jacutinga River).

For the upper & middle sections of the Uruguay River Basin (Brazil and Argentina), 40 species are cited in the literature (Agudo 2004 d); of these, 14 are confirmed/included in this registration. The occurrence of *Anodontites iheringi* (Clessing, 1882) and *Diplodon pilsbryi* Marshall, 1928 in the Santa Catarina's territory increases the species total to 42. For the remainder, the occurrence of only 5 of the 14 cited species in the historical literature for the Southern Brazilian Atlantic Coastal Plains ( Bonetto 1964; Mansur 1970, pp. 66, 74) and the Iguazu (= Iguaçú) River Basin System in the neighboring State of Paraná, to the North (Morretes 1949, pp. 17-19, 25, 30; Zanardini 1965; Parodiz 1968, pp. 4, 10), previously revised in the specialized regional literature (Mansur 1970), are confirmed in this study (Agudo 2004 e).

Finally, another invasive exotic species, the freshwater asiatic bivalve *Limnoperna fortunei* (Dunker, 1857), was recently profiled with potential occurrence in the territory of the State (Mansur et al 2004). Imminent entrance is awaited through the Uruguay & Iguazu River Basin Systems and, secondarily, in the "Itajaí River Basin" (through the Port of Itajaí, at the Itajaí-Açu River estuary), in the Atlantic Coastal Plain.

Systematic Species List Class PELECYPODA = BIVALVIA	Regional Distribution	
	Atlantic Plains	Uruguay River
Order Unionoida		
Family MYCETOPODIDAE (8)		
<i>Anodontites crispatus tenebricosus</i> (Lea, 1834)	X**	X
<i>Anodontites ferrarisi</i> (Orbigny, 1835)		X
<i>Anodontites iheringi</i> (Clessing, 1882)		X
<i>Anodontites lucidus</i> (Orbigny, 1835)		X
<i>Anodontites trapesialis</i> (Lamarck, 1819)	X	X

<i>Leila blainvilliana</i> (Lea, 1834)	X	
<i>Monocondylaea minuana</i> Orbigny, 1835		X
<i>Mycetopoda legumen</i> (Martens, 1888)	X	X
Family HIRIIDAE (7)		
<i>Diplodon aethiops</i> (Lea, 1860)		X
<i>Diplodon ellipticus</i> (Wagner in Spix, 1827)	X*/***	X
<i>Diplodon expansus</i> (Küster, 1856)	X*/**/***	
<i>Diplodon hildae</i> Ortmann, 1921	X	
<i>Diplodon martensi</i> (Ihering, 1893)	X**	X
<i>Diplodon pilsbryi</i> Marshall, 1928		X
<i>Diplodon rhuacoicus</i> (Orbigny, 1835)	X*	X
Order Veneroida		
Family CORBICULIDAE (2)		
<i>Corbicula fluminea</i> (Müller, 1774)	X	X
<i>Corbicula largillierti</i> (Philippi, 1844)	X	X
Family SPHAERIIDAE (3)		
<i>Eupera klappenbachi</i> Mansur & Veitenheimer, 1975	X	
<i>Eupera platensis</i> Doello-Jurado, 1921		X
<i>Sphaerium observationis</i> (Pilsbry, 1911)		X

\*Bonetto (1964); \*\*Zanardini (1965); \*\*\*Mansur (1970)

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Compiled by Kevin S. Cummings  
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This bibliography lists freshwater mollusk papers that have been published up to and including 2003 and that have not appeared in previous FMCS bibliographies. Citations are split into five groups: Unionoida, Sphaeriidae, Corbiculidae, Dreissenoida (and other bivalves), and Gastropoda. Papers that list taxa from more than one category are included in each group. A searchable database of over 14,300 references on freshwater mollusks is available on the web at <http://ellipse.inhs.uiuc.edu:591/mollusk/>. To insure that papers are cited correctly, researchers are encouraged to send reprints to: Kevin S. Cummings, Illinois Natural History Survey, 607 E. Peabody Drive, Champaign, Illinois 61820 or [ksc@inhs.uiuc.edu](mailto:ksc@inhs.uiuc.edu)

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## Helpful Hints from Hoppy:



Needles, glass, nails, and spam cans will ruin your  
day...wear Kevlar gloves, kneepads, and boots.  
Don't come crying to me!

*Submitted by Steve Anstear*

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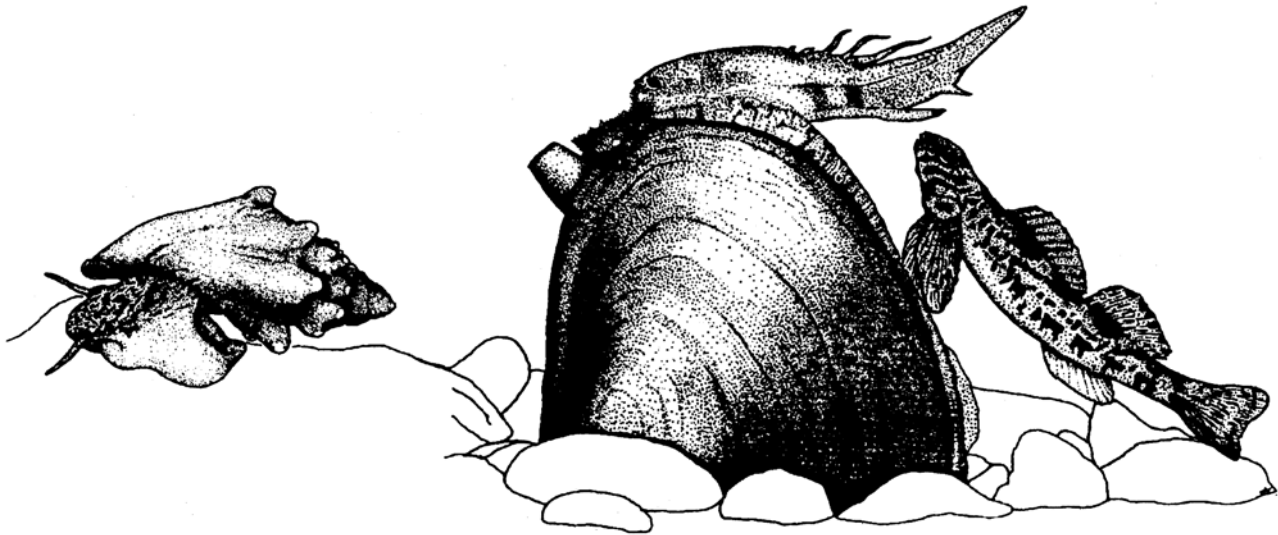
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# Freshwater Mollusk Conservation Society



*... dedicated to the advocacy and conservation science of freshwater molluscan resources*