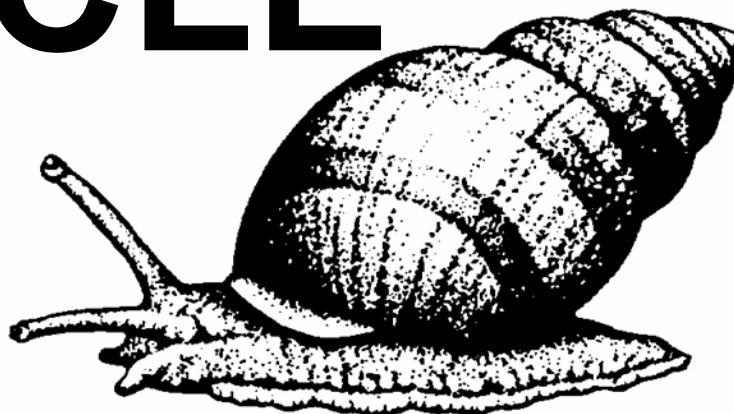


The Newsletter of the IUCN/SSC Mollusc Specialist Group
Species Survival Commission • IUCN - The World Conservation Union

TENTACLE



Editorial

With but days to go before the deadline, I thought this was going to be a very thin issue of *Tentacle*. Then my e-mail filled up with contributions; and what a diverse variety of contributions! *Tentacle* started out (in 1989) with a distinct focus on Partulid tree snails—and the same illustration of one still adorns the first page of this issue as it did that first issue. That first issue also included articles on other Pacific island snails, on freshwater bivalves, and on marine mollusks.

Tentacle continues to include sections on all these groups, but has expanded to include news of all kinds of mollusks and from almost every corner of the world—in this issue, from six continents!

Mollusks, especially land and freshwater mollusks, are one of the most threatened groups of organisms on earth—look out for a forthcoming article in *BioScience* authored by Chuck Lydeard and a number of IUCN Mollusc Specialist Group members—yet they remain in dire need of increased conservation effort, which of course means increased allocation of funding. The diversity of articles in this issue reflects the fact that there are committed conservationists all over the world with an interest in mollusks. They all need our support and encouragement in publicizing the importance of mollusk conservation.

Tentacle now reaches many more people than its original audience (which was primarily the members of the Mollusc Specialist Group). All issues are available on the web at <http://www.hawaii.edu/ccrt/tentacle.html>. However, because of very limited resources, hard copies are now only sent to those people on the distribution list for whom I do not have e-mail addresses. So please keep me updated with your current addresses. I also announce the availability of each issue, as it appears, on the MOLLUSCA listserv (for details of this listserv, see page 5).

As always, I reiterate that the content of *Tentacle* depends largely on what is submitted to me. *Tentacle* is one means to publicise the threats mollusks face—and the conservation successes. Of course, it is also a free, easy way to advertise your own projects! You may notice that this issue includes a number of articles not directly dealing with threatened

mollusks (alien species, slug control). Many issues are linked to the threats faced by mollusks and there is no good reason to exclude them from a newsletter such as this. So I encourage anyone with anything relevant to mollusc conservation, even in a broad sense, to send me an article, however short.

Don't wait until I put out a request for new material (usually via the MOLLUSCA listserv). Send me something now, and

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Internet resources: lists and websites

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News: Black carp escapes to the wild, Flying snails and the Xerces Society, New Conchological Society publication, New mollusk systematics book, Golden apple snail CD-ROM

Freshwater bivalves in North America: *Margaritifera falcata* in Oregon

Genetic structure of rock-dwelling snails in Poland

Giant African snail in Pennsylvania

Cemeteries as snail refuges in Turkey

Plant extracts as slug repellants

Australian land snail conservation workshop

Patagonian mussels

Hydrobioids in Greece

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Introduced freshwater mollusks in Israel

Mission "Schnecke des Jahres" [snail of the year]

Helix pomatia in Moldova

Pacific island land snails: Land snails of Palau; Hawaiian tree snails

Marine matters: Exploitation in Mozambique

Recent publications relevant to mollusc conservation

Members of the Mollusc Specialist Group

it will be included in the next issue (in general an issue is published once a year, in January). Line drawings (or in some cases high-contrast photographs) are particularly welcome.

I make only minor editorial changes to submitted articles and I accept almost everything submitted to me—though before I accept it I will make a judgement about whether an article really has anything to say that is relevant to conservation. Statements made in *Tentacle* therefore remain the authors' responsibilities and the balance of each issue reflects more or less whatever I receive.

Printing and mailing of *Tentacle* is supported by UNITAS MALACOLOGICA, the international society for the study of molluscs, for which the Mollusc Specialist Group is most grateful. To become a member of UNITAS, fill out the application form at the end of this issue of *Tentacle*.

Robert H. Cowie, Editor, contact details in the list of Mollusc Specialist Group members at the end of this issue of *Tentacle*.

IUCN AND SSC NEWS

Correction

Craig Hilton-Taylor, IUCN Red List Programme Officer (craig.hilton-taylor@ssc-uk.org) has pointed out that, contrary to the article on page 2 of *Tentacle* issue 11, there is no longer any formal linkage between UNEP WCMC and the IUCN Red List. The production of the Red List is done entirely within IUCN through the SSC network and other partner organizations like BirdLife International. The web site at www.redlist.org (also www.redlist.net and www.iucnredlist.org) is owned and managed entirely by IUCN through the IUCN Red List Programme.

All following contributions from Mary Seddon, Mollusc Specialist Group Chair
(contact details in the list of Mollusc Specialist Group members at the end of this issue of *Tentacle*)

2003 IUCN Red List of Threatened Species released

The number of known threatened species has topped 12,000 according to the 2003 update of the *IUCN Red List of Threatened Species* that was released on 18 November 2003 amid widespread global media interest.

Some of the molluscs were highlighted as part of the media pack, and SSC thanks the specialists who provided access to pictures, information and their expertise. The cases can all be seen on the Red List website at <http://www.iucnredlist.org>. The launch information kit for 2003, is available in English, French and Spanish at www.iucn.org/themes/ssc/RedList2003 and samples of the media coverage are available at www.iucn.org/news/pressredlist03.htm. It was notable that both the abalone and the Galapagos land snails did get media coverage, despite competition from species such as the giant mekong catfish!

The deadline for the next updates is 31 March 2004. Please note that you should meet the documentation requirements for

any new species listings or for all new revisions. Anyone may submit a case to list a species; however, the case must be made with full documentation, and where possible demonstration that there is support for the listing from other scientists in the local region. Documentation requirements are given on the IUCN Red list site. In brief, when preparing a case you should include a statement with:

- Taxonomy: scientific name, English or local name, nomenclatural reference source, and taxonomic hierarchy.
- Range information: distribution (if possible a map of extent of range), estimate of area where species is found (e.g. 10 km x 2 km).
- Comments on whether a rare or abundant species within range.
- Population information (if available): average life span, number of offspring, information on status of subpopulations suggesting increasing, decreasing, stable size over last 10-20 yr (unless long-lived species, in which case use 3 generation times).
- Habitat: statement on type of habitat and any specialised requirements that the species has, including dependency on host species for part of life cycle, specific habitat such as river rapids, lichens on trees.
- Threat to species: nature of threats to the species, whether actual, proposed or inferred, with comments as to how rapidly change is occurring that is leading to, or could lead to decline in either the range, habitats or populations of the species.
- UCN category: a statement as to how the species meets the IUCN criteria.
- Name of Assessor(s).
- Bibliography: research papers, reports and other sources of information on the species.

Red List User Guidelines online

The Guidelines for Using the IUCN Red List Categories and Criteria (May 2003) have been posted on the Red List Programme page of the SSC website
<http://www.iucn.org/themes/ssc/red-lists.htm>

Guidelines for Application of IUCN Red List Criteria at Regional Levels have been finalized and now published as a booklet in English, French and Spanish. The document is also posted on the SSC website
<http://www.iucn.org/themes/ssc/redlists/regionalguidelines.htm>

For copies please contact Caroline Pollock giving your name and mailing address, and preferred language:
caroline.pollock@ssc-uk.org

New SSC Climate Change Task Force

SSC has established a Climate Change Task Force to be chaired by Camille Parmesan of the University of Texas. The objective is to enhance understanding of how ongoing changes in the global climate may threaten plant and animal species, and determine how best this understanding may be incorporated into key policy arenas. Activities will include: promoting selected studies on species and regions that are showing changes as a probable result of global climate

change; providing assistance on how best to incorporate global climate change impacts into assessments of species to be included in the Red List; raising the profile of likely impacts of global climate change on species within the Intergovernmental Panel on Climate Change; and establishing a network of scientists (including both the climate change modelling community and the species specialist community) with expertise in this area of work.

SSC Invertebrate Activities

SSC has started to establish a series of regional groups to coordinate local activities across invertebrate groups. There are now four regional groups: SSC European Invertebrate Specialist Group, SSC Southern Africa Invertebrate Specialist Group, SSC Southern Asian Invertebrate Specialist Group and the latest addition the SSC North Eurasian Invertebrate Specialist Group. There are some overlaps between membership of the Mollusc Specialist Group and the groups listed above, as would be expected. If there is not an invertebrate group established within your region and you believe there is sufficient interest and activity to merit a group being established, then contact the SSC officer in charge of invertebrates, Jean Christophe Vie (jcv@hq.iucn.org), and your local IUCN office to initiate discussions about the future for invertebrates in your region.

IUCN SSC European Invertebrates Specialist Group is launched

In August 2003 a new group was launched with the aim of “working for a stronger network of invertebrate conservation activity across Europe”. This new group is one of the 120 Specialist Groups of IUCN’s Species Survival Commission (SSC). The SSC vision for invertebrates is: “A world that researches, documents, monitors, values and conserves invertebrate biodiversity for the maintenance of ecosystem health and integrity into the future”.

In Europe there are already a series of different taxon-based and issue-based groups working on a diverse range of initiatives relating to the conservation of invertebrates, yet at present there is little interface with the IUCN and SSC programmes.

The EISG seeks to increase regional coverage within SSC and to work with existing, well established groups to build a stronger network of invertebrate conservation activity in Europe. This will form a bridge between the various types of specialists in Europe, so that all can work together to develop a better understanding of the nature of the threats facing invertebrates. It will also allow better management of resources to minimise human effects on the species and their habitats.

The EISG will cover all European taxa—terrestrial, freshwater and marine—and has identified potential members as being drawn from:

- natural history societies dealing with invertebrate taxa in each country
- European Invertebrate Survey
- Bern Group of Invertebrate Experts

- taxon based SSC invertebrate Specialist Groups (e.g. Mollusca and Odonata)
- research institutes and government departments dealing with the conservation of invertebrate taxa

The Group’s first meeting started to establish programmes of activity, the focal points, and who will lead on these activities. These include:

- collating information needed to assess the conservation status of threatened invertebrates; acting as a Red List Authority, and contributing to the global IUCN Red List of Threatened Species;
- building awareness and understanding of threats posed by introduced non-native species, their current ranges and rates of movement; and exchanging information about eradication methods;
- working with other SSC Specialist Groups on specific topics such as reintroduction, sustainable use and conservation breeding.

For news about future meetings and activities please contact:

Deborah Procter, Chair SSC European Invertebrates Specialist Group, JNCC Monkstone House, City Road, Peterborough PE1 1JY, UK. deb_p@dsl.pipex.com

Other Regional Invertebrate contacts are:

North Eurasian Invertebrate Specialist Group
Prof. Dr. Michael G. Sergeev, Department of General Biology and Ecology, Novosibirsk State University, 2 Pirogova Street, Novosibirsk 630090, Russia; or Institute of Systematics and Ecology of Animals, Siberian Branch, Russian Academy of Sciences, 11 Frunze Street, Novosibirsk 630091, Russia. Tel +7 3832 397564, or –397208, fax +7 3832 397564, mgs@fen.nsu.ru

Southern African Invertebrate Specialist Group
Prof. Michael Samways, Department of Entomology and Nematology, University of Stellenbosch, Faculty of Agricultural and Forestry Sciences, Private Bag X1 Matieland, 7602 South Africa. tel +27 21 808 3728, samways@sun.ac.za
Newsletter: *Colophon*

South Asian Invertebrate Specialist Group
Dr. B.A. Daniel, Zoo Outreach Organisation, 29-1, I Cross East, Bharathi Colony, P.B., 1683 Peelamedu, Coimbatore 641004, India. icinsa@vsnl.net
Prof. T.N. Ananthakrishnan, Flat 6, 42 (22), Kamdar Nagar, Nungambakkam, Chennai, TN 600034, India.

SSC at “Defying Oceans’ End” conference

Two SSC marine initiatives have been incorporated into the marine conservation agenda that resulted from the recent “Defying Oceans’ End” conference, convened by Conservation International. Roger McManus, recently appointed as marine focal point on SSC’s Executive Committee, helped ensure that expansion of the IUCN Red List for marine species was included as one of the meeting’s marine conservation priorities. The working proposal from the meeting calls for the evaluation of over 12,000 marine species over the next 10 yr at an estimated cost of US\$7.25 million. SSC plans a major fundraising effort for this. Also emerging from the meeting is a call for work to recast the assumptions behind much of the management of marine species, the ‘myths’ that SSC sees as a political obstacles to better

management of marine species and their habitats. This call reflects SSC's project to leverage emerging science about extinction vulnerability in marine organisms more effectively to improve policy and practice. A web page covering these activities will be available on the SSC website shortly. See also the Global Marine Programme web page for "Defying Oceans' End" outcomes: <http://www.iucn.org/themes/marine/>

There is also a partnership with the Perry Institute for Marine Science to help protect the world's oceans through research and the development and promotion of conservation efforts for threatened marine species. The alliance between the Florida-based Perry Institute and IUCN/SSC will support critical scientific efforts to identify the growing number of threatened marine species worldwide
http://www.iucn.org/themes/ssc/news/SSC_perry.htm

SSC staff news

SSC's information management initiative, the Species Information Service (SIS) has received fresh impetus with the appointment of Stuart Salter as SIS manager. Previously Stuart was Director General, Science, Technology and Advisory Services Division, Policy Branch at the Canadian International Development Agency. He has broad domestic and international experience both within government and in the private sector. Based at IUCN headquarters in Gland, Stuart takes on the critical position of coordinating this multi-million dollar initiative and is working closely with SSC Chair David Brackett on fundraising.

Mandy Haywood, SSC's Wildlife Trade Programme Assistant for many years, is leaving to take a well-earned break to travel and pursue her passion of rock climbing. Demands on the Programme for its technical advice and products have grown enormously over the years and Mandy's dedication and commitment have been unflinching.

New IUCN/SSC project works to safeguard biodiversity in eastern Africa's inland waters

Biodiversity in eastern Africa's inland waters is globally significant, not only for the exceptional number of species, but also for the high level of reliance on these species by local communities. For example, each of the African Great Lakes contains more endemic fish species than any other lake in the world. Lake Victoria's fisheries alone provide protein for approximately 8 million people and support over 100,000 artisanal fishermen.

With major plans evolving to develop the region's water resources for provision of drinking water, sanitation, irrigation and power, potential impacts on biodiversity must be assessed and adequately considered. Numerous projects and massive expenditure have already amassed a vast body of biodiversity information that could be usefully applied in the planning and development process—but can those that need it find it? Are the decision makers aware of the information available? In many cases the answer is "no". The existing information is so widely dispersed and becomes so rapidly outdated as project finances dry up, that it is often of little use to those that need it.

The IUCN Freshwater Biodiversity Assessment Programme has initiated a regional assessment of biodiversity in the inland waters of five eastern African countries. The project was launched through a training workshop hosted by IUCN's East Africa Regional Office in Nairobi, 5-9 May 2003. More than 25 experts in freshwater biodiversity and policy development from Malawi, Tanzania, Burundi, Kenya and Uganda attended the workshop, where training was provided in biodiversity data management and assessing species' threatened status according to the IUCN Red List Categories and Criteria. Training was provided by Species Programme staff Will Darwill, Caroline Pollock and Jean-Christophe Vie, with assistance from Mary Seddon, SSC Mollusc Specialist Group Chair.

This project is collating the existing information on distribution and threatened status of a number of priority taxa including all freshwater molluscs, fishes, aquatic plants, crabs, and Odonata (dragonflies and damselflies) throughout the region. The information is taken from existing databases, books and research papers, and local scientists have been summarising the data into a single document for each species, including map data if available.

Initial workshops on molluscs involved Ellinor Michel and Kelly West, who have been working on the production of a key to the Gastropods of Lake Tanganyika, and have worked on Lake Malawi and Lake Tanganyika for over 10 yr, as well as local scientists Charles Lange (National Museums of Kenya), Christine Meena (National Museums of Tanzania), Richard Kyambadde (Lake Victoria Environmental Management Project, Uganda), Felix Nicayenzi (University of Burundi) and Emmanuel Kaunda (University of Malawi). This has meant evaluation (and reevaluation) of over 200 species of molluscs (gastropods and bivalves) for the IUCN Red List of Globally Threatened Species. The information on these species will be sent out to other specialists for review in early 2004, and the information will be incorporated into the next update to be launched in November 2004. The species data sheets also identify future actions necessary for the conservation of the species, which may be used by the local NGOs and Universities to identify small projects suitable for their M.Sc students and volunteers to undertake with supervision from the taxonomists and ecologists.

The species information is placed into a database that is centrally verified, and then the information will be passed directly to individuals involved in decision making concerning the conservation and development of inland water resources regionally. It will be made available throughout the region and will ultimately be accessible, and regularly updated, through a web interface to the database using the internet.

As part of this project, a separate workshop was held with various European and American freshwater mollusc experts, who drew up a set of guidelines for applying to a selection of priority sites for conservation action using data on species of molluscs. These guidelines are very similar to those developed by Birdlife International for the Important Bird Areas projects, and will be reviewed by other species specialists around the world, as well as used for a trial project in defining priority areas in East Africa.

This project has been carried out with financial support from the Dutch Ministry of Foreign Affairs (DGIS) under the Partners for Wise Use of Wetlands Programme, managed by Wetlands International. The project forms part of the IUCN Species Programme's global programme of biodiversity assessment.

This is the first of a series of projects that will be directed at assessing the changing biodiversity of inland freshwaters around the world. There is interest in running similar capacity building projects in South America and West Africa in future years. For more information on the project and the IUCN Freshwater Biodiversity Assessment Programme please contact Will Darwall, Freshwater Biodiversity Assessment Officer, IUCN/SSC UK Office, 219c Huntingdon Road, Cambridge CB3 0DL, UK. Tel +44 (0)1223 277 966, fax +44 (0)1223 277 845, will.darwall@ssc-uk.org

CITES issues

At present the molluscs listed under Appendix II are:

- All species of giant clams: *Hippopus* and *Tridacna*.
- *Strombus gigas*. Action was taken this year using CITES legislation.
- *Papustyla pulcherrima*.

The New Zealand *Paryphanta* spp. were delisted from Appendix II as there was no significant trade. It may well be that *Papustyla pulcherrima* should be considered for Appendix I rather than II, given that there is no longer significant trade. Any evidence to the contrary would be useful.

Discussions in the aquarium trade suggest that some organisations have been lobbying for the addition of *Nautilus* species on Appendix II, and recent reports from the Galapagos suggest that there maybe significant trade in chitons, although if the trade is mainly local consumption, then obviously CITES listing is not appropriate.

Mary Seddon passed on the following from Alison Rosser:

At the next meeting of the CITES Animals Committee (29 March - 2 April 2004), the Committee will be looking at levels of trade of Appendix II species to determine whether any taxa may be subject to significant levels of reported international trade and thus warrant further review. As trade levels are often not reported accurately any information on taxa that are thought to be subject to detrimental levels of unreported or illegal trade will also be useful. This is an ideal opportunity for all SSC to draw attention to any Appendix II listed species that you feel may be threatened due to detrimental trade. If you have some thoughts on this please tell us what taxa you feel may have problems, with information to justify the concern. Any information received will be compiled and provided to the Animals Committee for their forthcoming meeting in 2004, and we will also send you the report. We need any input by 30 January please to alison.rosser@ssc-uk.org.

Please note that the CITES resolution on this subject is available at <http://www.cites.org/eng/resols/12/12-8.shtml>. We have placed all relevant files in a folder on the IUCN website. This includes a questionnaire aimed at helping you to

provide information for this process at <http://www.iucn.org/webfiles/doc/SSC/04Sigtrade/>.

UNEP-WCMC have prepared trade data on Appendix II animals, and this is available in excel files for the following groups: mammals, birds, amphibians, reptiles, fish and invertebrates at

<http://www.iucn.org/webfiles/doc/SSC/04Sigtrade/>

UNEP-WCMC will undertake an initial analysis on the basis of average trade levels and increasing trade to select species for review. This report will be available in due course on the CITES web site www.cites.org/eng/news/meetings/AC120.shtml * documents link)

A table of taxa that have been reviewed in the past is also available <http://www.iucn.org/webfiles/doc/SSC/04Sigtrade/>

If you need assistance, further explanation or have trouble accessing the data, please contact: alison.rosser@ssc-uk.org.

Many thanks

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Tel +44 (0)1223 277980, fax +44 (0)1223 277890,
alison.rosser@ssc-uk.org,
<http://iucn.org/themes/ssc/programs/trade.htm>

INTERNET RESOURCES: LISTS AND WEBSITES

These are just a few of the many websites dealing with molluscan conservation, and with molluscs and conservation in general.

UNITAS MALACOLOGICA

<http://www.inter.nl.net/users/Meijer.T/UM/um.html>

Red List

The entire Red List of Threatened Animals can be searched at www.redlist.org/ www.redlist.net www.iucnredlist.org

Mollusca

The MOLLUSCA listserver is intended as an informal forum for discussions of molluscan evolution, palaeontology, taxonomy and natural history. There are over 700 subscribers. From time to time it has something of interest related to conservation. To subscribe to the list send e-mail to:

listproc@ucmp1.berkeley.edu

Then on the first line of the body of the message:

sub mollusca <your_name>

You will get a reply soon after saying that your name has been added. You will then receive anything that is posted to the list. MOLLUSCA is maintained and managed by D.R. Lindberg of the University of California Museum of Paleontology, Berkeley, USA.

Mollia

The MOLLIA web site makes available the UNITAS MALACOLOGICA newsletters (up to 1998), which have a lot of information complementing information in *Tentacle*. The site also includes instructions to authors, subscription information and links to various malacological journals. It also allows you to subscribe to the MOLLUSCA listserver (above) and to access the MOLLUSCA archives. MOLLIA, like MOLLUSCA, is maintained and managed at the University of California Museum of Paleontology, Berkeley, USA.

www.ucmp.berkeley.edu/mologis/mollia.html

CITES

CITES-L is a Bulletin board restricted to trade issues for endangered species, which is managed from the World Conservation Monitoring Centre in Cambridge. The majority of information relates to mammal and bird trade, but updates to the CITES lists are posted there. To subscribe send a one line message to MAJORDOMO@WCMC.ORG.UK with the command line (in message body):

SUBSCRIBE CITES-L

Freshwater Mollusk Conservation Society

<http://ellipse.inhs.uiuc.edu/FMCS/>

Australian marine invertebrates

Overview of the Conservation of Australian Marine Invertebrates by W. F. Ponder, P. Hutchings & R. Chapman (588 p.), published in July 2002, is available in HTML at http://www.amonline.net.au/invertebrates/marine_overview/ and PDF at www.amonline.net.au/invertebrates/pdf/marineoverview.pdf

Invasive Species Specialist Group

Includes details of the Aliens-L listserver and the ISSG newsletter, *Aliens*.
www.issg.org/index.html

MUSSEL Database Project

<http://clade.acnatsci.org/mussel/>

American Malacological Society

The homepage of the AMS carries a link to the Society's conservation policy.
erato.acnatsci.org:80/ams/

Unionids

UNIO is a listserver focusing on the biology, ecology and evolution of freshwater unionid mussels. Details, including how to subscribe, are given at the UNIO website:
<http://my.fit.edu/~rtankers/unio.htm>

The primary objectives of the list are (1) to foster communication and collaboration among scientists, researchers, and students engaged in mussel-related activities and (2) to facilitate the informal discussion of regional and

federal research priorities. Postings related to mussel conservation issues, including the artificial propagation and captive rearing of threatened and endangered species, are especially welcomed. Subscribers are also encouraged to use the list for posting information on mussel-related meetings, symposia, workshops, and funding opportunities. The list is sponsored by the Florida Institute of Technology and administered and managed by Rick Tankersley (rtank@fit.edu) to whom any questions regarding the list, including problems while attempting to subscribe or post messages, should be addressed. There are currently about 400 members.

Illinois Natural History Survey

This site has much information on the mussels of North America, with links to other mussel sites.
www.inhs.uiuc.edu/cbd/collections/mollusk.html

Samoan Snail Project

The Samoan Snail Project has as its goals assessing the diversity and historical decline of the native Samoan non-marine snail fauna, as a first step in its conservation.
www2.bishopmuseum.org/PBS/samoasnaill

Conchologists of America

The homepage of the COA carries a link to a number of pages dealing with its conservation policy and conservation issues.
<http://coa.acnatsci.org/conchnet/coatrack.html>

The Malacological Society of London

www.sunderland.ac.uk/MalacSoc

Field Museum Land Snails

Information for over 142,000 lots (a lot is a collection of a single species taken from a single locality on a single occasion), including over 2,500 type lots, of land snails in the Field Museum (Chicago) collections is accessible on the web at
fm1.fieldmuseum.org/collections/search.cgi?dest=inverts

Malacological Society of Australasia

www.amonline.net.au/malsoc/

Haus der Natur—Cismar

The homepage carries a link to a page on mollusc conservation in Germany, as well as other links.
<http://home.t-online.de/home/hausdernatur.vwiese/hncengl.htm>

Hawaii Biological Survey

The Hawaii Biological Survey (based at the Bishop Museum, Honolulu) web site has searchable databases and much additional information on most Hawaiian organisms, including both indigenous (99 % endemic) and non-indigenous land and freshwater snails, endangered species, and so on.
hbs.bishopmuseum.org

Links

Useful sites with links to many of the major malacological websites:

www.geocities.com/Paris/LeftBank/6559/scc28.html

manandmollusc.net/

www.staffs.ac.uk/schools/sciences/biology/dhome/dhome.htm

www.uni-mainz.de/~lieb/

MEETINGS 2004-2005

Freshwater Mollusk Conservation Society's Gastropod Workshop

Registration is now open for this workshop, to be held in conjunction with a water quality conference at the University of Alabama. The water quality conference is scheduled for 15-16 March 2004, with the gastropod workshop to follow on 17-18 March. A single registration fee (\$90 members, \$120 nonmembers) admits you to both events. Additional information and registration materials may be found at the conference web site:

<http://ellipse.inhs.uiuc.edu/FMCS/Meetings/GastropodWorkshop.html>

On 17 March there will be a systematic review of the freshwater gastropod families, guided by Jack Burch and a team of fresh young scientists. On 18 March the discussion will turn to biology and conservation, wrapping up with a discussion of a nascent "National Strategy" for freshwater gastropod conservation and recovery.

The conference chair is Dr. Paul Johnson (Paul.Johnson@tnari.org) and the local arrangements contact is Chuck Lydeard (clydeard@bama.ua.edu).

Conservation Genetics Workshop on Imperiled Freshwater Mollusks and Fishes

National Conservation Training Center, Shepherdstown, West Virginia, USA. 29-30 June 2004.

Sponsored by the Freshwater Mollusk Conservation Society and the U.S. Fish and Wildlife Service.

Format: The workshop will provide resource managers and biologists with an opportunity to learn the principles of conservation genetics as applied to recovery of freshwater mollusks and fishes. This two-day workshop will contain 8-10 platform presentations/day with a 1-hr computer data analysis demonstration and an evening poster session. The first day, nationally recognized experts will introduce the topics of quantitative genetics, molecular genetics, phylogeography, species concepts, taxonomic analysis, detecting cryptic species, hybridization and genetic management guidelines for captive propagation and stocking of endangered species.

The second day, case studies will be presented to demonstrate how the tools of conservation genetics are applied in real-world examples to help protect species. A final discussion will give attendees the opportunity to question the presenters and

clarify the implications of concepts learned throughout the program.

Registration: The registration form can be found at the website of the Freshwater Mollusk Conservation Society (<http://ellipse.inhs.uiuc.edu/FMCS/index.html>); or contact, Dr. Richard Neves, Workshop Coordinator, at +1 540 231 5927 or mussel@vt.edu. Meeting registration includes materials, lunches and breaks.

Call for posters: Participants interested in having a poster presentation at the workshop should submit an applicable title and abstract to Dr. Neves before March 31, 2004.

American Malacological Society Annual Meeting

The 2004 American Malacological Society meeting will be held on Sanibel Island, Florida, from 31 July to 4 August, hosted by the Bailey-Matthews Shell Museum.

Symposia include:

- Relationships of the Neogastropoda
- Biodiversity of marine mollusks
- Coastal molluscan assemblages as environmental indicators and monitors of restoration efficiency
- Systematics of freshwater gastropods
- Snails and slugs as agricultural and horticultural pests
- Global marine bivalve database workshop
- Forum: Graduate students in malacology

Other projected activities include a book auction as well as aquatic and terrestrial field trips. For more information see the conference website: <http://www.shellmuseum.org/AMS/> Or contact the conference organiser and AMS president, José H. Leal, The Bailey-Matthews Shell Museum, 3075 Sanibel-Captiva Road, Sanibel, Florida 33957, USA. Tel +1 941 395 2233, fax +1 941 395 6706, jleal@shellmuseum.org

World Congress of Malacology—2004

The WCM—2004 will be held in Perth, Western Australia, 11-16 July 2004. Several major symposia are planned:

- Phylogeny of molluscs
- Molluscan aquaculture and fisheries
- Ecology of molluscs
- Special sessions on particular groups (such as bivalves) and other topics (e.g. conservation) are also planned or can be included.

There will also be the usual contributed papers sessions and a poster session with posters on display throughout the conference. For further information see the UNITAS MALACOLOGICA website or the Malacological Society of Australasia website (details for both, above). You can also obtain information directly from the conference organiser, Dr Fred Wells: wellsf@museum.wa.gov.au.

13th International Conference on Aquatic Invasive Species

This conference will be held 19-23 September 2004 at the Lynch West County Hotel, Ennis, County Clare, Ireland, hosted by the Institute of Technology, Sligo.

This annual four-day conference is widely considered the most comprehensive international forum for the review of accumulated scientific knowledge on the impacts of aquatic invasive species, presentation of the latest field research and data, new technologies or advancements in control and mitigation, discussion of policy and approaches to effective public education and outreach initiatives to prevent new introductions. Suggested topic areas include: (a) policy, legislation and monitoring; (b) ecological and ecosystem impacts; (c) socio-economic impacts; (d) information exchange; (e) education and outreach initiatives; (f) vectors of introduction; (g) control technologies for industrial and non-industrial settings.

Abstract deadline: before 31 December 2003

Early Registration deadline: 31 May 2004

For additional information, contact

Elizabeth Muckle-Jeffs, 1027 Pembroke Street, East Suite 200, Pembroke, Ontario K8A 3M4, Canada. Tel (USA/Canada) 1 800 868 8776, (international) +1 613 732 3386, fax +1 613 732 3386, profedge@renc.igs.net
Website: www.aquatic-invasive-species-conference.org

3rd IUCN World Conservation Congress

People and Nature, Making the Difference: 17-25 November 2004. Bangkok, Thailand. Topics include:

- Sharing knowledge and accessing information
- Interactive presentations and exhibitions
- Demonstrations of biodiversity information systems

XIX Brazilian Malacological Meeting

XIX EBRAM – Encontro Brasileiro de Malacologia

The next Brazilian Malacological Meeting will be held on the campus of the State University of Rio de Janeiro (UERJ), in the city of Rio de Janeiro, Brazil, during July 2005. Several symposia are planned: morphology and taxonomy, phylogeny, aquaculture and fisheries, pathology, education, conservation and other topics of particular interests such as public health. There will also be oral and poster sessions. More information will be available after July 2004 on the website www2.uerj.br/~sbma

or contact Dra. Sonia Barbosa dos Santos, President of the Brazilian Society of Malacology: sbsantos@uerj.br

NEWS

Black carp escapes to the wild

Modified slightly from: *River Crossings, the newsletter of MICRA (Mississippi Interstate Cooperative Resource Association)*, 2003, Vol. 12, No. 2.

The first black carp (*Mylopharyngodon piceus*) ever reported taken from the wild in the United States was collected on 26 March 2003 by Jim Beasley, a commercial fisherman, from Horseshoe Lake, Illinois (an oxbow lake), near the confluence of the Mississippi and Ohio Rivers. The exotic carp measuring

78 cm [30.8 in] and weighing 5.8 kg [12.8 lb] was determined to be four years of age, and exhibited the molar-like pharyngeal (throat) teeth typical of the species. Black carp are very similar in appearance to the grass carp except for the presence of this characteristic. Rob Maher, Commercial Fishing Program Manager for the Illinois Department of Natural Resources (ILDNR) received the fish from Mr. Beasley and vouchered it with Brooks Burr, Southern Illinois University, Carbondale. Working with Maher, Greg Conover (U.S. Fish and Wildlife Service, Marion, Illinois) obtained the services of Paul Wills at the Logan Hollow Fish Farm to conduct further tests. Mr. Wills extracted a blood sample from the fish and tested it to determine the size of the red blood cells (RBCs). Three known diploid (fertile) grass carp and three known triploid (sterile) grass carp were used as a reference regarding the nuclear diameter of the RBCs. The RBCs in the black carp sample were identical in size to those of the sterile grass carp.

According to Mike Freese, Keo Fish Farms (a primary supplier of triploid black carp in Arkansas), the nuclear diameter of RBCs are consistent between grass and black carp, suggesting that the Horseshoe Lake fish was in fact sterile. However, Conover cautioned that these results are preliminary and additional tests using tissue samples will be analyzed to confirm the fish's fertility. In late 1999 MICRA learned that fish farmers in the South were planning to begin using the imported black carp as a control for snail infestations in their catfish production ponds. Fearing that these fish would escape to the wild and prey on wild populations of threatened and endangered freshwater mollusks, MICRA petitioned the U.S. Fish and Wildlife Service (USFWS) on 24 February 2000 to list the black carp as an injurious species of wildlife under the federal Lacey Act. Such a listing would prevent interstate shipment of the species, and hopefully safeguard against its escape to the wild. Readers are referred to *River Crossings* Vol. 8, No. 6 and Vol. 9 Nos. 1-4, available on the Web at <http://www.waux.cerc.cr.usgs.gov/MICRA/>. MICRA's hope was that the black carp could be listed and "contained" before it was allowed to escape to the wild. It had already been reported that a half dozen or so black carp had escaped from a private fish hatchery near Lake of the Ozarks, Missouri, during the 1994 floods.

After more than two years of controversy and delay, the USFWS, on 30 July 2002 published in the *Federal Register* a notice of intent to so list the black carp. Most MICRA states and many other groups and individuals expressed support for such a listing, but to date no Lacey Act listing has been made. Based on the age of the fish taken from Horseshoe Lake, it is the result of a 1999 year class and so has escaped captivity sometime since then, validating MICRA's concern that any fish held in farm fish ponds or other loosely controlled environments will, in fact, escape to the wild. Under intense political pressure in 2000, Missouri chose to begin raising triploid black carp at one of its state fish hatcheries in order to supply fish farms in their state with the needed fish. Missouri feared that if left in private hands, triploidy may not be guaranteed. Since 2001 Missouri has supplied about 1,800 sterile black carp to 5 different fish farmers. If the Horseshoe

Lake black carp, indeed proves to be sterile, biologists can breathe a slight sigh of relief—for now, no fertile black carp have been captured in the wild, so no natural reproduction should have occurred, and wild populations should not be established. But the truth is, that even sterile wild black carp will consume large numbers of freshwater mollusks. According to the USFWS, the species can grow to 1.5 m [5 ft] in length and reach weights up to 68 kg [150 lb]. Fish this size can consume huge amounts of freshwater mollusks to maintain their biomass. An Asian carp brochure and key to identification can be found on the MICRA Web Site. Contact: Rob Maher, Illinois Department of Natural Resources, Commercial Fishing Program, 8450 Montclair Avenue, Brighton, Illinois 62012, USA; Tel + 1 618 466 3451.

Flying snails and the Xerces Society

The Spring 2003 issue of *Wings – essays on invertebrate conservation*, a publication of the Xerces Society, is devoted to slugs and snails. There are four articles, two of which are specifically focused on land snail conservation. All articles are beautifully illustrated with color photographs of live snails – the front cover has photos of five Hawaiian *Achatinella* species, reprinted from the wonderful book *Remains of a Rainbow: Rare Plants and Animals of Hawai‘i* by David Littschwager and Susan Middleton.

The four articles are:

- Living in a world of tastes and smells—by Jim Atkinson. Discusses how the senses of snails and slugs are dominated by their chemosense.
- Jumping-slugs!—by William Leonard and Kristiina Ovaska. Tells us about the biology of the jumping slugs of western North America in the genus *Hemphillia*.
- *Kahuli*: the tree snails of Hawai‘i—by Anita Manning and Steven Lee Montgomery. Reprinted from *Remains of a Rainbow* (see above) and outlines the well-known threats to Hawaiian Achatinellidae.
- Saving the Tumbling Creek Cavesnail—by Tom Aley and David Ashley. Outlines the efforts to save this tiny snail (see *Tentacle* 11, page 4).

The Xerces Society is an international nonprofit organization dedicated to protecting the diversity of life through the conservation of invertebrates. To join and receive *Wings* costs US\$25 per year. For information: info@xerces.org or www.xerces.org.

The Conchological Society’s new magazine

The revamped *Conchologists’ Newsletter* is now entitled *Mollusc World*. It is an exciting, full color magazine. The first three issues (March 2003, July 2003, November 2003) all have a number of articles dealing with mollusc conservation. Issues 2 and 3 have a special section entitled “Conservation News”, and included the following articles:

Issue 2

- A new snail reserve at Kew [for *Balea biplicata*]
- The New Forest Ponds Project—the Conchological Society’s involvement [possible monitoring of *Lymnaea glabra*]

- Roman snails get stuck! [*Helix pomatia* getting trapped in rabbit-proof fencing]
- Reports from Molluscan Steering Groups [of the U.K. Government’s Biodiversity Action Plan]
 - Terrestrial [*Vertigo* spp. *Catinella arenaria*]
 - Freshwater [*Anisus vorticulus*, *Segmentina nitida*, *Pisidium* spp., *Myxas glutinosa*]

Issue 3

- What’s happening in Europe? [Council of Europe Berne Convention Group of Experts for the Conservation of Invertebrates meeting. Launch of the IUCN/SSC European Invertebrate Specialist Group]
- Are you a climber? [Impact of rock climbing on snails]
- Molluscan conservation statuses: a summary of the current situation [British species listed by various agencies]

Members of the Conchological Society of Great Britain & Ireland receive *Mollusc World* free with their Society membership. Ordinary membership is UK£23.00 and student membership is UK£10.00. For details, go to the Society’s website: <http://www.conchsoc.org>; or e-mail membership@conchsoc.org.

New mollusc systematics book

Molecular Systematics and Phylogeography of Mollusks, edited by Charles Lydeard & David Lindberg with a foreword by Geerat J. Vermeij. 2003. 328 p. Hardcover US\$80.

Systematics is the underpinning of the conservation of biodiversity. In this new multi-authored volume, leading scientists provide the most up-to-date information on the systematic relationships and phylogeography of mollusks. This richly detailed book is the first complete review of molecular systematics and phylogeography of mollusks. Ten chapters cover a full range of issues such as research opportunities, molecules and evolution, bivalve evolution, gastropod evolution, and how mollusks have evolved into so many species.

The concluding title in the Smithsonian Series of Comparative Evolutionary Biology, this book brings together experts from around the world. Each explores their topic in a way that reveals not only the evolutionary history of mollusks, but also how evolution operates. Anyone seriously interested in living mollusks, fossilized shells, or evolution will find this book to be an invaluable resource.

For more information, go to www.sipress.si.edu

Golden Apple Snail (GAS): CD-ROM

Scientific Information Database on Golden Apple Snail (*Pomacea* spp.). ISBN 971-92558-7-0

This CD provides quick and easy access to about three decades of literature on ecology, damage, management options and utilization of *Pomacea* spp. GAS is an invasive alien pest of rice, taro and other plants that grow in aquatic environments. It has the potential to damage natural ecosystems and has been implicated in the decline of native snail species in the areas it has invaded. The CD includes over 400 articles and over 100 images. The information is sourced

from experts around the world. The CD is designed as a reference tool or a resource package for agricultural technicians, researchers, advisors, students and for those engaged in GAS research, extension and training. It is easy to use, as all the software needed is supplied on the disc. Information on the CD is searchable by author, title, and year of publication, journal title, and keywords.

Future plans include developing web wizards, establishing mirror sites for web page and translating the CD contents into Spanish, Chinese, Thai, Khmer, Vietnamese, Indonesian, and other languages.

It is envisaged that the cooperation between the GAS collaborators and institutions now contributing will continue to improve and strengthen in the future.

For orders, contact:

Ms. Salome Ledesma, Agricultural Librarians Association of the Philippines (ALAP), University of the Philippines at Los Baños, Main Library, College, Laguna 4031, Philippines. Each CD-ROM is priced at 500 Philippine Pesos (local purchase) and US\$50 (foreign purchase exclusive of postage and handling). E-mail: omecledesma@yahoo.com or ejoshi@philrice.gov.ph

FRESHWATER BIVALVES IN NORTH AMERICA

Mortality of *Margaritifera falcata* associated with an excessive degree of shell erosion in low-hardness waters of the Siuslaw watershed, Oregon

By Ray Kinney

The freshwater mussel *Margaritifera falcata* is prominent in this habitat and provides an important component for salmonid ecological health by sequestering ocean-derived-nutrient (ODN) and providing water filtration. Decline of nutrient retentive stream structure is recognized as an important limiting factor that is driving much of the salmonid habitat recovery effort. River mussel populations have declined historically with land use habitat degradation, consequently the nutrient retentive resiliency of the system has lessened. Spawner supplied fish fertilizer flushes out of the system too fast to be utilized by all of the species that support this salmonid habitat. Habitat restoration activity to restore stream complexity is ongoing and will provide increased mussel habitat; however these mussels appear to be declining rapidly because of premature mortality from a perforating shell degradation condition that affects all age classes. There is very little evidence of adequate recruitment to re-establish colonies in restored habitat.

All post-mortem valves have shown a specific type of damage: an extensive dissolution of calcium from the exterior of the valves that exceeds the degree characteristic of the species. As the erosion spreads out from the umbo region to extend over the posterior adductor anchor points the valves perforate, causing premature mortality. Mussel preference for

water hardness (H) has been characterized as 8-75 mg CaCO₃ l⁻¹, while current ambient H is at the extreme low end of this range (6-18 mg CaCO₃ l⁻¹). Available ambient calcium may have dropped below prehistoric levels because of greatly reduced ODN. Buffering capacity in the water may have lessened. Disruption of calcium utilization by elevated levels of lead from lost fishing sinkers, documented in these waters, may possibly play a causative role. If the rate of population decline of *M. falcata* is now greatly increased, the loss of this calcium sequestration pool could be a huge blow to the overall aquatic health resiliency. The study, in progress, explores potential contributing factors, including elevated ambient lead levels, in the *M. falcata* habitat. Early life stage salmonids may plausibly be subject to calcium utilization changes as well. A new study is designed to assess shell degradation rates and resultant potential for rapid population decline of *Margaritifera falcata*.

Ray Kinney, Siuslaw Watershed Council, Lake Creek Lead Assessment Project, 91636 West Fk. Rd., Deadwood, Oregon 97430, USA. Tel +1 541 964 3981, kennyr@casco.net

GENETIC STRUCTURE OF TWO ROCK-DWELLING SNAILS: PATTERN OF THE PAST OR HUMAN IMPACT?

By Magdalena Szarowska, Andrzej Falniowski & Krystyna Mazan-Mamczarz

We studied the genetic structure of two rock-dwelling snails of the Kraków-Częstochowa Upland, Poland: *Chondrina clienta* (Westerlund, 1888) and *Clausilia parvula* Férussac, 1807 (14 and 7 populations, respectively) and found it differed markedly between species. Isolated limestone rocks are like islands in that the inhabitants of one rock are more or less isolated from the inhabitants of another. Thus, the rock-dwellers live in isolated colonies prone to profound effects of inbreeding and genetic drift, and their interpopulation differences follow the infinite island or stepping stone patterns. In general, we observed this pattern in the *C. clienta* populations (Szarowska *et al.*, in press). On the other hand, in *C. parvula* one third of the loci we detected were polymorphic, and interpopulation variation was not related to geographic scale. Compared to *C. clienta*, the habitat spectrum of *C. parvula* is wider, yet it does not include dry habitats (Kerney *et al.*, 1983). It may be more numerous in the litter at the foot of the rock than directly on the rock surface, or else, on moist and mossy parts of the rock. It avoids open and dry habitats, and thus, unlike *C. clienta*, it cannot be found in the plateau of the northern part of the Kraków-Częstochowa Upland. *Chondrina clienta*, on the contrary, avoids shaded and moist spots. It can be found entirely on the sun-exposed rock surface.

The observed differences in the genetic structure may reflect the distinctness of the species' histories in the studied area. Forest habitats of the type *C. parvula* prefers prevailed there at the beginning of the Holocene and during the climatic optimum. With the New Stone Age, deforestation had started

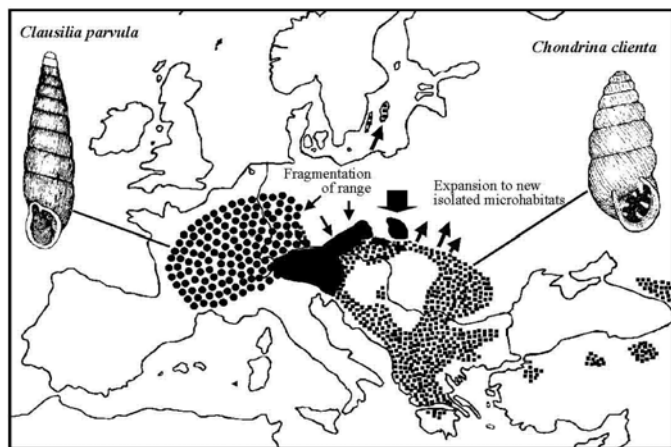


Fig. 1. Distribution ranges of the studied species; blackened area—common range, large arrow—studied area

and progressed steadily until the Middle Ages. Patches of the original forest remained in the south part of the Kraków-Częstochowa Upland. In consequence, the primarily continuous habitat of *C. parvula* has become fragmented (Fig. 1). On the other hand, deforestation caused the proliferation of open, sun-exposed rock habitats that were suitable for *C. clienta*. The snails may have colonized these new habitats (Fig. 1) one by one to found small populations. The genetic structure of such populations is prone to founder effects and bottlenecks, the result of which are genetic drift and the subsequent decay of polymorphism coupled with high frequencies of selfing.

Kerney, M.P., Cameron, R.A.D. & Jungbluth, J.H. 1983. *Die Landschnecken Nord- und Mitteleuropas. Ein Bestimmungsbuch für Biologen und Naturfreunde*. Verlag Paul Parey, Hamburg & Berlin.

Szarowska, M., Falniowski, A. & Mazan-Mamczarz, K. in press. Genetic structure of isolated selfers: *Chondrina clienta* (Westerlund, 1888) (Gastropoda: Stylommatophora) in Kraków-Częstochowa Upland. *Malak. Abh. Staat. Mus. Tierk. Dresden*.

Magdalena Szarowska, Andrzej Falniowski & Krystyna Mazan-Mamczarz, Department of Malacology, Institute of Zoology, Jagiellonian University, Ingardena 6, 30-060 Kraków, Poland. SZAR@zok.iz.uj.edu.pl

ACHATINA FULICA FOUND NEAR PITTSBURGH, PENNSYLVANIA, USA

By Timothy A. Pearce

A juvenile snail about 2 cm diameter was collected from a park on the south side of the Pittsburgh area in summer 2002 by a member of the education department at the Carnegie Museum of Natural History. The adorable pet snail, named Dickey by the kids, had a voracious appetite and grew rapidly to 11.5 cm by November 2003. Curious to find out if she had a Godzilla-like mutant, the collector brought the snail to the Museum's Section of Mollusks. I recognized Dickey to be *Achatina fulica* (giant African snail), which is federally listed as a pest species in the USA.

Achatina fulica has been intercepted at Pennsylvania ports, but this is the first time it has been found living in the state of Pennsylvania, according to Dr. David Robinson, malacologist

with the Animal and Plant Health Inspection Service (APHIS) in Philadelphia.

A tropical snail might not be expected to survive the cold winters of Pittsburgh, but this species is adaptive and survives dormancy well. Robinson noted that in recent years, *Achatina fulica* has been found to survive freezing winters on the south island of Japan and at high elevations on tropical islands.

We are considering three possibilities for how this snail or its ancestors arrived in the Pittsburgh area: intentional smuggling and releasing, purchasing from a pet store and releasing, or arriving on vegetation. We currently have no indication which scenario is true.

The park where *Achatina fulica* was found has been recognized as one of the most significant natural areas in Allegheny County. If an infestation of *A. fulica* were found in the park, the control measures needed to eradicate it could be devastating to this rich natural area. Eradication of an infestation in Florida in 1966 took 9 years, large amounts of poisonous chemicals, more than one million US dollars, and ultimately destroyed 18,000 snails that had descended from the original three.

In November 2003, an agent from APHIS and two agents from the Pennsylvania Department of Agriculture joined me to survey the park for *Achatina fulica*. The cold weather was not particularly good for finding snails, and we did not find any *A. fulica*. The 21 species of native snails that we did find, including some rather uncommon species, reflect the biological significance of the area. We plan to return in the spring to look again when *A. fulica*, if present, should be easier to find.

We can play a role in educating the public not to release pets into the wild. Dickey might have been a pet that was released into the park by well-meaning people. I am glad to see the progress we have made in teaching people to be compassionate toward other animals, but we have largely failed to teach people that we must not release our captive animals. In order to maintain an intact environment free from invaders, we must keep our pets until they die naturally, give them to someone who will keep them until they die, or kill them when we are finished with them.

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CEMETERIES AS REFUGES FOR NATIVE LAND SNAILS IN ISTANBUL, TURKEY

By Aydin Örstan

Istanbul, under its former name Constantinople, is the type locality of about nine species of land snails described in the 19th century (Schütt, 2001). Since then the unabating growth of the city has consumed much of the surrounding land and now threatens various critical wildlife habitats that are not under protection (Özhatay *et al.*, 2003). As a result, it is

becoming more and more difficult to find relatively undisturbed locations in the vicinity of the city where one can expect to find the endemic species. Nevertheless, surveys of neglected spots in and around the city still produce surprises. For example, in August 2002, I found *Zonites algirus* (Linnaeus, 1758), a probable native, on a nearby island off Istanbul (Örstan, 2003). This was the first record of the species from the area since 1863.

I have also discovered that refuges for the native snails remain in the numerous cemeteries within the city. These were established long ago on what must have been back then deforested, but otherwise relatively undisturbed land outside the city. The snails that were probably already there when the cemeteries were established appear to have survived to this day. Most cemeteries are open to the public and if one doesn't rummage around the graves carelessly and indiscreetly, the groundskeepers usually leave visitors alone. I have collected the following species in two cemeteries during recent trips to Istanbul (the asterisks denote the non-natives).

The Moslem cemetery on the island of Heybeliada off Istanbul in the Sea of Marmara (August 2000): *Bulgarica thessalonica* (Rossmässler, 1839), *Euxina hetaera* (Pfeiffer, 1848), *Mastus carneolus* (Mousson, 1863), *Pupilla muscorum* (Linnaeus, 1758), *Vitrea* cf. *angystropha* (Boettger, 1880), *Helix lucorum* (Linnaeus, 1758), *H. aspersa* (Müller, 1774)*, *Oxychilus camelinus* (Bourguignat, 1852)*.

Büyük Ayazma Greek Cemetery on the European side of the Bosphorus (August 2002): *Pomatias elegans* (Müller, 1774), *Oxychilus investigatus* Riedel, 1993 [or possibly *O. moussoni* (Kobelt, 1878)], *Monacha carascaloides* (Bourguignat, 1855) [or possibly *M. solidior* (Mousson, 1863)], *Xeropicta krynickii* (Krynicky, 1833), *Helix lucorum* (Linnaeus, 1758), *H. pomacella* (Mousson, 1854), *H. aspersa* (Müller, 1774)*, *Eobania vermiculata* (Müller, 1774)* and unidentified fragments of clausiliid shells.

Various factors have made the cemeteries suitable for the survival of native snails. First, all cemeteries more or less conform to the original topography of the land, indicating that the soil animals were not terribly disturbed when the cemeteries were started. For example, the cemetery on Heybeliada was on a relatively steep hillside that was only minimally terraced. Second, the present day floras of the cemeteries probably come close to their original compositions. This is because the perennially mediocre economy of the region never seems to justify the spending of sufficient money for cemetery grounds, especially during the dry summers when regular watering and gardening would be necessary for a formal plant cover consisting of alien grasses and ornamentals. The continuation of the original flora may in turn have helped the native snails survive. Third, the economic woes (and perhaps also social factors) also hamper the maintenance of graves. In most cemeteries, and regardless of their religious affiliation, one can find rather dilapidated sections, especially where the oldest graves are located. In such places haphazard collections of plants overgrow in and around the graves, while the retaining walls and tombstones, aided by the plant roots, get dislocated and cracked. As a result, all sorts of nooks and crannies open up for the snails to

hide in while being shaded by the plants that also provide an unlimited supply of food. And, finally, the common use of marble for the walls around some graves and for the tombstones must contribute to the proliferation of the snails. Fortunately for the snails, the cemeteries of Istanbul will continue to provide them with homes.

Örstan, A. 2003. Rediscovery of *Zonites algirus* in Istanbul, Turkey. *Zoology in the Middle East* 29: 75-78.

Özhatay N., Byfield, A. & Atay, S. 2003. *Türkiye'nin Önemli Bitki Alanları* [Important Plant Areas in Turkey]. WWF Türkiye, Istanbul.

Schütt, H. 2001. Die türkischen Landschnecken. *Acta Biologica Benrodis* Supplementband 4: 1-549.

Aydin Örstan, Section of Mollusks, Carnegie Museum of Natural History, 4400 Forbes Ave., Pittsburgh, Pennsylvania 15213, USA. pulmonate@earthlink.net

HARMLESS PLANT EXTRACTS AS SLUG REPELLENT

By Ifor Bowen & Ahmed Ali

Current methods of slug control rely heavily on the broadcast application of poison baits using the molluscicides metaldehyde, methiocarb or thiodicarb. However, this method of control is becoming less acceptable as questions arise regarding both the reliability and environmental safety of these products as well as their impact on mollusc biodiversity.

A further disadvantage is the potential toxic hazard posed by these molluscicides, where cases of poisoning have been noted with birds, hedgehogs and smaller mammals, and beneficial predatory beetles. Consequently, with increasing awareness of the environmental impact of pesticides and residue accumulation, molluscicides remain a cause of major concern.

Because of changes in farming practices, such as the switch to autumn sowing of cereals, sowing winter wheat after oilseed rape and the banning of stubble burning, slug numbers are on the increase and the demand for a new effective control strategy is immense. This is creating an urgent need for the development of practical, inexpensive methods of protecting agricultural crops, which do not adversely affect the biodiversity of target and non-target species.

Controlling pests like slugs in an environmentally friendly way has been a major objective of Cardiff University's School of Biosciences. They have been developing slug control agents involving behaviour-modifying methods using either non-toxic semiochemicals, or bound metal chelates of low inherent toxicity that are more attuned to low-input sustainable agricultural practice. These non-toxic slug repellents can be used on their own, or as part of an integrated pest control strategy in which the amount of molluscicide used could be greatly reduced, with welcome cost and environmental benefits.

One particularly promising development involves the use of extracts from certain African plants that have been found to act as a barrier against slugs, without harming non-target species. For example myrrh resin can be mixed with an inert

biodegradable substrate such as sawdust to produce an effective slug and snail repellent barrier. This property has resulted in the development of a new environmentally friendly slug control agent that has been patented and is now about to be launched on a commercial basis. Not only is it more effective than current chemical controls but it avoids harmful effects on slugs and snails and other components of local ecosystems.

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AUSTRALIAN LAND SNAIL CONSERVATION WORKSHOP— TOWARDS A NATIONAL STRATEGY

By Winston F. Ponder

Text slightly modified from an article published in the newsletter of the Malacological Society of Australasia, *Australian Shell News*

Australian land snails, like those in many other parts of the world, are under threat from various human-induced processes, notably the destruction of habitat and the introduction of alien species. They are much more diverse than previously recognised with nearly 2,000 species known from collections in museums around the country, but only about 800 of these are formally named. Many of these species have a restricted range and a significant number are critically threatened. Some of these threatened species are formally listed at State level (in Western Australia, Northern Territory, Victoria, New South Wales and Tasmania) but only two at Commonwealth level. No land snails are listed under threatened species legislation in South Australia or Queensland. In comparison, 164 threatened Australian land snails are currently listed by IUCN.

A one day seminar-workshop on Australian land snail conservation was held at the Australian Museum (Sydney) on Monday 27 October 2003. Organised by the Malacological Society of Australasia (MSA) President, Des Beechey, and Winston Ponder, the aim was to raise awareness of the issue amongst government agencies and provide a stimulus to increase conservation action. It was attended by 33 people representing all states, the Northern Territory and New Zealand. The participants included several specialists (unfortunately Brian Smith, Bronwen Scott and Stephanie Clark were unable to attend), members of key Commonwealth and state agencies and museums, students and a few members of the MSA. Unfortunately non-government conservation organisations were virtually absent—probably a reflection of the current low standing that the conservation of land snails (and invertebrates generally) has in the community. These organisations have either failed to notice, or choose to ignore, the fact that world-wide there are more documented recent extinctions of non-marine molluscs than there are of mammals, birds, reptiles and amphibians combined.

The morning was devoted to six lectures introducing some of the main aspects of Australian land snail conservation. Winston Ponder (Australian Museum) gave a general

introduction summarising the issues from a global and national perspective. Two speakers then discussed work at a regional level. John Stanisic (Queensland Museum) gave a summary of land snail diversity and conservation issues in eastern Australia where the majority of Australian land snails are found, and Kevin Bonham (University of Tasmania) outlined his survey and assessment of the conservation status of Tasmanian (including the Bass Strait islands) land snails. Cameron Slatyer (Australian Heritage Commission) gave a summary of the Commission's work on national land snail mapping that has been made possible by data obtained from some of the state museum collections. Andrew Hugall (University of Adelaide) outlined his extensive molecular studies on camaenid snails and pointed out that the data for this large family are amongst the best for any group of animals. Michael Murphy (NSW National Parks & Wildlife) outlined his experiences with the listing of two New South Wales land snails, the development of recovery plans and engaging the community.

Two parallel workshops were held in the afternoon. One covered conservation priorities and strategies and the other the issues regarding the upgrading and utilisation of the data in museum collections (by far the largest repository of land snail data) for conservation purposes. The reports from these workshops will detail immediate and future actions leading to land snail conservation. Amongst those identified were the need to list additional threatened species under state and Commonwealth legislation and to raise public awareness. The production of a poster on land snails and their conservation was identified as one way of helping to achieve this and one that could be done quickly. Funding for the databasing and identification of land snails held in Australian museum collections was also identified as an important need as these data were seen as central to progress. An important short-term aim is to produce a document that will lead to the production of an Australian land snail action plan within the next few years.

An exciting initiative announced at the meeting is the development of an extensive field guide for eastern Australian land snails by Michael Shea and John Stanisic. Other resources include a catalogue of all the named pulmonate species on the ABIF website. The catalogue of other non-marine taxa is now completed and should be available online in early 2004. The ABIF website is:
<http://www.deh.gov.au/biodiversity/abrs/online-resources/abif/fauna/afd/group.html#Molluscs>

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CONSERVATION RESEARCH PROJECT ON THE PATAGONIAN MUSSEL *ANODONTITES PUELCHANUS*

By Pablo R. Martín & Pablo A. Seewald

Anodontites puelchanus and *Diplodon chilensis* are the only two freshwater mussels living in Argentinean Patagonia, a region of nearly 900,000 km² east of the Andean Range,

mostly an arid steppe crossed by a few allochthonous rivers.

The Patagonian mussel, *Anodontites puelchanus*, was described in 1835 by the French naturalist Alcide d'Orbigny, who found it in the lower Negro river in Northern Patagonia and noted that it inhabited sand-mud bottoms and was very rare (d'Orbigny, 1946). In 1879 Doering (1881) apparently found only old shells and commented that it was very much more rare along the river than the Chilean mussel, *D.*

chilensis, a species that also dwells in lakes and rivers of Chile. These reports are previous to the colonization of the Río Negro basin by Europeans. Bonetto (1973), although considering it a subspecies of *Anodontites patagonicus*, also stated that it was rarely found and that its distribution was restricted to lotic environments. According to Castellanos & Landoni (1990), *A. puelchanus* is endemic to the Negro river and one of its only two tributaries, the Limay river. Besides these reports, almost nothing is known about the biology and ecology of this Patagonian mussel, although, as other congeneric species, they are presumably hermaphroditic branchial brooders, releasing a lasidium larva that is parasitic on fishes.

Anodontites puelchanus is by far the southernmost species of the family Etheriidae, inhabiting a river of pluvio-nival regime in a cold and arid region, where winter water temperatures can descend down to 4°C. The realm of this family in South America is mostly tropical and subtropical, extending southwards to the La Plata river and nearby waterbodies. The gap between these two basins is 800 km wide and extends over an arid and semi-arid region. The present isolation of the two basins dates from late Pleistocene and their original fish faunas shared no species and almost no families.

Presently there is no public conservation concern about this endemic mussel and even its endemic character and its singularity from a biogeographic point of view are not commonly acknowledged. More information about its distribution and abundance is very much needed since the Negro river basin is the most heavily altered in Patagonia. Several dams on the Limay river have impounded most of the course where the Patagonian mussel has been recorded. On the other tributary, the Neuquén river, there are no impoundments on the course itself but the water is deviated to the Cerros Colorados reservoir system, to the Pellegrini Lake and to the Upper Río Negro Valley irrigation system. The hydrological regime of the Negro river has changed radically since the construction of these dams, which began in the 1960s. Other possible threats are the intensive use of pesticides and fertilizers in the irrigation schemes that extend almost continuously over most of the course. The Negro river basin concentrates most of the human population of Neuquén and Río Negro provinces and receives mostly non-treated wastewater discharges.

The recruitment and dispersal of freshwater mussels are strongly dependent on the presence and abundance of suitable fish hosts for the parasitic stage. The autochthonous fish fauna of this basin is mostly endemic to Patagonia and is itself threatened by the factors mentioned above and by the introduction of several exotic salmonids for sport fishing. Bonetto (1973) first suggested that mussel populations and

distribution would be diminishing in Patagonia as a result of the introduction of salmonids, which began in the first decades of the twentieth century. Fishes from other regions of Argentina have also been reported and there are fishermen's rumours of the presence of the common carp *Cyprinus carpio*. A potential competitor to the Patagonian mussel, the Asiatic clam, *Corbicula fluminea*, has also been reported recently from this basin (Cazzaniga & Pérez, 1999) and seems to be spreading very fast (Martín & Estebenet, 2002).

These antecedents have prompted us to initiate studies to assess the conservation status of the Patagonian mussel and to gather bioecological information relevant to its conservation. Only scarce empty shells of *A. puelchanus* were found during a preliminary survey in the middle and upper course of the Negro river and in the lower course of the Neuquén river and most of them were heavily eroded post-mortem and apparently quite old. The Asiatic clam was by far the most common and abundant macrobivalve in most of the surveyed sites, though the Chilean mussel was also abundant in some of them. A more extensive survey will be performed in summer 2004 along the Negro river to try to find extant populations of *A. puelchanus* and to determine its distribution and habitat requirements. Efforts will be made to raise public awareness about this singular endemic mussel. If any viable populations are eventually found, further studies will concentrate on reproductive habits and the identification of the fish host.

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“HYDROBIOID” LOCALITIES IN GREECE: AN URGENT CASE FOR CONSERVATION

by Magdalena Szarowska and Andrzej Falniowski

The tiny prosobranchs, once included in the Hydrobioidea, have in Greece been studied for a century and a half. Most of the studied sites are, however, situated either at archaeological sites or other places like that, or along main roads. The major part of the country is not easily accessible for a stranger and so far remains unstudied. Many of the existing records are doubtful and the snail collections are dry shells, the taxonomic

position of which cannot be checked. Furthermore, the taxonomy of “hydrobioids” is based on morphology and, there being a lot of confusion in it, to resolve the phylogenetic relationships among the taxa, one needs to use molecular characters. To study these, and to maintain the stability of nomenclature, one needs topotypical specimens.

In September 2003, in search for material for a molecular study, we visited about 20 localities of “hydrobioids” in the continental part of Greece. We found that the following type localities no longer exist: spring at Perama at Janina (type locality of two species), spring at Kefalovriso, holy spring at Vravra (the ancient Brauron), spring at Githion, Kamena Vourla spring, spring at Vrysia, spring at Velestino. Two other localities were changed: the polluted spring at Kessariani and the partly destroyed spring at Myli (the ancient Lerna).

In Greece water has always been a limiting factor, and the demand for water is still increasing. To satisfy this, deep-drilled wells are built and the existing intakes rebuilt so as to provide more water. The road network and town development makes the situation yet worse.

The “hydrobioid” localities, most of them springs, are prone to change and destruction. Some steps must therefore be taken to protect them urgently. The unique fauna needs phylogenetic and phylogeographic studies before it disappears.

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THE MICHIGAN STATE UNIVERSITY SNAIL LAB AND INVERTEBRATE ZOOLOGY COLLECTION

By Jim Atkinson

Current Projects with some bearing on conservation include:

- Population dynamics and dispersal mechanisms of the introduced land snail *Cepaea nemoralis*, focusing on a recently discovered population in Ingham County, Michigan (Merritt Gilliland).
- Ability and willingness of several species of land snails to cross man-made barriers such as asphalt and concrete as part of a general examination of land snail dispersal in fragmented landscapes (Bridget Kruger).
- Survey of the land snails in the Dansville Games Area (a preserve with a wide variety of habitats), Ingham County, Michigan. In the process we have come upon a small slug of the genus *Pallifera*, which has some characteristics of *P. ohioensis* and of *P. pilsbryi* but differs from the written descriptions of these species. We are collaborating with J. J. Smith to combine morphological and molecular analysis in an effort to sort out these relationships, including also *P. dorsalis* (J.W. and K.E. Atkinson).
- Computerized catalog of the holdings of the research collections of invertebrates for the Michigan State University (MSU) Zoology Department. These collections are small but contain some interesting molluscan material including unionids from various Michigan localities collected in the

1950s, 1960s, and 1970s, a small but growing collection of land snails and slugs, and a few aquatic and marine gastropods. We plan to get a web site up and running in the coming new year. Plans are also in the works to increase our space so that we can include over 10,000 lots of molluscan material owned by the MSU museum but currently in storage and unavailable for scholarly analysis. Anyone interested in a list of the specimens currently cataloged should contact me.

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MOLLUSC COLLECTIONS IN DUBLIN

By Julia Sigwart

Collections-based Biology in Dublin (CoBiD) is making specimen resources more available to conservation workers. This new partnership between the National University of Ireland (University College Dublin) and the National Museum of Ireland (Natural History) aims to develop teaching and research resources locally, as well as improve collections access to all researchers internationally. The NMINH collections contain some 3-4 million specimen objects in total, but chronic understaffing has severely limited their availability for research use. Molluscan holdings include strong marine and terrestrial collections, increasing material from ongoing regional studies, as well as important historical collections (e.g. di Monterosato). For example, voucher specimens from the European Union BioMar (1996) survey of Irish nearshore invertebrate faunas comprises detailed biogeographical data for marine species and biotopes defined by the project. Together with colleagues from the Ulster Museum (Belfast) we are developing this material for continuous biodiversity assessment. Use and accessibility of voucher material is essential to biological conservation research; CoBiD teaches undergraduate and postgraduate students in Dublin research skills in collections, to form pilot data and prevent unnecessary specimen collecting. As an additional benefit to everyone, this works to promote and enhance a valuable but neglected malacological resource. With comments or questions, please contact me.

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RE-ESTABLISHMENT OF THE ENDANGERED BANFF SPRINGS SNAIL INTO TWO FORMERLY OCCUPIED HABITATS

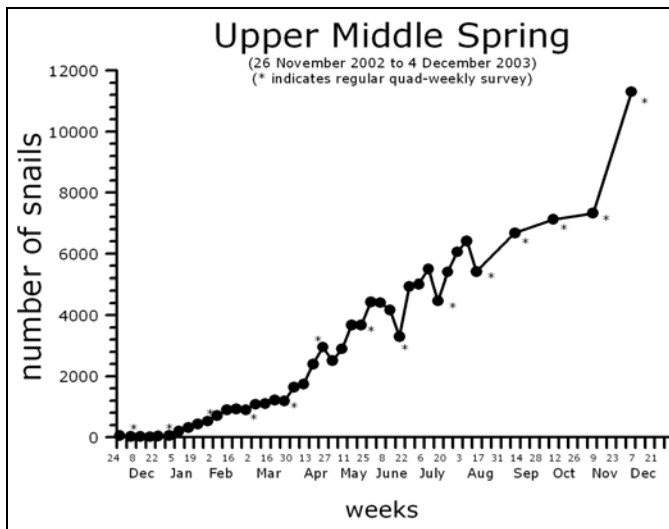
by Dwayne Lepitzki

In a handful of thermal springs near the townsite of Banff in Banff National Park, Alberta, Canada lives an inconspicuous mollusc (see *Tentacle* issues 7[1997] and 9[2000]). Exactly 70 yr passed between the original description of the Banff springs snail (*Physella johnsoni*) and the initiation of the first

ecological research program on the species in 1996. It was soon discovered that the endemic species had been extirpated from four of the nine originally occupied thermal springs and populations underwent annual fluctuations of over two magnitudes. Four of the five remaining populations continued to survive at the Cave and Basin National Historic Site, a high visitor use area. These results led to the species' listing by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) as 'threatened' in 1997 and then 'endangered' in 2000. In 2002, a Resource Management Plan (RMP) for the Recovery of the Endangered Banff Springs Snail became the first endangered species plan approved under the sole jurisdictional authority of Parks Canada.

One of the recovery actions of the RMP is to re-establish populations into habitats the species' formerly occupied. Before such re-establishments could occur, an Environmental Assessment had to be approved, habitat had to be secured from human-disturbance, a source of snails had to be confirmed, and critical habitat components, i.e. water flow, had to be ensured.

In November 2002, 50 snails were translocated from one thermal spring to another (fall is the time of year populations typically begin their annual increase). Until August 2003, the re-established population was monitored weekly; thereafter, it has been monitored once every 4 weeks. During monitoring a visual count of all the snails is made, therefore a total population count is achieved. Initially, the Upper Middle Spring population declined to a low of 16 snails; however, on Christmas Eve 2002, newly hatched snails began to be observed. Since then, the Upper Middle Spring population has undergone an increase of over two orders of magnitude (see Figure 1); at the latest count, over 11,000 individuals



catalogued by Cowie & Thiengo (2003). The monograph of the Ampullariidae by Alderson (1925) has to be considered a classic work, but unfortunately it is far from complete and moreover largely outdated. The work by Perera & Walls (1996) on keeping apple snails in the aquarium is a rather popular one among aquarium and shell lovers, but it is far from suitable for carrying out identifications. For example, all figured golden apple snails are treated as belonging to *Pomacea bridgesii*, this in spite of the fact that some pictures show clearly specimens with a deeply channeled suture, which is not the case in other specimens identified as *P. bridgesii*. In fact the beautiful golden variety may occur among a number of cultivated species. The identifications in this list are based on a comparison of the recent material from Israel with material identified by E.G. Alderson and T. Pain and present in the collection of the late Arthur Blok, now in the National Mollusc Collection of the Hebrew University of Jerusalem.

***Marisa cornuarietis* (Linnaeus, 1758)**

Origin: Northern part of South America

Status in Israel: Unknown. In the past it has been used in trials as a competitor of *Bulinus truncatus* (Audouin, 1826), an intermediate host of schistosomiasis. Most likely the remaining stock has been destroyed.

***Pomacea bridgesii* (Reeve, 1856)**

Origin: South America

Status in Israel: Readily available in pet-shops. Specimens have been collected from a fishpond near Rehovot.

***Pomacea canaliculata* (Lamarck, 1822)**

Origin: South America

Status in Israel: Readily available in pet-shops. Specimens have been collected from several garden ponds and fishponds in the Sharon area.

***Pomacea insularum* (d'Orbigny, 1835)**

Origin: South America

Status in Israel: Readily available in pet-shops. Specimens have also been collected from a pond.

***Pomacea paludosa* (Say, 1829)**

Origin: USA (Florida)

Status in Israel: Readily available in pet-shops. It is a common aquarium snail.

Family PHYSIDAE

The nomenclature applied in this list is based on the thorough revision of this problematic family by Taylor (2003).

***Haitia acuta* (Draparnaud, 1805)**

[incl. *heterostrophia* Say, 1817]

Origin: USA

Status in Israel: This well known aquarium snail has become the most common species in Israel and lives in any aquatic biotope (lakes, rivers, streams, ponds, marshes, temporary ponds and ditches), even in the most polluted streams.

Additional remarks: A few years ago I wondered whether the "original" circum-Mediterranean species *Physella acuta*, although now widely distributed over Europe, had to be considered in reality an American species (Mienis, 2001). I based this supposition on two facts: all close relatives of *P. acuta* are New World (American) species and fossil

specimens of it have never been recorded from the Old World (Eurasia and Africa). In the meantime, Dillon *et al.* (2002), Taylor (2003) and Anderson (2003) have demonstrated independently that the "Mediterranean" *Physa/Physella/Haitia acuta* and the North-American *Physella heterostrophia* (Say, 1817) are one and the same species. This means that *Haitia acuta* has to be considered a very old introduction into Europe from North America.

***Physella ancillaria* (Say, 1825)**

Origin: USA

Status in Israel: Twice collected in ponds (Jerusalem and Ramat Aviv).

***Physella gyrina* (Say, 1821)**

Origin: USA

Status in Israel: Collected in the botanical gardens of the Tel Aviv University—once in the old botanical garden at Abu Kabir, Tel Aviv (1960), and once in the new botanical garden in Ramat Aviv (2001).

Additional remarks: All the specimens are identical with the high, slender form, which has been described as *Physa virginea* Gould, 1847.

Family PLANORBIDAE

***Planorbella duryi* (Wetherby, 1879)**

Origin: USA

Status in Israel: A common aquarium snail that has also been found in streams, ponds and lakes (Sea of Galilee).

Family LYMNAEIDAE

The nomenclature of the European species in this list follows that proposed by Falkner *et al.* (2001, 2002).

***Pseudosuccinea columella* (Say, 1817)**

Origin: USA

Status in Israel: A common aquarium snail that is also living in rivers, streams and ponds. It may serve as an intermediate host of the liver flukes *Fasciola hepatica* and *Fasciola gigantea*.

***Radix auricularia auricularia* (Linnaeus, 1758)**

Origin: Europe

Status in Israel: An aquarium snail that turns up occasionally in streams and ponds.

***Radix balthica* (Linnaeus, 1758)**

Until recently this species was widely known as *Radix ovata* (Draparnaud, 1805).

Origin: Europe

Status in Israel: Known only from a single population in the Botanical Garden of the Tel Aviv University.

***Radix rubiginosa* (Michelin, 1831)**

Origin: South-east Asia

Status in Israel: Occasionally encountered in aquaria, where it soon becomes a pest. Consequently it is being dumped in nearby aquatic biotopes.

***Radix viridis* (Quoy & Gaimard, 1832)**

Origin: South-east Asia

Status in Israel: Occasionally encountered in aquaria, where, like the preceding species, it soon becomes a pest and is dumped in a nearby aquatic biotope.

Family UNIONIDAE***Cristaria plicata* (Leach, 1815)**

Origin: China

Status in Israel: Unknown. A few years ago members of the cooperative settlement Kibbutz Gan Shmuel imported this large mussel species for trials in growing freshwater pearls and as bio-filters for purification of contaminated water from fishponds. After several years these trials were aborted and the remaining adult mussels were killed. It is unknown what has become of the fish living in the same pond. They may have served as intermediate hosts of the glochidia of the mussels.

Family CORBICULIDAE***Corbicula fluminea* (Müller, 1774)**

Origin: China

Status in Israel: Unknown. A few years ago members of the cooperative settlement Kibbutz Dan have imported this mussel species in an attempt to grow it for food. After several years these trials were abolished. The fate of the remaining mussels is unknown.

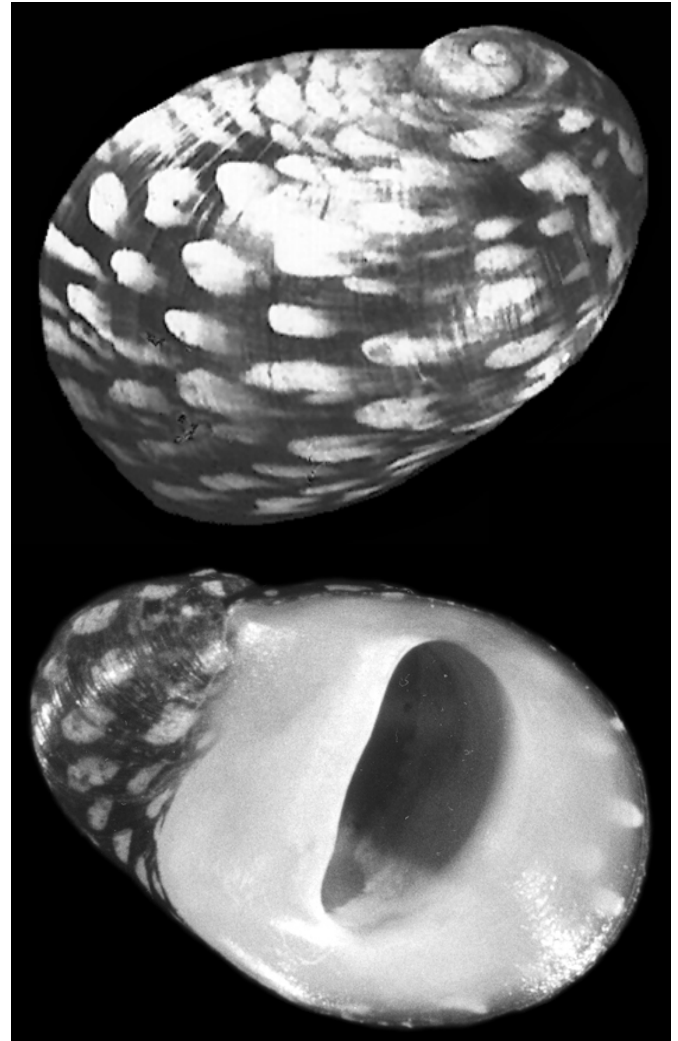
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MISSION "SCHNECKE DES JAHRES" (SNAIL OF THE YEAR)

By Gerhard Haszprunar

The activity started in 2003 with the land gastropod *Vertigo moulinsiana* (Dupuy, 1849). The species are nominated by a committee of Germany malacologists, who want to inform the public that "endangered species" is not just a matter of vertebrates, but that other groups, molluscs in particular, are



Theodoxus fluviatilis (photos: P. Glöer)

of great concern too.

For 2004 we nominated a member of a group of freshwater gastropod species that are all highly endangered or extinct and that should not only arouse public interest because of their interesting biology but impress people by their simple beauty. We plan to nominate for 2005 a slug, for 2006 a freshwater bivalve, for 2007 a land gastropod, and for 2008 a marine species.

Snail of the Year for 2004

Theodoxus fluviatilis (Linnaeus, 1758) (4.5-6.5 x 6-9 mm shell size) is an archaic prosobranch gastropod that inhabits freshwater but also occurs sometimes in brackish waters. It prefers large rivers with stony ground and significant current or the stony borders of lakes. Reproduction of this gonochoristic species is by copulation, with a penis being situated on the right side of the head. Egg capsules with about 70 eggs are deposited on stones. However, each egg capsule releases only a single (0.5-1 mm) offspring, the other eggs having been used as "nourish eggs". *Theodoxus fluviatilis* feeds mainly on diatom algae, which have to be crushed against a hard substrate to be digested—a reason why the species needs stony substrates.

In Germany *Theodoxus fluviatilis* occurs in the northern plains, particularly in the low eastern hills of Schleswig-

Holstein; it is widely distributed in Mecklenburg-Vorpommern and northern Brandenburg. However, populations are rapidly decreasing in the remaining parts of Germany. The main reasons for this are destruction of the edges of rivers and lakes and pollution. Thus, *T. fluviatilis* is listed in the German *Red List* as “very endangered”.

Theodoxus fluviatilis littoralis (Linnaeus, 1758)—the brackish form—is currently considered as a subspecies by most authors. It reaches only 70 % of the size of the nominotypical form and the shell is thinner. In addition, the ecology is different: *T. f. littoralis* does not inhabit hard substrates but lives on seaweeds and seagrass. In Germany this subspecies occurs only along the coast of the Ostsee.

Theodoxus transversalis (C. Pfeiffer, 1828) is similar in size and in its ecology to *T. fluviatilis*. The shell is grey to yellow with fine spiral lines but always lacking reticulate or line patterning; the operculum is orange. In Germany *T. transversalis* only occurs in small populations near the entrance of the Isar into the Danube and a few other locations in Bavaria. In Austria this species is already extinct.

Theodoxus danubialis (C. Pfeiffer, 1828) is larger (9-14 mm) and shows characteristic dark zig-zag lines; the operculum is bright yellow. It also lives on stony substrates. Small populations still exist in the Bavarian Danube (near Bad Abbach and near Kellheim). In Austria this species is also highly endangered.



Theodoxus danubialis (photo: G. Falkner)

The homepage of the “Weichtier des Jahres” can be accessed from: www.mollusken-nrw.de

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THE EFFECT OF EXPLOITATION ON *HELIX POMATIA* POPULATIONS IN MOLDOVA

By Nadejda Andreev

The Roman snail *Helix pomatia* L., the largest European land snail species, is facing a growing commercial interest in

Moldova. Some biological characteristics of this species, including its slow maturity and recruitment, high mortality among juveniles coupled with low fecundity, and their propensity for high spatial aggregation, make this species vulnerable to exploitation. Traditionally in Moldova the Roman snail was not used for food, although some data (Chihac, 1837) indicate that Moldavians consumed it during Lent. Each year a quantity of about 100-200 tonnes of snails collected from the wild is exported abroad. Until now no attempts have been made to assess the status of wild populations in exploited areas in spite of the necessity of doing this since such records are important for long term management of the populations.

During summer 2003, with financial support from the Swedish Biodiversity Centre, a survey was conducted on population density, shell size and age distribution of the Roman snail in Moldova. A total of 10 exploited and 7 non-exploited sites were investigated. A macroplot of 20 m x 40 m was set up at each site and randomly selected squares within the plot were sampled.

The study revealed a considerable impact of exploitation on snail populations—for example the density in non-exploited areas exceeded by far those in exploited areas. Moreover, in two exploited sites no live snails, only shells, were found. This could indicate that collection has probably exterminated the populations in these places and there is a negative impact of exploitation on wild populations. Additional life table data on the population would allow an assessment of sustainability and setting of the necessary measures for species conservation.

However, the adults from exploited sites were larger, perhaps resulting from a density effect (Oosterhoff, 1977; Cameron & Carter, 1979; Goodfriend, 1986). Studies (Robinson & Redford, 1994) have demonstrated that age distribution can be an indicator of sustainability of exploitation, exploited populations having a lower proportion of adults than non-exploited populations. The current study revealed lower proportions of adults in exploited sites. This is because commercial exploitation has an effect not only on adults, but on all age groups.

Having a high commercial value, the Roman snail should be subject to rational and sustainable exploitation. In order to avoid resource depletion, a systematic survey of the status of the populations is necessary. Development of snail breeding enterprises would also help conservation of the species since it could provide the necessary amount of snails required for the market and hence lead to a decrease in pressure on the wild populations.

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PACIFIC ISLAND LAND SNAILS

Determinants of diversity of the diplommatinid land snails of Palau

By Rebecca J. Rundell

The islands of Palau (Republic of Belau) are Micronesian islands located in the western Pacific, about 800 km east of the Philippines. Palau comprises over 350 islands, many of which are very small (less than 1 ha) and composed of limestone (the “Rock Islands”—Crombie & Pregill, 1999). Although Palau has an incredible diversity of land snails, including the diplommatinids (many specimens of which are housed at the Bishop Museum in Honolulu), few malacologists have explored Palau or studied its land snails. The work of Cowie *et al.* (1996) helped to document many species from the largest island of Babeldaob. Thompson and co-workers (F. Thompson, pers. comm.) have also contributed significant collections from the Rock Islands. Smith (1993) compiled a list of Palau’s land snails, including 26 endemic diplommatinids; however, it is likely that many more species await description (Cowie *et al.*, 1996).

During July and August of 2003, I embarked upon my Ph.D. dissertation research: a study of Palau’s diplommatinid land snails. Funded by the Field Museum (Chicago) and the Hinds Fund (University of Chicago), I began collecting specimens and distribution data, which will be critical for detailed phylogenetic and biogeographic study. This work is especially important at this juncture in Palau’s economic development, since major road construction is underway on Babeldaob, and it is likely that this construction will severely impact the land snail fauna. During this field season, I worked closely with the Palau Conservation Society, local governors and chiefs, as well as local citizens in building the foundation for future land snail research in Palau. I was fortunate to be joined by two University of Chicago undergraduates, Ann Gawel and Chris Carroll, whom I trained in land snail census techniques. Their enthusiasm and contributions to the project helped build momentum for future conservation efforts in Palau. The director of the Palau Conservation Society, Belhaim Sakuma, was instrumental in helping us bring the topic of land snail conservation to the fore in Palau. Our hope is that continuing survey efforts in Palau will significantly contribute to the preservation of Palau’s unique land snail fauna.

My dissertation research, of which the general surveys are a part, will help us better understand the processes of (potentially) adaptive radiation that have contributed to the current diversity of Palau’s diplommatinid land snails. I will also bring principles of community ecology to bear on the subject, in an attempt to understand why distinct assemblages

of diplommatinids occur on particular islands. In both cases, the phylogenetic hypotheses I generate will be essential.

I am currently planning future field seasons for collecting in Palau. If you know of someone who is interested in joining the Palau Land Snail Project, and gaining valuable field experience, please contact me.

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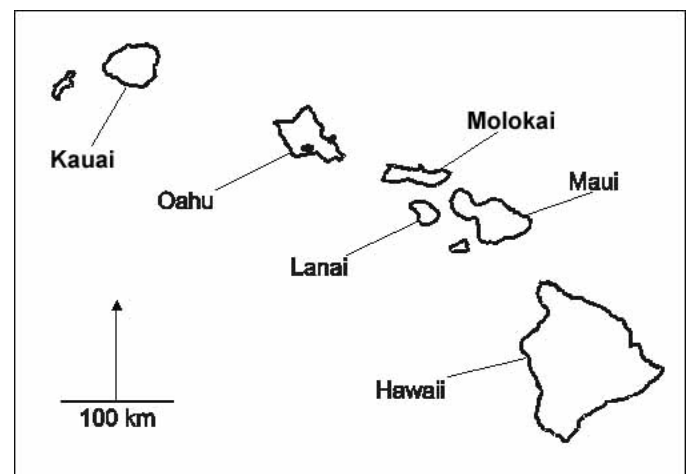
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Molecular phylogeography of an endangered Oahu tree snail: long-term geological separation, short term vicariance, and conservation implications

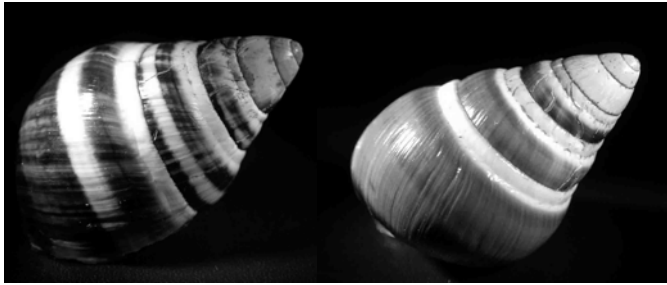
By Brenden S. Holland & Michael G. Hadfield

The decimation of endemic Hawaiian tree snails (subfamily Achatinellinae) has been well-documented in recent years (e.g. Hadfield *et al.*, 1993). Throughout the Hawaiian Islands, the percentage of species lost as well as the range reductions of extant taxa have been devastating (USFWS, 1993). Of the 41 species on the island of Oahu as of the last taxonomic revision (Pilsbry & Cooke, 1912-1914), only nine or possibly 10 species remain today (Holland & Hadfield, in press). All are listed as Endangered species.



The Hawaiian Islands

As part of multidisciplinary, ongoing efforts to better understand tree snail biology and simultaneously provide conservation-relevant information to regional managers, we are using DNA markers to elucidate patterns of genetic diversity in extant populations of tree snails. In a recent phylogeographic analysis of the Oahu tree snail *Achatinella mustelina*, mitochondrial DNA (mtDNA) sequences were



Achatinella mustelina – a sinistral-shelled individual on the left and a dextral-shelled individual on the right

used to define evolutionarily significant units (ESUs) for use by regional wildlife managers (Holland & Hadfield, 2002). The focus of this investigation was to evaluate phylogeographic structure within and among populations, which are patchily distributed along upper ridges of the Waianae Mountain Range, and to use this information in setting conservation priorities. Tissue samples were obtained in the field via a non-lethal sampling technique developed for Hawaiian tree snails (Thacker & Hadfield 2000). Pairwise genetic distance matrices and phylogenetic trees were generated, and an analysis of molecular variance (AMOVA) was performed on 675 basepair cytochrome oxidase subunit I (COI) gene sequences of 86 individuals from 24 populations of Oahu tree snails. Sequence data were analyzed under genetic distance, maximum-likelihood, and maximum-parsimony optimality criteria.

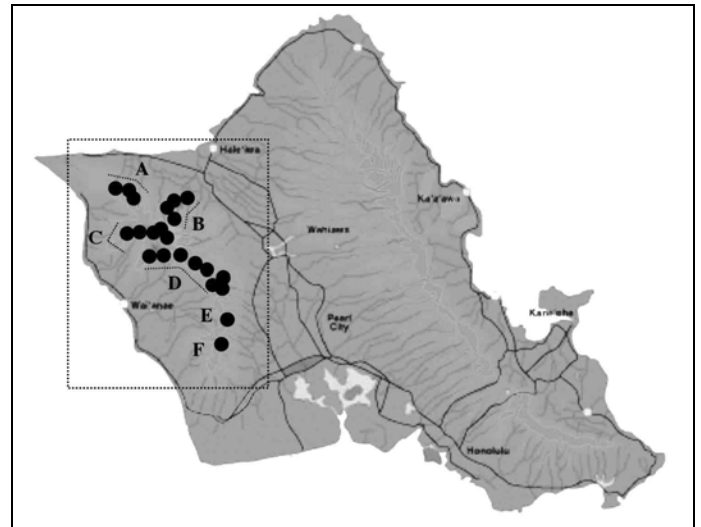
The COI gene fragment proved highly informative; pairwise intraspecific mtDNA sequence divergences ranged from 0 to 5.3 %, and population genetic structure and mountain topography were highly correlated. Maximum genetic distances were observed across deep, largely deforested valleys and steep mountain peaks, independent of geographic distance. However, in certain areas where forest cover is presently fragmented, little or no mtDNA sequence divergence exists despite relatively large geographic scales (10 km). Reproductive isolation driven by the action of both long-term geological events such as erosional formation of valleys, and short-term vicariant events such as forest fragmentation, appear to have acted in concert to produce a pattern of sharp genetic breaks across valleys and widespread genetic homogeneity along ridges.

Phylogeographic data were used to define six ESUs that are being used for conservation management purposes including decisions regarding placement of predator exclusion structures (Holland & Hadfield, 2002). ESUs defined in this study may prove useful in future management applications such as captive propagation, re-introduction, and translocation.

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The island of Oahu, highlighting the Waianae Mountain range (boxed), with the approximate sampling locations and the six genetically defined ESUs, indicated as A-F.

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MARINE MATTERS

Exploitation of molluscs in northern Mozambique

By Dai Herbert

On Tuesday, 15 July 2003, a container of shells en route from northern Mozambique (Nacala) to Italy (Naples) was intercepted by port authorities in Durban. Alarmed at the size of the shipment, the authorities alerted the provincial nature conservation agency, Ezemvelo KZN Wildlife, who in turn seized the cargo for further investigation under the South African Marine Living Resources Act.

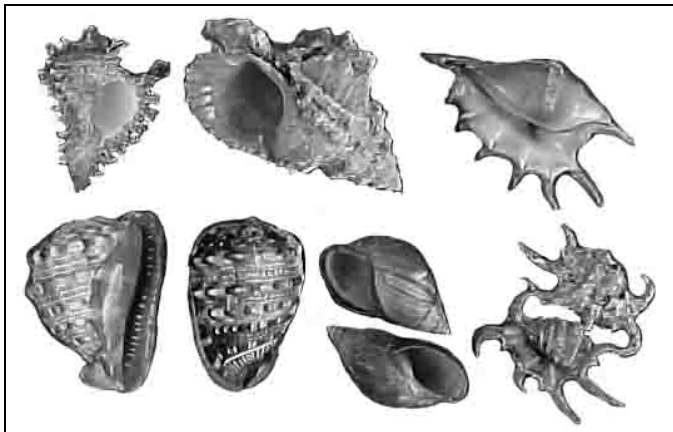
The shipment of almost 50,000 shells, weighing approximately 11 tons, comprised the following:

Species	Quantity
Red helmet shell (<i>Cypaecassis rufa</i>)	15,450
Frog shell (<i>Tutufa bubo</i>)	661
Common spider shell (<i>Lambis lambis</i>)	1,500
Spiny murex (<i>Chicoreus ramosus</i>)	17,308
Pink-lipped agate snail (<i>Achatina immaculata</i>)	12,470
Total	48,219

These species, with the exception of the agate snails, are all

spectacular tropical marine species and were almost certainly destined for the ornamental shell trade. The red helmet shells would most likely be used to make cameo jewellery, a popular item in Italy, much manufactured in Naples. Indeed the consignee to which the shipment was being sent, identified as “Torre del Greco”, is a suburb of Naples known for its cameo industry. The possible use of the agate snails is not clear, but it could be that they would be ground up and used as ingredients of specialised products, for example pottery glazes (natural whitening).

All of the ornamental species were without doubt collected alive—the fresh condition of the shells and the smell of the rotting remains of the animals inside the shells was clear evidence of this. They would have been collected, probably by subsistence gatherers, in the sheltered lagoons and reefs on the northern Mozambique coast.



Some of the nearly 50,000 shells exported from northern Mozambique to Italy; the vast majority harvested alive. Clockwise, from top left, *Chicoreus ramosus*, *Tutufa bubo*, *Lambis lambis*, *Lambis chiragra arthritica* (x2), *Achatina immaculata* (x2), *Cypraecassis rufa* (x2).

Although harvesting of these animals on this scale must be a matter of concern, the fact remained that, unless specifically prohibited by Mozambican law, the South African authorities could not legitimately impound the cargo indefinitely and would have to allow it to continue its journey to Italy. None of the species concerned is listed in the CITES appendices governing the trade in threatened species, and so, if the harvesting in Mozambique was not illegal, then no laws were broken and the trade in the shells was permissible. Subsequent investigation revealed that permits for shipping the cargo were issued, but that these originated from the Mozambican Ministry of Agriculture and concerned matters relating to animal and plant health. The National Directorate of Fisheries Administration in the Ministry of Fisheries was evidently not aware of the shipment. Seemingly, Mozambican law had not been broken, but rather ingeniously circumvented, and thus the South African port authorities were obliged to allow the shipment to continue its journey to Italy.

It is a fact of life today that economics dictates that nature's resources must, wherever possible, be used to human advantage. Underpinning this, however, is the principle of sustainable utilisation. In this case I am sure that there is virtually no information available to indicate whether this level of harvesting of living molluscs is in fact sustainable.

Similarly, we have no information regarding the frequency with which such shipments occur. Was this a once-off cargo or do these shipments occur regularly and if so, how often? Hopefully, the discovery of this large shipment has now alerted the Mozambican fisheries authorities to the scale of the exploitation and they will investigate further and consider implementing regulations, if these are not already in place. Although the species involved may be common in pristine tropical habitats, their numbers are not inexhaustible and some are important predators in these ecosystems.

Trade in live-collected ornamental shells occurs simply because there is a demand for the product, largely in western society. Those who buy the shells are the people who perpetuate the exploitation—buy a shell, kill a mollusc, albeit indirectly. It is quite unrealistic to blame the desperately poor people of northern Mozambique for this—they have to feed themselves. Similarly businessmen are businessmen, and they will take any opportunity to make money. The way to address the problem is through education—environmental education—encouraging people to think about the environmental implications of their actions—teaching people things that will impact upon the day to day decisions that they make for the rest of their lives. At the risk of sounding like a rampant “greeny”, I ask: is it more important that children learn that the gravitational constant is 9.8 ms^{-2} , or that William the Conqueror invaded England in 1066, than that they learn about their own impact on the world in which they live? Surely, in today's hugely consumptive society, environmental education needs to be given greater priority in the school curriculum.

Dai Herbert, contact details in the list of Mollusc Specialist Group Members at the end of this issue of *Tentacle*.

RECENT PUBLICATIONS RELEVANT TO MOLLUSC CONSERVATION

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