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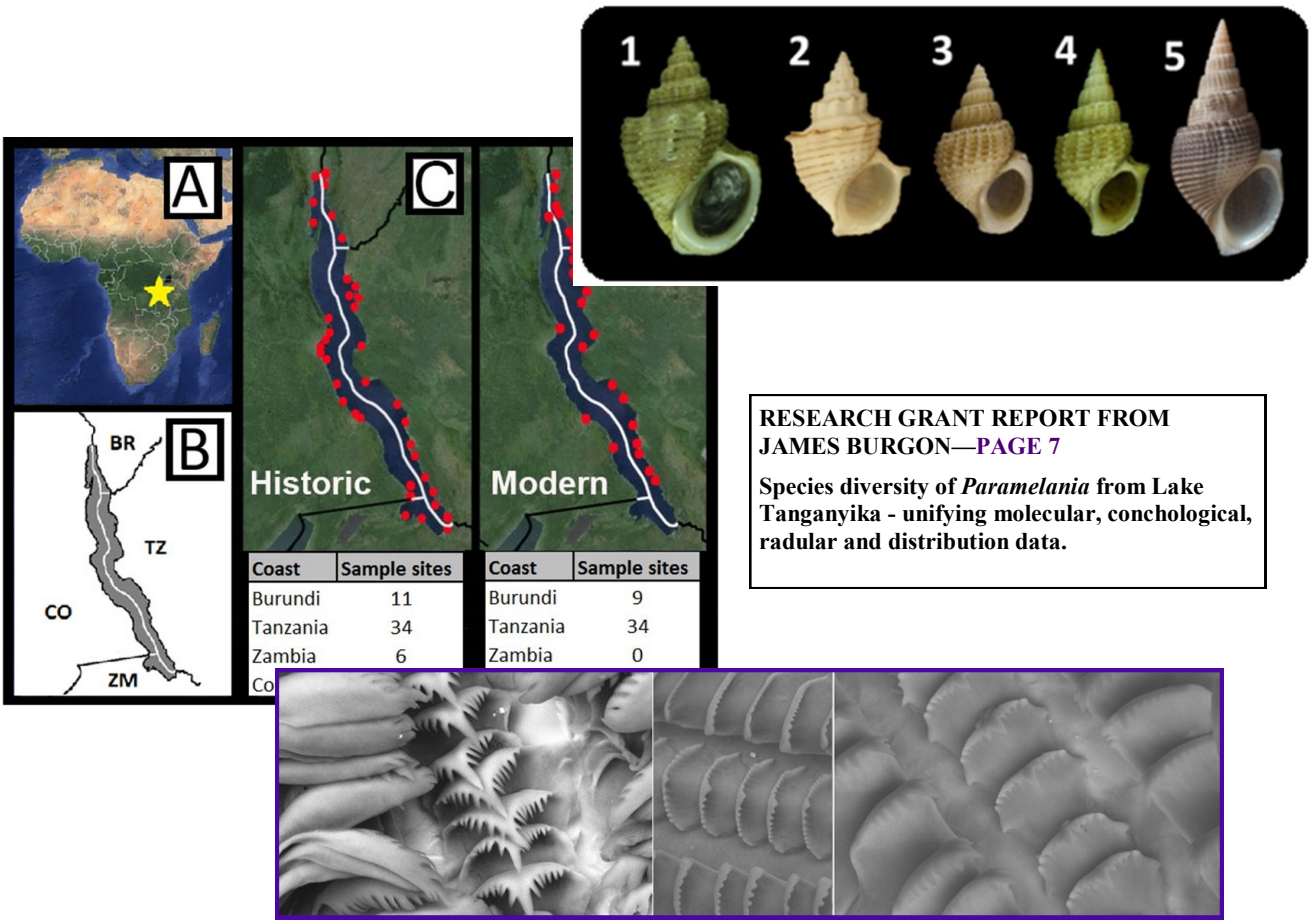


RESEARCH GRANT REPORT FROM JAMES BURGON—PAGE 7

Species diversity of *Paramelania* from Lake Tanganyika - unifying molecular, conchological, radular and distribution data.

The Malacological Society of London was founded in 1893 and registered as a charity in 1978
(Charity Number 275980)

EDITORIAL

As the 63rd issue of *The Malacologist* begins its circulation, the 2014 Congress of European Malacological Societies (EMS) comes to a close at St Catharine's College, University of Cambridge. This eclectic meeting benefitted from a refreshingly high proportion of young presenters. Many of these young faces were familiar from previous meetings of the Malacological Forum which take place annually at the Natural History Museum in London. The next Forum will be on 20th November 2014. Please see page 28 for further information.

A striking aspect of the EMS meeting was the quality of presentations of both papers and posters. As malacologists, we benefit from working on a taxonomic group which has a large number of visually arresting representatives, as shown on the front covers of the *Journal of Molluscan Studies*. This aesthetic seems to be appreciated by malacologists in the way they approach their presentations both at conferences, as demonstrated at the EMS, and in their contributions to the literature. A glance through the *Journal of Molluscan Studies* shows that the aesthetic can be carried into the layout and general presentation of a journal. While evolution needs to be credited for the aesthetic of the molluscs, the Editor, David Reid, deserves huge credit for the high quality of the journal.

The current issue of *The Malacologist* offers several short reports of research carried out with financial support from the Malacological Society of London and it is gratifying to see the Society's efforts being rewarded by good quality scientific output. On page 20, the Annual Report of Council provides an overview of the activities of the Society for 2013-2014. It shows the enthusiasm and energy that this group of malacologists are prepared to devote to furthering the scientific study of a remarkable group of animals particularly as demonstrated at the EMS. The EMS will be a major focus of the next issue of The Malacologist in February 2015.

Prof. Georges Dussart
Canterbury Christ Church University
North Holmes Rd.,
Canterbury,
Kent CT1 3JZ
georges.dussart@canterbury.ac.uk

TAXONOMIC/NOMENCLATURAL DISCLAIMER
This publication is not deemed to be valid for taxonomic/nomenclatural purposes [see Article 8b in the International Code of Zoological Nomenclature 3rd Edition (1985), edited by W.D. Ride *et al.*].

NOTICES

The Astronaut Trail Shell Club Award

The Astronaut Trail Shell Club is pleased to announce that we once again are able to provide scholarships for graduate students (masters or doctorate) in Marine Sciences at Florida's public or private universities and colleges. The study may be related to, but is not limited to marine, fresh water, or terrestrial molluscs. Scholarship awards will be presented at the Shell Show Awards Banquet in January. Attendance at the banquet is not required. If a winner cannot attend, the cheque will be mailed to the recipient following the award announcement. Winning students will be invited to attend the banquet as guests of the club. Successful applicants will be expected to provide a report on their work at its completion or earlier if appropriate. The report may be made in the form of an oral presentation at a club meeting or as a written report for the club's newsletter, The Capsule.
Contact—Astronaut Shell Club SF. Matthew Blaine , 908 West Street, Laurel, Delaware 19956-1932, USA

Cornu aspersum (*Helix aspersa*)

Anne Guiller reiterates a request made five years ago regarding the sampling of invasive populations of the Mediterranean land snail *Cornu aspersum* (*Helix aspersa*). Armelle Ansart, Luc Madec and Anne Guiller have for many years been working on the evolutionary history of *Cornu aspersum*. This typically anthropochorous species, originated from North-Africa, has been secondarily introduced in Europe and is nowadays widespread throughout the world in many zones with climates different from that of the Mediterranean. Whatever the nature and the reason (economic or not) of its introduction, its presence is now reported on the American and African (South Africa) continents, as well as in Australia, New Zealand. Whilst this helicid species is not considered as an alien in Europe, *C. aspersum* is a notorious agricultural pest especially in American states such as in California (see http://www.cabi.org/isc/datasheet/26821). Thanks to the generosity of colleagues from different countries, we inferred the introduction routes of this invasive species by comparing the genetic profiles of several native and recently introduced populations (see Guiller *et al.,* 2012, in PlosONE). To further examine and refine the routes of invasion and colonisation histories of the species, and to investigate the impact of selection and genetic drift in the invasive process, we plan to use genetic and morphometric / geometric markers. The reason of the present request concerns the sampling of natural populations of *Cornu aspersum* in areas where the species as been recently introduced i.e. in America, Africa, Asia, Oceania. As the use of both molecular and morphometric markers is planned, the team need either live individuals or a small piece of the foot of each snail (piece of tissue of 5 mm^3 each preserved individually in eppendorf with 70-80% ethanol) accompanied by empty shells of the same population. A sample size of 20-30 individuals would be excellent. More information on the sampling protocol can be supplied. Anne Guiller would be grateful for help in either sampling snails or providing email address of persons that could take samples.
Contact—Annie Guiller (MC) , UMR CNRS 6553 - Equipe ESDD, Université de Rennes I, Av. du Pr. Léon Bernard 35043 Rennes, France Tel. : 33 (0)2 23 23 48 19

Florida Museum of Natural History - Malacology collection

We would like to call your attention to the Florida Museum of Natural History's Malacology collection, currently serving data from ~467,000 specimen lots online at: http://www.flmnh.ufl.edu/scripts/dbs/malacol_pub.asp, as well as through iDigBio, GBIF, and Discover Life. A large portion of the holdings are preserved in alcohol and made in the past couple of decades. Live/fresh images of many specimens are available and are being gradually posted on the iDigBio portal https://www.idigbio.org/portal/search, so check back there over time. Curation and databasing were funded in part by NSF DBI. If you are interested in access to specimens, please contact us.
Contact - Gustav Paulay, Curator; Fred Thompson, Curator Emeritus or John Slapcinsky, Collection Manager

Bivalve Tree of Life – based on molecular and novel morphological characters

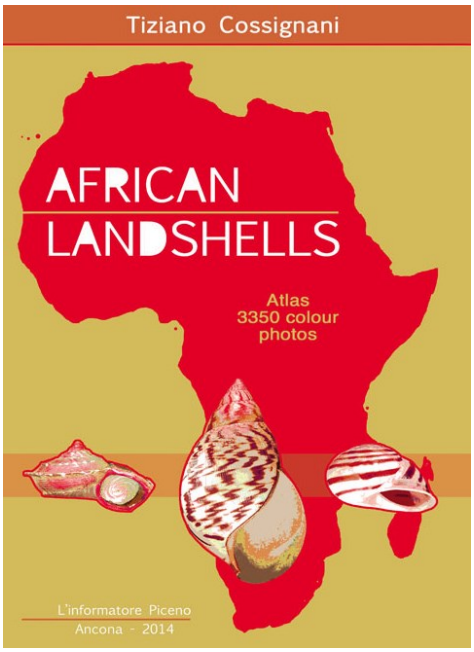
The latest issue of *Invertebrate Systematics* (vol. 28: 32–115) contains a large study by 20 authors of the Bivalve Tree-of-Life (bivatol.org) team, entitled *"Investigating the Bivalve Tree of Life – an exemplar-based approach combining molecular and novel morphological characters."* The paper has open electronic access [http://www.publish.csiro.au/?nid=120], with the underlying data available via Morphobank (Project 790) and GenBank.
Contact - Rudiger Bieler

Malacology Collection—Natural History Museum of Los Angeles County

All preserved land snails and freshwater bivalves have been relocated to a new offsite facility shared with the LACM Invertebrate Paleontology collection. Note that the dry preserved freshwater gastropods are still located in the main LACM facility as are all of the freshwater and land snail type specimens. The new facility is located at 17232 S. Main St., Carson CA 90248. Access to Malacology collections must be made through Collection Manager Lindsey Groves at the main LACM facility at either 213-763-3376 or lgroves@nhm.org There is plenty of work space and better lighting at the new facility and a large portion of the reprint collection of the late C. Clif Coney (who specialized in land snails and unionid bivalves) has also been relocated to Carson. .
Contact—Lindsey T. Groves

AFRICAN LANDSHELLS
Atlas 3.350 colour photos by Tiziano Cossignani
212 pp 100.00 euro
Order: malacologia@fastnet.it

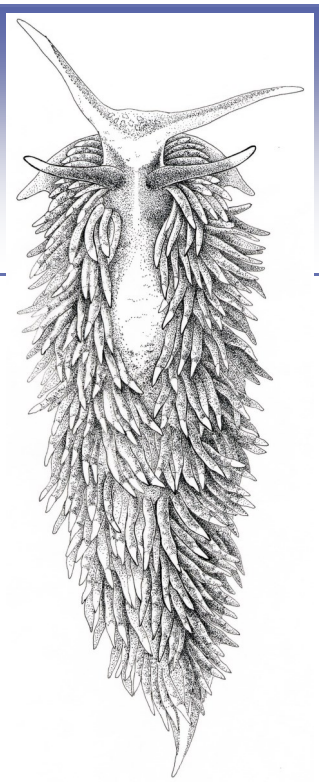
This atlas documents the collection of Land Shells of the Malacological Museum of Cupra Marittima. During the past few years I took pictures of almost all the samples collected in Cupra Marittima, but I've also enriched the photo-archive with specimens belonging to friends, collectors, dealers and museums, to whom I extend my special thanks. This work is planned in three volumes, the first devoted to African landshells, the second and the third to American and Asian snails. The present work is not intended to be a scientific revision or validation of any kind, but I do hope that it will be of some help to land-shells collectors as well as an invitation addressed to the experts in the field to share their knowledge. The presentation of the various species follows a geographical order for the snails belonging to the most significant nations, and for which we have more specimens photographed, and in principle an alphabetical order for the rest and other miscellaneous (some exceptions are due to typographical requirements). The malacological areas for which exist valid and recent publications, such as Mascarene and South Africa, have been somewhat deliberately neglected. I inserted also some pictures of easy-to-find freshwater molluscs. For each shell I indicate the genus, species, author, year, and location of the photographed specimen, the size in millimetres and the eventual placement in a museum in case of type. A brief bibliography and an index conclude this editorial work edited by L'Informatore Piceno, Ancona.



Research grant reports

What is *Aeolidia papillosa* (Lineaus, 1791)?

Leila Carmona Barnosi
Departamento de Biología
Universidad de Cádiz
Polígono del Río San Pedro s/n
Apdo. 40, 11510 Puerto Real (Cádiz) , SPAIN
leila.carmona@uca.es



INTRODUCTION

Aeolidia Cuvier, 1798 is the type genus of Aeolidiidae with only two or three species currently recognised as valid. *A. papillosa,* its type species, can be regarded as well-known since it has been intensively studied by historical and modern authors (e.g. Hancock & Embleton, 1845; Thompson & Brown, 1984). Over the years, species from different localities of temperate-cold waters have been synonymised as *A. papillosa*: *Doris bodoensis* Gunnerus, 1770, North Sea; *Doris papillosa* Müller, 1776, North Sea; *Doris vermigera* Turton, 1807, British Isles; *Eolis rosea* Alder & Hancock, 1842, *E. obtusalis* Alder & Hancock, 1842, British Isles; *Aeolis murrayana* MacGillivray, 1843, Scotland; *Eolis papillosa* Hancock & Embleton, 1845, British Isles; *Eolis plumata*, Dalyell, 1853, Scotland; *Eolis farinacea* Gould in Stimpson, 1853, New England (USA) and *Aeolidia papillosa var. pacifica* Bergh, 1879, Alaska Peninsula (USA). As a consequence of all these synonyms, different colour patterns have been explained as great intraspecific colour variability of this species. In addition, the on-going controversy about the validity of *A. collaris* Odhner, 1921, *A. serotina* Bergh, 1873 and *A. herculea* Bergh, 1894 (Schrödl, 1996, 1997, 2003; Martynov & Korshunova, 2011), has blurred the morphological characteristics of *A. papillosa* and therefore the limits among these species.

One of the most puzzling aspects of *A. papillosa* is its disjunct geographical range. Nowadays it is accepted that its geographical distribution covers from Norway (type locality), Iceland (Platts, 1985), Greenland (Rosenberg, 2009) to California (Er. Marcus, 1961; McDonald, 1983), passing through Atlantic coast of USA (Bleakney, 1996), Alaska (Dall, 1884), the White Sea (Russia) (Martynov & Korshunova, 2011) and northern Japan (Baba, 1935; Nakano, 2004; Debelius & Kuiter, 2007). Furthermore, there are some records from the west and east coasts of South America (Er. Marcus, 1959; Schrödl, 1996, 1997, 2003) (Fig. 1). Based on data from three molecular markers, Carmona *et al.* (2013) clarified some important aspects of the systematics of *Aeolidia papillosa*. That study confirmed that the latter species is amphi-atlantic and showed the existence of three sibling species under the name of *A. papillosa*. New material from Chile, Oregon, Scotland, France and Denmark allowed us to extend the research by Carmona *et al.* (2013), increasing the range of distribution recorded for this cryptic species.

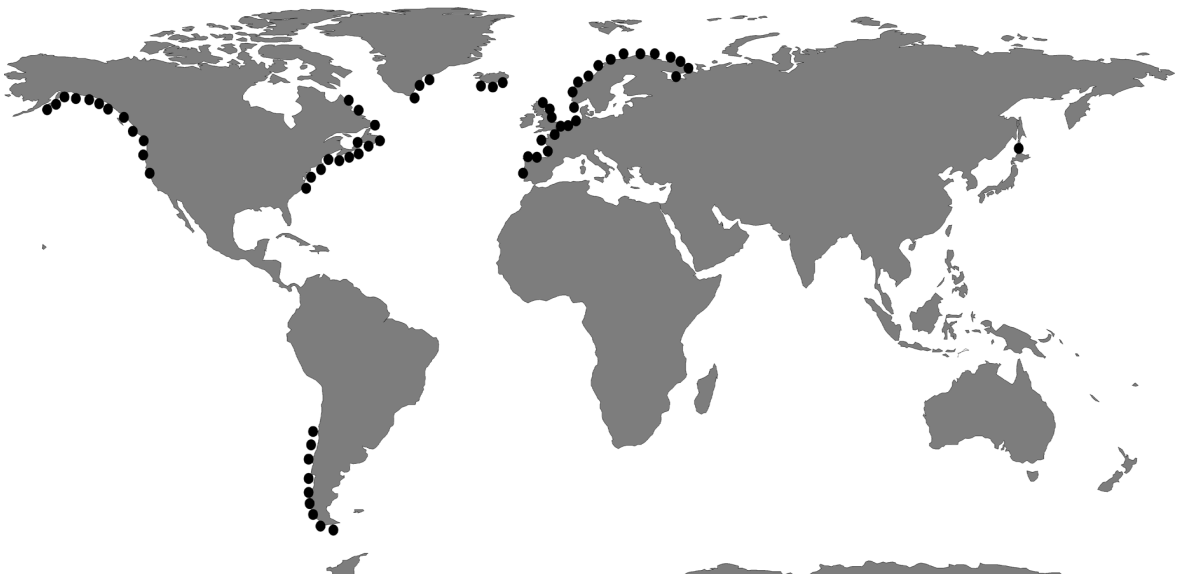
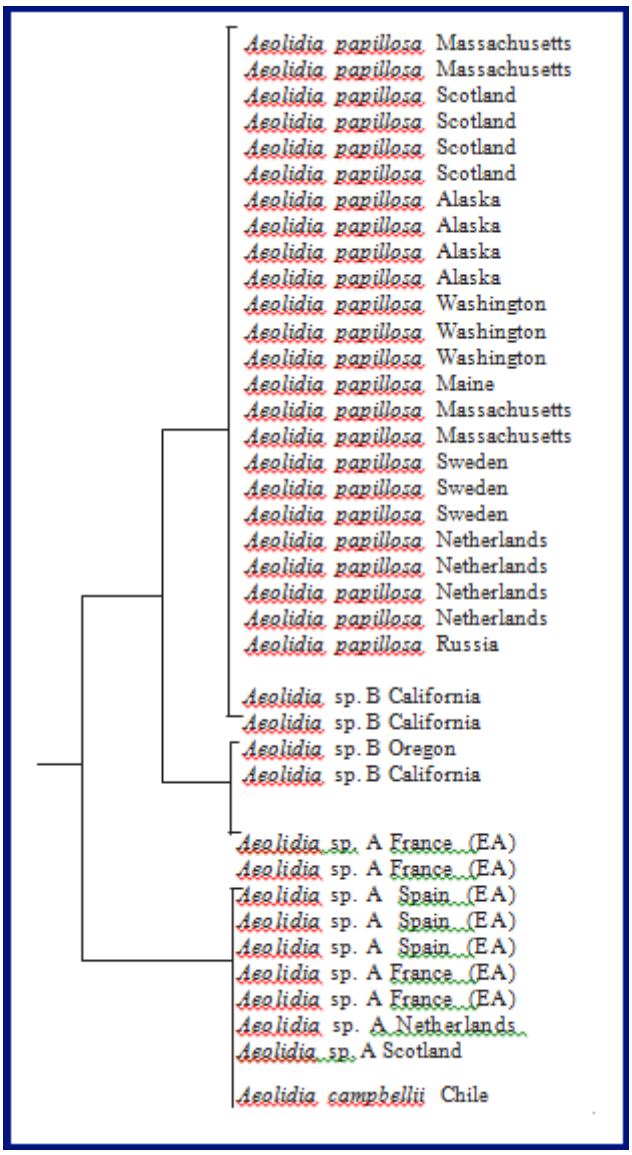


Figure 1. Currently accepted geographical distribution of "*Aeolidia papillosa*" (Platts, 1985; Schrödl, 1996, 1997, 2003; Debelius & Kuiter, 2007; Rosenberg, 2009).

MATERIAL & METHODS

For the present research, a systematic revision of the *A.papillosa* species complex was undertaken based on molecular data from two mitochondrial genes, cytochrome c oxidase I (COI) and 16S ribosomal RNA (16S), and from one nuclear gene, histone 3 (H3). Specimens covering a wide range of distribution of the target species were included, including specimens from both hemispheres. Additionally, morphological traits, such as external morphology, radula and reproductive system were examined to supplement the molecular results.

RESULTS & DISCUSSION



The *Aeolidia* species included in this studied split into four clades, with maximum support, although the relationship among them remained unclear (see adjacent Figure). All the *Aeolidia papillosa* specimens clustered together. The true *A. papillosa* still presents a wide distribution range, appearing in both Atlantic coasts (Russia, Sweden, the Netherlands, Scotland and Maine) as well as in Alaska. However, it seems that *A. papillosa* distribution overlaps part of the geographical range of the two sibling species. Actually, the Californian species, whose clade is also constituted by one specimen from Oregon, seems to cohabit with *A. papillosa* in the latter locality. This hypothesis could not be molecularly tested since additional material from Oregon arrived at our laboratory too late for this investigation. However, the photographs of these specimens suggest that they could belong to the true *A. papillosa*. The third clade included specimens of *Aeolidia* sp. A. from the north of Spain, the Atlantic coast of France, one specimen from the Netherlands and the other from Scotland. This result confirms the existence of at least two *Aeolidia* species in the UK. On the other hand, *Aeolidia campbellii* came out isolated from the remaining *Aeolidia* species. *Eolis campbellii* was described by Cunningham in 1871, two years before the description of *Aeolidia serotina* (Bergh, 1873). Cunningham (1871) erected this new species based on a single specimen from Swallow Bay, north-east of Tierra del Fuego (Chile). Although the original description is quite brief, the author described the coloration of the living animal (as pale pink with chocolate brown spots) and also provided a drawing of the specimen. In 1873, when Bergh described *Aeolidia serotina* from Valparaiso (Chile), he did not compare that new species with *Eolis campbell*ii.

Actually, the only reference of Bergh to *E. campbellii* is the catalogue of the Aeolidiidae species (1878), where *E. campbellii* (as *Ae. campbelli*) appears with a question mark. Since then, the latter species has passed almost unnoticed. According to Er. Marcus (1959), Cunningham's specimen could not even be identified to generic level, but Fig.5 of Cunningham's contribution clearly refers to *Aeolidia papillosa*. Schrödl (2003) suggested *Aeolidia campbellii* as a junior synonym of *Aeolidia papillosa*, rendering the latter species together with *Aeolidia collaris* the only valid *Aeolidia* species of South America. However, Fig.52 of that contribution depicts a pale pink "*Aeolidia papillosa*", which matches the original description of *Aeolidia campbellii*.

Since Bergh (1873), the validity of *Aeolidia serotina*, has been questioned. In fact, Bergh (1894) stated *A. serotina* was a junior synonym of *A. papillosa* and soon thereafter resurrected it again (Bergh, 1898). In addition, Eliot (1907) attributed three specimens of *Aeolidia* from the Falklands Islands to *A. serotina* while Er. Marcus (1959) considered *A. serotina* as a variety of *A. papillosa*. Recently, based on the great variability of body colouration and ceratal shape, Schrödl (2003) rejected the validity of *A. serotina* and attributed his Chilean material to *Aeolidia papillosa*. The morphology and anatomical features of the specimens dissected in this study agree with those described by Bergh (1873, 1894, 1898), Eliot (1907) and Er. Marcus (1959), and at the same time with *Aeolidia campbellii* original description. Therefore, we render *A. serotina* as a junior synonym of *A. campbellii* since according to the ICZN (1999, Article 23.9.2) *Aeolidia serotina* cannot take precedence over *A. campbellii*.

The minimum genetic distance (uncorrected *p*-distance for COI) among these *Aeolidia* species ranged from 8.4% to 18.2%. Material from Denmark is currently being analysed, although the preliminary results from a morphological approach may point to the true *Aeolidia papillosa*. Additionally, it would be useful to test the systematic position of *Aeolidiella drusilla* in Aeolidiidae. Although this species has never been attributed to the genus *Aeolidia*, the long, broad and depressed body together with the wide head and the abundant cerata lead us to consider this species closer to the genus *Aeolidia* rather than *Aeolidiella*. Moreover, the latter genus is restricted to the Atlantic-Mediterranean so far, while the genus *Aeolidia* is present in almost all the ocean basins. The systematic position of *Aeolidiella drusilla* needs to be confirmed by further comparative studies, which are currently being conducted. The *Aeolidia* species included in this studied split into four clades, with maximum support, although the relationship among them remained unclear (Fig. 2). All the *Aeolidia papillosa* specimens clustered together.

ACKNOWLEDGMENTS

We are deeply grateful to all individuals that helped to collect and provided specimens and images to this study, including A. Martinov, D. W. Beherens, K. Iken, L. Harris, P. H. van Bragt, J. Pérez Dieste, M. Poddubetskaia and G. Calado. A. Sellas helped us with some molecular lab. work. This project was supported by several research grants (CGL2006-05182/BOS and CGL2010-17187, Spanish Ministry of Economy and Competitiveness (includes the early Ministry of Sciences and Innovation) to J. L. Cervera; California Academy of Sciences, National Science Foundation (DEB 0329054 PEET) to T. M. Gosliner; and a Research Grant of the Malacological Society of London to L. Carmona.

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RESEARCH GRANT REPORT

Species diversity of *Paramelania* from Lake Tanganyika, East Africa – unifying molecular, conchological, radular and distribution data.

James D. Burgon[1], J. A. Todd[2] and E. Michel[3]
[1] IBAHCM, University of Glasgow, Glasgow, UK
[2]Department of Earth Sciences, Natural History Museum, London, UK
[3]Department of Life Sciences, Natural History Museum, London, UK
j.burgon.1@research.gla.ac.uk

INTRODUCTION

Lake Tanganyika, East Africa, is renowned for its high species diversity and numerous endemic radiations. One of these, a 'superflock' of benthic gastropods is the most diverse (>100 spp.) and disparate (18 genera) extant radiation of its kind[1]. Despite this it remains poorly systematised. One component, the iconic genus *Paramelania*, has been known for 130 years and historically thought to comprise 2-5 morphologically variable species (and occasionally '*forms*'; Figure 1) [2,3]; however, it has long been recognised that the genus likely contains greater diversity and is in need of revision[3]. Previous phylogenetic analyses revealed five robust clades congruent with *a priori* fine-scale shell-based species[4]. We used this correspondence to assess species diversity in three major historic collections comprising shells only, including samples from the currently inaccessible Congo coast. Re-assessments of two modern research collections, largely from the Tanzanian coast, were also conducted in the light of insights gained from historic samples. Opercula and radulae were examined for all putative taxa for which material was available.

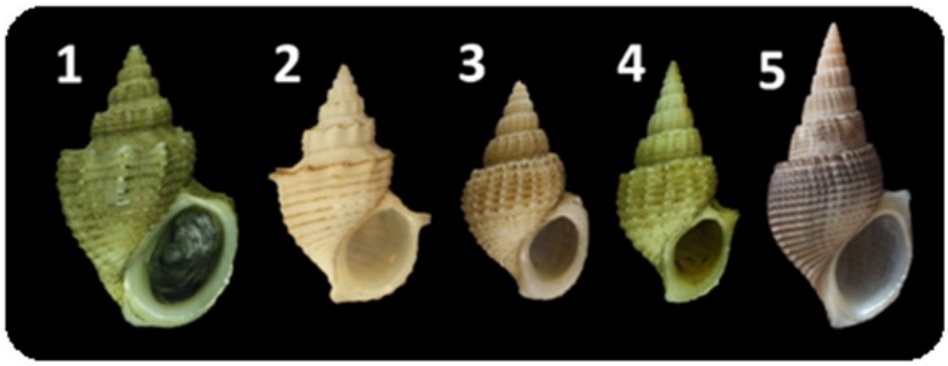


Figure 1: Described *Paramelania*: 1) *P. damoni* Smith, 1881 (holotype: NHMUK 1881.4.11.1); 2) *P. imperialis* (Giraud, 1885); 3) *P. crassigranulata* Smith, 1881; 4) *P. minor* Moore, 1903 (syntype: NHMUK 1909.8.25.14-25); 5) *P. iridescens* (Giraud, 1885). Only *P damoni* and *P. iridescens* have been consistently recognised, the rest often being considered '*forms*' of *P. damoni*. Photocredit: 1, 3 and 4- O. Cheronet; 2 and 5- J. Todd.

METHODS

Radulae from alcohol preserved tissue were examined for five taxa identified by molecular analyses and shell morphology: *Paramelania damoni* (n=3), *P. crassigranulata* (n=2), *P. iridescens* (n=3), *P.* sp. A (n=3; undescribed) and *P.* sp. C (n=4; undescribed). All radulae are associated with molecular sequences (CO1, 16S or both). Radulae were carefully separated from surrounding tissue and cleaned in a bath of dilute sodium hypochlorite (bleach). They were then mounted on a thin layer of poly-vinyl acetate glue on a glass coverslip (mounted on an scanning electron microscope (SEM) stub). Outer marginal teeth were folded outwards with fine needles before the radulae completely dried. Specimens were imaged using a LEO 1455 VP SEM (uncoated). As previous molecular studies showed that consistent shell differences were adequate for delimiting species in this genus if no other data are present[4], we re-examined five main dry shell collections of *Paramelania*: three historic, Royal Museum for Central Africa (RMCA; *Tervuren*, Belgium), Royal Belgian Institute of Natural Sciences (RBINS; Brussels), Natural History Museum, London (NHMUK) and two modern research collections. Using a process of reciprocal illumination, specimens were examined and assigned to putative taxa based on fine shell morphology. These were then compared to type material. Collections information was used to assemble data on distributions, depths and substrata allowing the first synthesis of perspectives on ecology and biogeography. In particular, we used a criterion of sympatry to help determine species limits *sensu* Genner *et al*. [5]. Opercula were examined using light microscopy for all putative species, identified by shell morphology, with available material (n= 11 from 21).

RESULTS

Radulae were all small (ca. 2mm) and are still being examined for species level differences. Due to their fragility leading to damage, exact row numbers are hard to determine but are not thought to vary significantly between species. However, some species level differences were discovered, notably in the length and shape of cusps, the presence of vertical striations and the presence or absence of "lateral horns" (Fig.2).

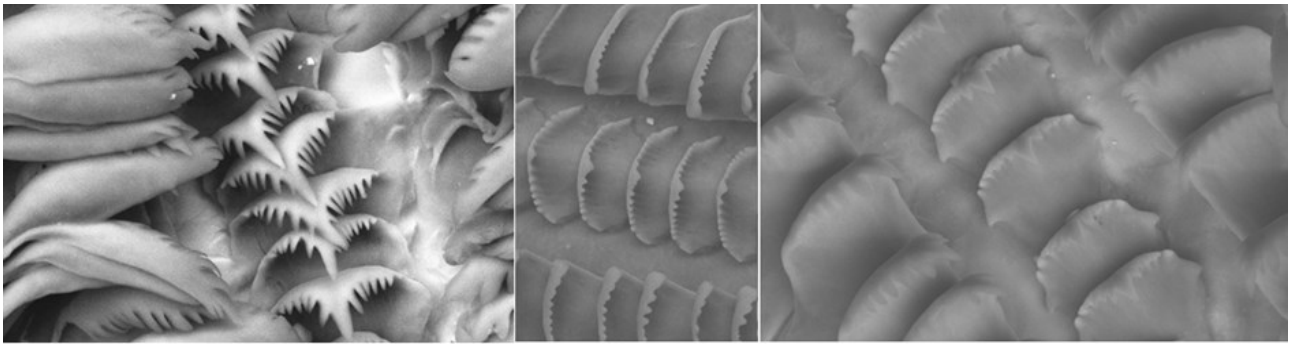


Figure 2. SEM images of radulae. **Left**: *P. crassigranulata* showing long pointed cusps on rachidean teeth. **Middle**: rachidean teeth of *P. damoni* showing vertical striations and small "lateral horns" on the side of the rachidean teeth. **Right**: *P.* sp. A showing vertical striations and pronounced "lateral horns".

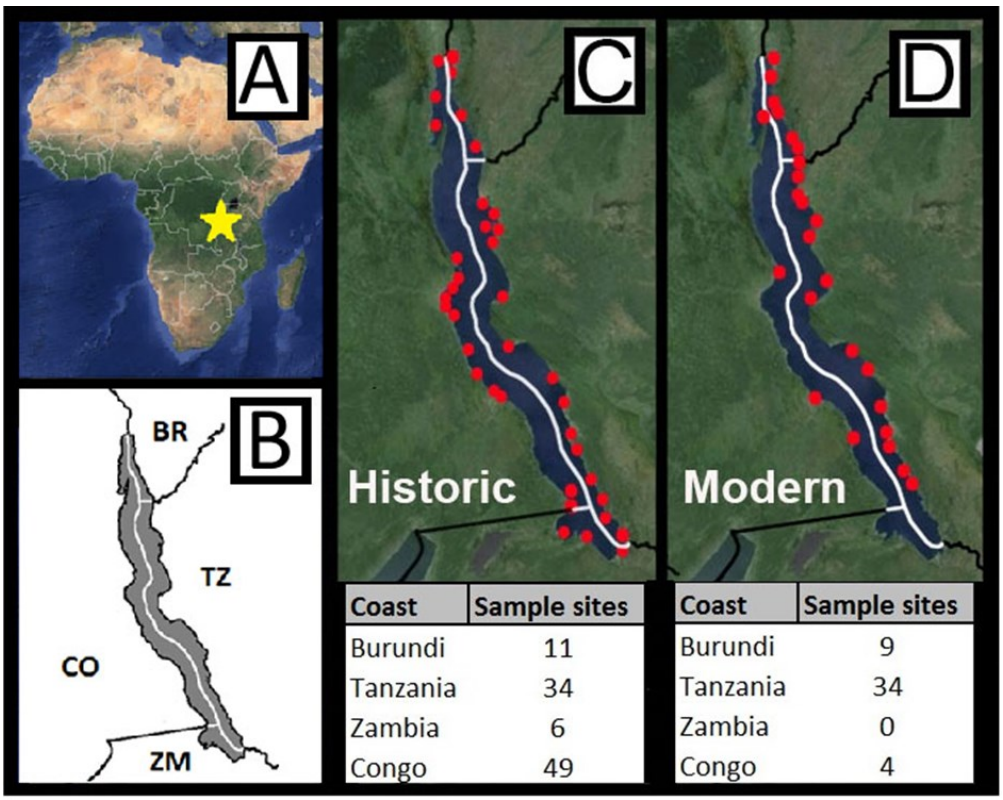
The combined historic and modern collections comprised over 8395 shells from 147 lake-wide locations. There was a marked difference in the collection method, maximum depth and substrata collected between historic and modern collections (Table 1). Sampling was found to be uneven, with historic collections containing greater numbers from the Congo coast and Zambia, while modern samples were largely restricted to Burundi and northern Tanzania (Figure 3). Twenty-one species were clearly defined by morphology (16 undescribed). Diversity between historic and modern collections differed with 16 and 14 species seen in each respectively, sharing only 9 in common. High levels of sympatry were seen, as well as several short range endemics (n=7; undescribed), wide ranging species (e.g. *P. damoni*), evidence for circum-lake range shifts (e.g. *P. crassigranulata* and *P. imperialis*) and cross-basin species which were present at roughly the same latitude on opposite shorelines despite mid-lake anoxia (e.g. *P. imperialis*). Opercula for putative taxa (where available) were found to be invariant across the genus and consistent with previous descriptions[3].

Table 1. Summary of collections information. Modern research collections identified by responsible researcher's initials. *NHMUK is lacking in information. Only two sites have a known locality (one by publication), and a third is named but not identified. **A reported depth of 600-700ft (converted to meters in table) is questionable given deep anoxia and methods.

Collection	Type	Specimens	Lots	Sample sites	Depth (m)	Collection method	Substrate
RMAC	Historic	198	81	36	0.2 to >100	Dredge	Presumably soft substrate
RBINS	Historic	5926	205	66	0 to >100	Trawl, dredge, hand (beach)	Rocks, sand, silt, mud and shells
NUMUK	Historic	290	37	2*	183 to 213**	Presumably dredge	?
EM-JT	Modern	529	87	28	1 to 30	SCUBA	Stromatolites, gravel, rocks, cobbles, boulders, silt, sand, sediment, mud and shell hash
AC-MJ	Modern	1382	69	20	12 to 40	SCUBA	Stromatolites, rocks, mud, sand, silt, shell hash, cichlid nests.

DISCUSSION

Historic and modern collections give complementary views of diversity and distribution of *Paramelania*, capturing differences in geographic ranges and ecology. Unexpectedly high levels of 'hidden' diversity were found with a total of 21 species delimited based on fine shell morphology, 16 previously undescribed. This is probably due to historic malacologists being unsure of how to treat conchological variation, and whether it constituted intra- or inter-specific variation. The utility of fine shell morphology in delimiting species within this genus was revealed here through a strong molecular-morphological congruence[4], allowing discrimination between gross morphologically similar taxa. Differences in species assemblages between historic and modern collections probably represent greater historic sampling of the Congo coast, inaccessible today due to political instability. However, several localities show both historic and modern sampling associated with different species complexes, indicating that different collection methods (dredge vs. SCUBA) which handle depths and substrata differently are needed to adequately sample the fauna. Dredging can cover a much wider bathymetric range than SCUBA, being able to sample deep water benthic environments; however, SCUBA allows the fine scale investigation of microhabitats between and underneath features such as rocks, which by contrast, dredging does not. Work is on-going to formally describe new taxa and select type material. Once this is complete and published, an Encyclopaedia of Life entry will be made for the genus. Work is also on-going to analyse and interpret the distribution of these species and the imaged radulae. Our results emphasise that in systems with high local endemism, historic collections may contain undocumented diversity only revealed in a modern interpretive context. Species discovery needs to be undertaken on both modern and historical collections to get the most accurate view of biodiversity.



Coast	Sample sites
Burundi	11
Tanzania	34
Zambia	6
Congo	49

Coast	Sample sites
Burundi	9
Tanzania	34
Zambia	0
Congo	4

Figure 3. Sample localities: **A)** Position of Lake Tanganyika in East Africa (star); **B)** outline of Lake Tanganyika showing national borders: BR-Burundi, TZ- Tanzania, ZM-Zambia, CO- Congo; **C)** Distribution of historic sampling (some circles represent multiple sample sites in close proximity). **D)** Distribution of modern sampling (some circles represent multiple sample sites in close proximity). Maps modified from Google Maps.

ACKNOWLEDGMENTS

Many thanks to Didier Van den Spiegel (RMAC), Rose Sablon and Yassine Loufa (RBINS) and Jon Ablett (NHMUK) for kindly providing access to historic collections and Dr Andrew Cohen (University of Arizona) for loaning us his modern collection (AC-MJ). Special thanks go to Dr David Reid (NHMUK) for generously offering training, help and guidance in radulae dissection and preparation, and for allowing me to use his office and tools. This work was partially funded by the Malacological Society of London.

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The Caribbean shipworm, *Teredothyra dominicensis* (Bivalvia, Teredinidae), has invaded and established breeding populations in the Mediterranean Sea.

J. Reuben Shipway[1], Luisa M S Borges[2], Johann Müller[3] & Simon M Cragg[1]
[1] Institute of Marine Sciences, University of Portsmouth, Hampshire, PO4 9LY, UK
[2] Helmholtz-Zentrum Geesthacht, Centre for Material and Coastal Research, Germany
[3] Independent consultant, Dörpen, Germany
reuben.shipway@gmail.com

INTRODUCTION

The wood-eating bivalves of the Teredinidae, commonly referred to as shipworms, are a major economic pest of coastal and marine constructions, including ships, piers, jetties and fishing equipment. Indeed, recent estimates predict shipworm cause billions of dollars' worth of damage per annum around the world (Distel, 2011). Furthermore, historical artefacts such as shipwrecks, which are of considerable archaeological and cultural importance, are also at risk of destruction from these organisms (Bjordal & Gregory, 2011). The spread of teredinids into new regions is a cause for concern due the lack of effective measures protecting wooden structures from infestation (Cragg, 2007). Typically, these introductions lead to rapid and wide-spread destruction, such as the invasion of *Teredo navalis* in San Francisco Bay in 1912, estimated to have caused $25 million worth of damage. As such, effective measures are required to monitor the distribution of teredinids, particularly the colonisation of new areas and the spread of invasive species, which are known to be more destructive (Hoagland & Turner, 1980). This investigation reports the invasion of the tropical teredinid, *Teredothyra dominicensis*, in the Mediterranean Sea, the first known report of this species in European waters. Furthermore, this research represents the only known case-study of a teredinid invasion.

MATERIALS AND METHODS

Sample Collection & Rearing
Sample collection was carried out in Kaş in southern Turkey, during August 2010 and June 2011. Infested wood was recovered from the shipwreck, Uluburun III, located approximately 36 metres below mean sea level. Wooden panels of *Pinus sylvestris* (2.5 cm × 10 cm × 20 cm) were also attached to the mast of the wreck during August 2010 for retrieval and analysis the following year. Specimens of *T. dominicensis* were obtained from the Caribbean, the recorded native range of this species, for comparison with specimens sampled in the Mediterranean.

Fig. 1. The invasive wood-eating bivalve, *Teredothyra dominicensis*, recovered from a shipwreck in the Mediterranean Sea. Scale bar equal to 1 cm.

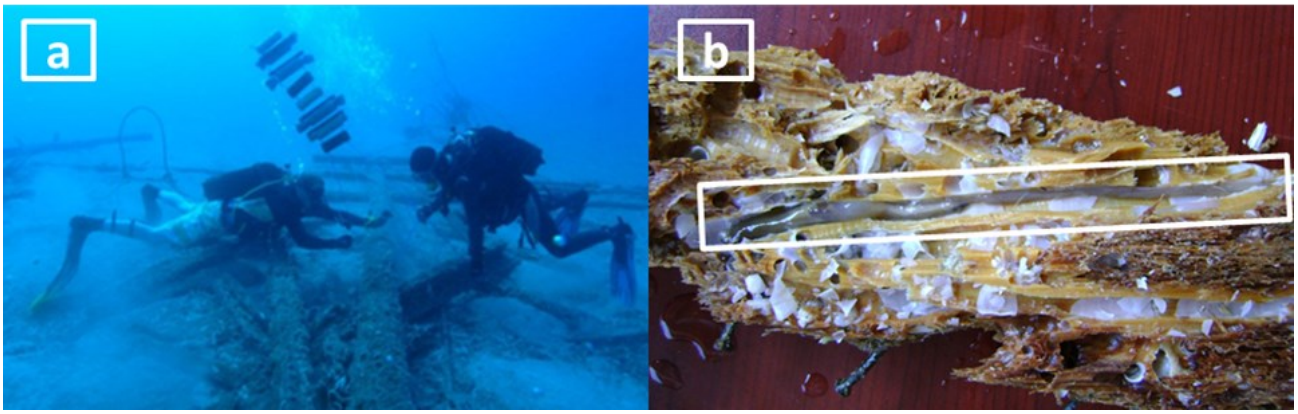

Fig. 2. a) The placement of wooden sampling panels in the Mediterranean. b) Collection of sample panels revealed exclusive infestation by the Caribbean shipworm *Teredothyra dominicensis*. The highlighted area indicates a single specimen, measuring approximately 25 cm in total length.

Molecular Identification

DNA was extracted from siphonal tissue and associated musculature. Total genomic DNA was extracted using DNeasy Blood & Tissue kit (Qiagen), following the manufacturer's protocol. Concentration, yield and purity of DNA were determined by UV spectrophotometry and DNA template was diluted using molecular grade water to a concentration of 10-20 ng/µL. A 658 bp fragment from the 5' end of the cytochrome oxidase subunit I (COI-5P) was amplified using the primer pair LCO1490 (forward 5' GGT CAA CAA ATC ATA AAG ATA TTG G 3') and HCO2198 (reverse 5' TAA ACT TCA GGG TGA CCA AAA AAT CA 3') (Folmer *et al.*, 1994), following the protocol outlined by Borges *et al*. (2012). Amplifications were performed following the protocol outlined by Borges *et al*. (2012). A 6 µL aliquot of PCR product was then electrophoresed in a 2 % agarose gel. Amplified products were purified using a NucleoSpin Gel and PCR Clean-up kit (Macherey-Nagel, Duren, Germany) according to the manufacturer's guidelines. All PCR products products were sequenced by Source Bioscience.

Data Analysis

COI-5P sequences were edited and aligned using MEGA 6.1 (Tamura *el al.,* 2011). Edited sequences were compared with those on the GenBank database to confirm species identity and ensure that endosymbiont bacteria or other contaminant had not been co-amplified in error. Sequences were aligned using Clustal W (Tamura *et al.,* 2011) and COI sequences were translated to check for the presence of frameshift mutations, stop codons or unusually divergent amino acid profiles. Sequences consisting of 658bp were used for phylogenetic inference using Neighbour-joining (NJ). Neighbour joining trees were constructed using the Kimura 2-parameter model (K2P) with the programme MEGA 6.1. Selected GenBank sequences were used to compare with our data set and to be used as outgroups.

RESULTS

Collection

Specimens were acquired from a shipwreck off the coast of Kaş, southern Turkey, in which *T. dominicensis* (shown in Figure 1) was the dominant species present, representing 93 out of 104 specimens collected. Wooden panels placed at the wreck site and recovered the following year were colonised exclusively by *T. dominicensis* (Figure 2).

COI-5P Sequences of Sampled Teredinids

A total of eight COI-5P sequences were obtained for *T. dominicensis*. A BLAST comparison revealed ≥ 99 % maximum identity with existing COI-5P sequences of *T. dominicneisis* by Borges *et al.* (2012). The neighbour-joining phylogenetic trees for COI-5P sequences are shown in Figure 3.

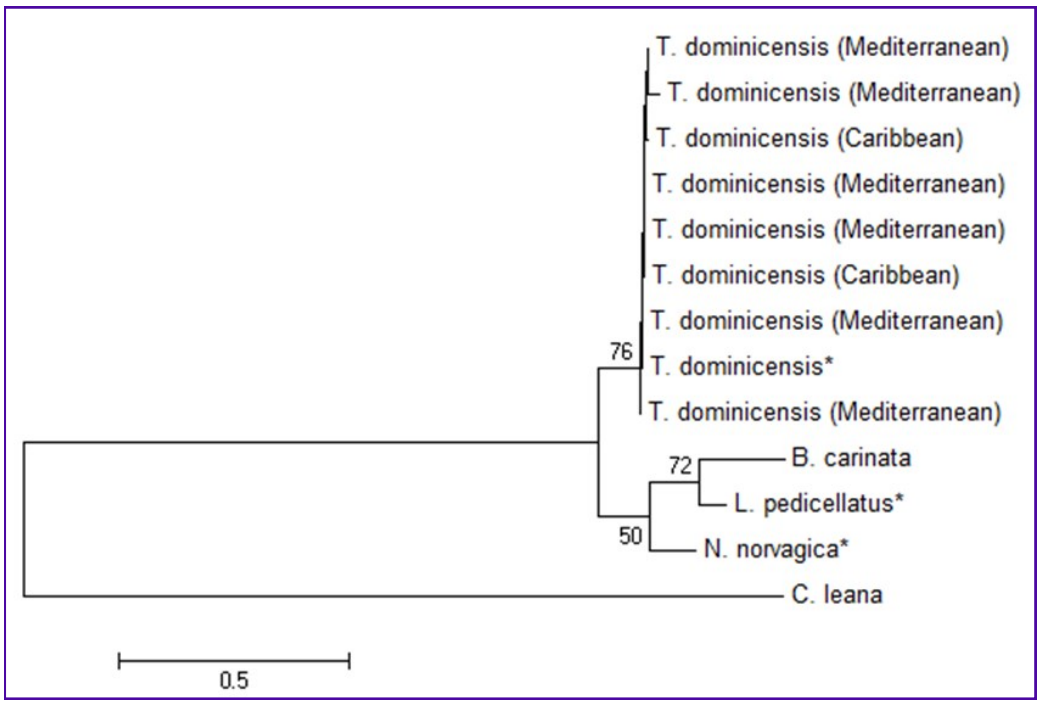

Fig.3 Molecular identification of *Teredothyra dominicensis* based on COI-5P sequences inferred by Neighbour-Joining. Asterisks denote sequences obtained from GenBank, including the shipworms *Bankia carinata*, *Lyrodus pedicellatus*, *Nototeredo norvagica*, *Lyrodus pedicellatus* and the bivalve *Corbicula leana* as an outgroup.

DISCUSSION

Molecular identification of *T. dominicensis* using COI-5P markers revealed a low interspecific divergence with known sequences on GenBank, as well as specimens of *T. dominicensis* collected from its native range in the Caribbean Sea, thus confirming the identity of the invasive species and ruling out the possibility of the Mediterranean population representing a cryptic species. This species was thought to be exclusively confined to the Gulf of Mexico and Caribbean Sea (Bartsch, 1922; Turner, 1966) and has never been documented in the Mediterranean, despite numerous and extensive surveys of the region (Roch, 1940; Turner, 1966). *T. dominicensis* was confirmed by Shipway *et al*. (2014) as a broadcast spawning species, with larvae undergoing planktotrophic development lasting between three and four weeks. Wooden panels placed on the shipwreck where *T. dominicensis* was first discovered were subsequently infested by mature adult specimens. As the free-spawned larvae of this species must spend a number of weeks developing in the water column, recruitment is unlikely to have taken place directly from the population infesting the shipwreck as the larvae would disperse away from the site. Larval production is therefore most likely to have originated from other breeding populations of *T. dominicensis* in the Mediterranean. As larvae were capable of settlement, metamorphosis and growth to maturity, *T. dominicensis* must be considered an established species in the region. The appearance and establishment of a Caribbean shipworm in the Mediterranean is of concern, as tropical borers may grow to larger sizes than European borers (Castagna, 1961) and are known to be more destructive than their temperate counterparts (Edmondson, 1942; Southwell & Bultman, 1971). The impact of global warming, particularly the rise in temperature of the Mediterranean also needs to be considered in relation to teredinid activity. An increase in the temperature and salinity of the region has already been observed (Gibelin & Déqué, 2003; Sánchez *et al.,* 2004) and is expected to continue over the coming decades (Giorgi & Lionello, 2008; Giannakopoulos *et al.,* 2009). These increases are known to extend teredinid distribution ranges (Borges *et al.*, 2010; Paalvast & van der Velde, 2011), accelerate growth and increase boring activity (Eckelbarger & Reish, 1972). Introduced tropical shipworms have also been shown to out-compete native species as they respond more favourably to environmental change (Hoagland, 1983). Thus, the warming of the Mediterranean will increase the threat posed by all teredinids in the region, particularly that of the destructive Caribbean species, *Teredothyra dominicensis*.

ACKNOWLEDGEMENTS

I would like express my gratitude to the Malacological Society of London for a travel grant which funded the field work undertaken in this research. Without this grant, the research would not have been possible. I would also like to thank my Ph.D supervisor Dr Simon Cragg, whose advice helped facilitate this work.

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The use of molecular cytogenetics to investigate potential hybridisation of slug species

Tereza Kořínková
Institute of Animal Physiology and Genetics,
Rumburská 89
CZ-277 21
Liběchov
Czech Republic
tereza.korinkova@natur.cuni.cz

INTRODUCTION

Some groups of molluscs are still rather under-explored cytogenetically. This is even the case for some genera that contain important pests. The few available cytogenetic studies dealing with the slug genera *Arion* and *Deroceras* indicated only small karyotypic differences within each genus, (most species showing the same chromosome number and a few differing by one or two chromosome pairs). However, these earlier reports mostly lack details about chromosome morphology and other characteristics, such as the distribution of constitutive heterochromatin and of nucleolar organiser regions (NORs).

Arion vulgaris, A species of large Arion that has invaded much of Europe. (photo by K Gromann,)

The aim of the project was to use a variety of techniques to characterise karyotypes of closely related species of pulmonate slugs, and thereby to assess the usefulness of these methods to detect fine-scale interspecific differences between karyotypes that might prevent hybridisation. The methods included fluorescence banding, fluorescence *in situ* hybridisation (FISH) and comparative genome hybridisation (CGH). We intended to focus on (1) "large *Arion*", such as *Arion vulgaris* Moquin-Tandon, 1855 and *A. rufus* (Linnaeus, 1758), and (2) the genus *Deroceras*. This work was carried out at the Senckenberg Museum of Natural History Görlitz (SMNG) in co-operation with the Institute of Animal Physiology and Genetics (IAPG) in Libechov.

METHODS

In total I assessed chromosome number (2n) and chromosome morphology in 11 *Arion* taxa (9 of them belonging to "large *Arion*"), although the more advanced techniques were tested in only a subset of these. The selection of large *Arion* species included *A. rufus* and *A. vulgaris* (which have been reported to hybridise: Roth *et al.* 2012), complemented by further taxa from northern Spain and southern France, which is considered a hotspot of *Arion* species diversity (Quinteiro *et al.* 2005). If we judge by their distinctive mating behaviours, each population studied may well merit specific rank. Additionally, I examined chromosome numbers, morphology and distribution of nucleolar organizer regions in five species of *Deroceras* that were taxonomically diverse, as well as *Malacolimax tenellus* O. F. Müller, 1774 as an outgroup.

Chromosome preparation was slightly modified after Kořínková & Morávková (2010) and Kořínková & Král (2011). The classification of chromosome morphology followed the system of Levan *et al.* (1964). Chromosomes of selected individuals were then subjected to CCD staining (sequential staining with chromomycine A3 and DAPI) performed according to Sola *et al.* (1992) and to silver-staining (Ag-NOR) after Howell & Black (1980). Preparations of suitable quality (with numerous metaphases and good chromosome spreading) were used for hybridisation of DNA probes against rDNA genes (rDNA-FISH with 5S-, 28S-rDNA and ITS1) prepared from the slugs' genomic DNA, or for hybridisation of whole-genome DNA probes of related congeneric species (CGH).

RESULTS

The results imply that the methods investigated are not appropriate to resolve issues concerning these closely related slug species and their potential hybridisation. The reasons are in part that some of the techniques (particularly the banding techniques) do not work at all with these slugs (even though they worked with non-molluscan taxa run alongside), and in part that the karyotypes within each of the two genera are too similar (as shown by the analysis of chromosome morphology, rDNA-FISH and CGH).

All "large" *Arion* species examined within this project exhibited the same 2n and similar chromosome morphology. Noticeable karyotype differences were only found in the two species belonging to other *Arion* lineages. We confirmed limited variation (by one chromosome pair) in chromosome number within the genus *Deroceras* by re-examining a population previously reported to have a different number (Colomba *et al.* 2009). However, we consistently found in that population as well as other species a different number of nucleolar organiser regions from previous reports.

The limited karyotypic variation found within both groups of species studied is not unusual within the Pulmonata (see Thiriot-Quiévreux 2003 for a review). This consistency is a factor that might allow the production of interspecific hybrids in these slugs.

ACKNOWLEDGMENT

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RESEARCH GRANT REPORT

The transparent tusk-shell: research trip to Bamfield, British Columbia, Canada

Lauren Sumner-Rooney
Queen's University Marine Laboratory
12-13 The Strand,
Portaferry
Co. Down BT22 1PF
Northern Ireland
lsumnerrooney01@qub.ac.uk

INTRODUCTION

Bamfield Marine Sciences Research Centre is located on Vancouver Island, off the West Coast of British Columbia, Canada. It was the landing site of the first trans-Pacific telegraph wires and has been used as a scientific base on the East Pacific ever since, so there is a long-standing tradition of scientific excellence in this remote location. The modern marine station is jointly owned by four Canadian universities and has been educating marine biologists from all over the world for generations. The primary aim of my trip to Bamfield was to collect specimens of the scaphopod *Rhabdus rectius* for detailed micro-anatomical study. These scaphopods live buried in mud in the deep waters surrounding Vancouver Island and particularly the western side surrounding Bamfield. Their inaccessibility has meant that little is known about their anatomy, physiology and behaviour and there is a wealth of potential research in this field (Reynolds, 2002). Our aim was to collect and successfully relax and sacrifice animals in sufficiently good condition for tomographic modelling.

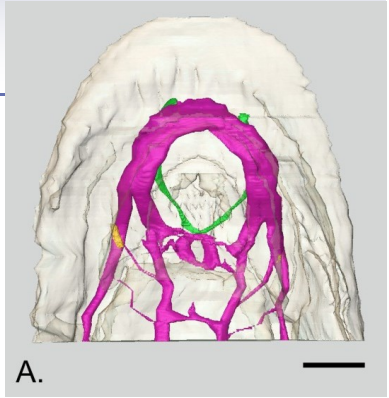

Figure 1. Tomographic reconstruction of the anterior nervous system in the chiton *Leptochiton asellus*. (Sigwart *et al.,* 2014)

METHODS

Specimen collection took place through four separate deep-water (80-100 metres) dredges at two sites in Barkley Sound between 1st September 2013 – 15th September 2013. The dredges obtained a total of 239 scaphopods (236 *R.rectius* and 3 *Pulsellum salishorum*), which was more than sufficient to complete the transparent scaphopod project. Specimens were carefully sorted, catalogued and sacrificed. Appropriately sized specimens of good quality were then dehydrated in acetone and embedded in epoxy resin ready for sectioning (Ruthensteiner, 2008). Due to practical constraints this part of the process could not yet begin in Canada, but is now under way and the reconstruction project should be completed in Spring 2014.

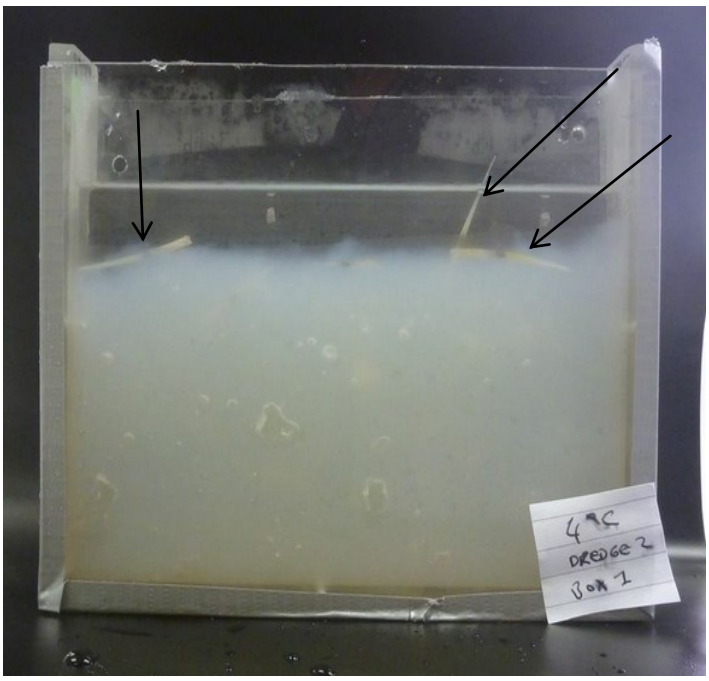

Figure 2 – Burial experiment with scaphopods in an artificial agarose 'sediment'

The entire animal was embedded in epoxy resin and its whole length was sectioned at a thickness of 1.5µm (these scaphopods are around 30mm long so this takes a considerable amount of time). Every section was then examined and an evenly-spaced selection was digitally recorded by a camera mounted on a slide microscope. The images were digitally edited, compiled into an aligned stack and materials of interest were identified using AMIRA software. These materials were then used to render and smooth surfaces of the eventual 3-d tomographic model, which acts as a 'virtual dissection' (Fig.1). Although this is very labour-intensive, the section gives us greater insight and context to the model, and the results are much higher resolution than other modelling methods such as µCT and MRI.

RESULTS AND DISCUSSION

From observations of the animals made while alive, we have made several anatomical observations which have not been reported previously and which will be incorporated into the tomographic reconstruction. For example, we noted that all previous anatomical drawings of scaphopods show that they have a single slit in the collar around their foot. However, in *Rhabdus rectius* we observed a pair of slits (in accordance with Steiner, 1991), and stripes of brown pigmentation on either side of these. In addition we observed that the long, slender tentacles (captacula) used for feeding remain motile after detaching from the rest of the body, contrary to some previous reports (Shimek, 1988). Observations such as these were only made possible by examining live specimens. In particular, preservation methods often cause pigment bleaching, and this is probably why the pigmentation we observed has not been reported before by scientists working on preserved material.

Due to the large number of living, healthy specimens we were able to obtain, an additional experiment was conducted into the burying behaviours of the scaphopod *Rhabdus rectius*. Experiments were run in parallel with respirometry studies being conducted at different temperatures and suggested that the animals were sensitive to changes in temperature between 4-15°C. Animals were placed into specially adapted tanks filled with fine agarose 'sediment' and kept at one of four different temperatures for 6 hours (Fig. 2). We found that the proportion of animals engaging in burying behaviour was dramatically affected by water temperature, with a maximum of 90% of individuals burrowing at 4°C but only 45% of individuals burrowing at 15°C (see Fig. 3). Given that 15°C was the ambient temperature of the seawater coming from the seawater system, it is possible that previous observations of scaphopod behaviour may have been made at the wrong temperature which could have affected the results. I would suggest that, at high temperatures, the animals are prevented from burying by some kind of metabolic constraint which should be confirmed or refuted by the results of the respirometry study.

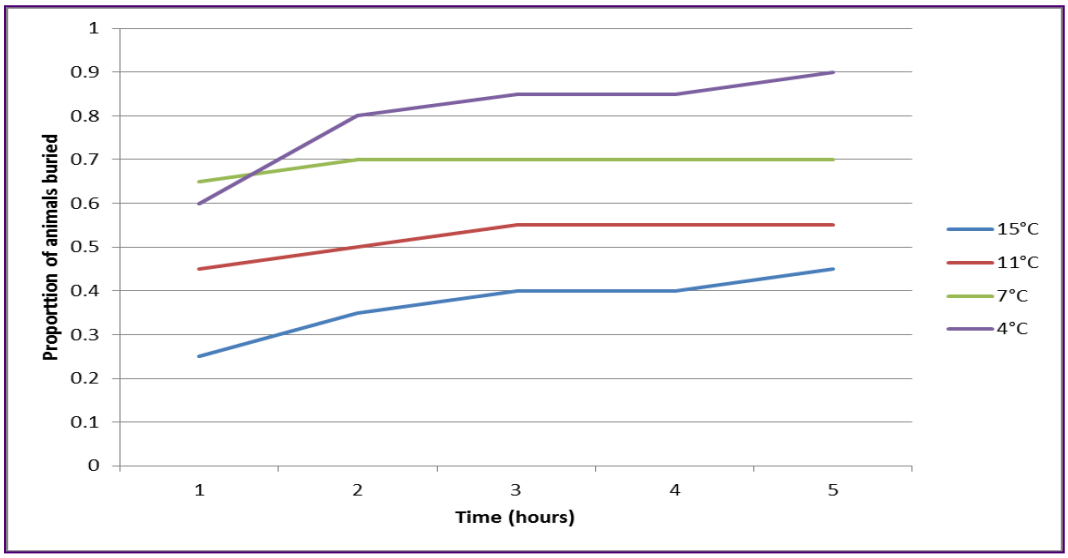

Figure 3. Effect of water temperature on burying behaviour of *Rhabdus rectius* .

Overall, the trip has yielded specimens and data beyond our expectations. As a result of the work done in Bamfield, I not only have material to complete a chapter of my PhD thesis, but have also been able to contribute to a second publication which will include the results of the behavioural experiment. On top of the academic value of this trip, I have also benefited greatly from the chance to travel to this beautiful area and acquaint myself with new people as well as new marine species. The molluscan fauna of the North-east Pacific is extremely rich, and it has been wonderful to experience this richness first-hand. I am grateful for the financial support of the Malacological Society of London.

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Gregor Christa received a grant from the Malacological Society of London in order to travel to the World Congress of Malacology where he presented a paper. The abstract is given below.

Functional chloroplasts in Sacoglossa: A non-plakobranchoid long-term retention form – *Costasiella ocellifera*

Gregor Christa[1*], William Martin[2], Sven B Gould[2], Heike Wägele[1]
[1]Zentrum für molekulare Biodiversitätsforschung, Zoologisches Forschungsmuseum Alexander Koenig, 53113 Bonn
2 Institut für Molekulare Evolution, Heinrich Heine Universität Düsseldorf, 40225 Düsseldorf
*gchrista@uni-bonn.de

Kleptoplasty is the sequestration and retention of photosynthetically active algal plastids by a predator. *Costasiella ocellifera* is the only kleptoplastic species that is not a member of the Plakobranchoidea, and whose photosynthetic capability was first noticed by Clark and colleagues (1981) by CO_2 fixation measurements. Phylogenetic relationship of *Costasiella* within Limapontioidea, as well as limapontioidean groups with all other sacoglossan taxa, is not resolved (Händeler, 2009; Maeda, 2012). According to recent phylogenetic analyses, sequestration of chloroplasts with subsequent maintenance over a longer period of time has evolved at least twice.

The photosynthesis of sequestered plastids within *Costasiella* during starvation is hardly studied and, so far, never confirmed by in situ PAM measurements for *Costasiella ocellifera*. Furthermore, whether photosynthesis truly contributes to the survival during starvation is not known for this species. Therefore we investigated four species of *Costasiella*, *C. ocellifera*, *C. nonatoi*, *C. kuroshimae* and *C.* spec with regard to photosynthetic capability under starvation conditions in a day/night cycle and *C. ocellifera* additionally in complete darkness and under light with a photosynthesis-blocking chemical, monolinuron. Our experiments clearly show that within the genus *Costasiella* functional kleptoplasty is present and that *C. ocellifera* is a long-term-retention form, similar to *Elysia clarki* or *Elysia timida*. However, we also show that photosynthesis is probably not essential for surviving periods of starvation. We further raise the question, "Do kleptoplasts function more as a nutrition depot rather than providing the slug primarily with photosynthates?"

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Spot the mollusc

Mollusca 2014 and the help given to two students by The Malacological Society of London

Jéssica Beck Carneiro & Sonia Barbosa dos Santos
Laboratório de Malacologia Límnica e Terrestre, Departamento de Zoologia,
Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Brazil
E-mail: jessicabcarneiro@yahoo.com.br
gundlachia@yahoo.com.br

Figure 1 - A specimen of *Diplodon ellipticus* Spix in Wagner, 1827.

Mollusca 2014 (http://www.mollusca2014.unam.mx/index_ing.html) was an enlargement of the traditional and already consolidated Latin American Congress of Malacology (CLAMA). It was held in México City, from 22 to 27 June 2014. Due to its proximity to Brazil, when compared to other international conferences, we considered the possibility of presenting in this conference the preliminary results of our studies. Owing to the high costs of attending an international conference, we began to search for funds, especially since a scheduled symposium would be on "Bivalvia of the Américas". In this context, JBC submitted to the Malacological Society of London a request for a Travel Grant to attend Mollusca 2014, presenting the abstract entitled "Some aspects of population dynamics of *Diplodon ellipticus* Spix Wagner in 1827 in Caiçaras Lake, Rio de Janeiro, Brazil", which was approved.

The Congress was attended by 330 registered participants and about 75 UNAM (Universidad Nacional Autónoma de México) students who helped at the meeting. Participants arrived from Argentina, Canadá, Chile, Colombia, Costa Rica, Ecuador, Egypt, Germany, Japan, México, Peru, Spain, United Kingdom, Uruguay, USA and Venezuela. From Brazil, there were more than twenty persons from the states of Bahia, Ceará, Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul and São Paulo. There were approximately 200 oral presentations, 155 poster presentations and 12 symposia sessions. The Bivalve Symposium (Fig. 2) featured 25 oral presentations and 11 posters, 30 about marine bivalves and six about freshwater bivalves. Taking part in an international congress about molluscs and participating in the Symposia of Bivalvia of the Américas was a great opportunity to exchange knowledge and experience with others freshwater mussels researchers and to see presentations from renowned scientists. Also, the participation in the congress enhanced and consolidated the scientific achievement of JBC, the first author of this note, who is a young researcher.

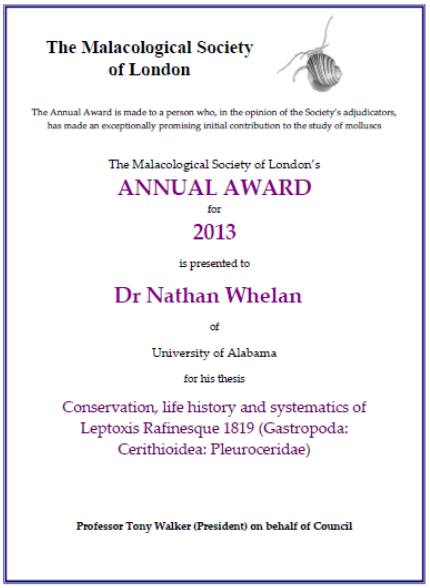
Diplodon Spix in Wagner, 1827 is the most representative genus in number of species among the freshwater mussels in Brazil (Fig. 1). The life cycle of this taxon is similar to that of bivalves of the order Unionoida, in which the larval stage is a fish parasite until complete development (Mansur *et al*. 1987; Mansur, 1999). Despite the great number of species , few studies of *Diplodon* taken place in Brazil and there is still a lack of knowledge about the taxonomy, the biology and the larval stage (Henry & Simão, 1985; Mansur, 1999; Meyer *et al*. 2010). Considering the importance of population studies providing data to understand the ecology and biology of freshwater bivalve species, and thus helping in the elaboration of appropriate conservation strategies, we are developing a study on *Diplodon ellipticus* Spix in Wagner, 1827 in Caiçaras Lake, Piraí, Rio de Janeiro, Brazil. Population dynamics are investigated by means of apture-recapture, evaluating growth, dispersion and life cycle (Carneiro, *et al*., 2013). This information should be relevant for future management action aiming to preserve the genus.

Figure 2 – Some of the participants of the Symposia of Bivalvia of the Américas and its organizers Diego Zelaya and Paul Valentich-Scott.

We would like to thank The Malacological Society of London that partially funded the travel of JBC to Mollusca 2014. There is no possibility of obtaining travel grants from Brazilian agencies, which provide exceptionally travel grants to PhD students. The initiative of the Malacological Society of London, by the Student Travel Award is therefore a great opportunity for young researchers around the world.

Conservation, life history and systematics of *Leptoxis* Rafinesque 1819 (Gastropoda: Pleuroceridae: Cerithioidea)

Nathan V. Whelan
Department of Biological Sciences
University of Alabama,
USA


The Malacological Society of London

The Annual Award is made to a person who, in the opinion of the Society's adjudicators, has made an exceptionally promising initial contribution to the study of molluscs

The Malacological Society of London's
ANNUAL AWARD
for
2013
is presented to
Dr Nathan Whelan
of
University of Alabama
for his thesis
Conservation, life history and systematics of Leptoxis Rafinesque 1819 (Gastropoda: Cerithioidea: Pleuroceridae)

Professor Tony Walker (President) on behalf of Council

The freshwater gastropod family Pleuroceridae is found in many rivers and streams east of the Rocky Mountains in North America, but 79% of approximately 162 species are considered extinct or critically imperilled. The majority of this peril has been caused by river impoundment for hydropower and navigation, or pollution from mines and metropolitan areas. Current Pleuroceridae taxonomy is considered to inadequately represent the true level of species diversity and genera are probably polyphyletic, which complicates conservation efforts. Management programmes would benefit from a better understanding of pleurocerid life history and evolution. The primary objective of my dissertation was to combine extensive field work, behavioural observations of snails in captivity, and molecular lab. work to document life history characteristics and clarify the systematics of the pleurocerid genus *Leptoxis* with a secondary objective of providing a framework for future systematic studies on pleurocerids.

Leptoxis is a genus of 23 species. Four species are listed under the U.S. Endangered Species Act and eleven species are putatively extinct. These animals are found in rivers that are accessible for field work (i.e. near well developed roads and accessible sampling localities in the United States) but there have been few modern surveys. As a part of field work for other aspects of my dissertation (see below), I rediscovered *L. compacta* (Anthony, 1854) (Fig. 1). *Leptoxis compacta* had not been seen in the wild since 1935 and was declared extinct by the International Union for the Conservation in 2000. This finding has resulted in an active conservation program for *L. compacta* by the Alabama Department of Conservation and Natural Resources that aims to re-establish a second population of the species within its historical range by using captive propagation and reintroduction within the historical range of *L. compacta*. This work was published in *PLOS One* (Whelan *et al*., 2012).

As in the case of *L. compacta*, the management plans for other *Leptoxis* spp. include captive propagation. These efforts require an understanding of *Leptoxis* egg-laying behaviours and the conditions required for each species to reproduce and lay eggs in captivity. I designed captive propagation procedures for each *Leptoxis* species, documented egg-laying behaviours for each extant *Leptoxis* species, quantitatively compared the average number of eggs per clutch in clutch-laying species, and measured temperature cues for the onset and ceasing of oviposition. I found three different egg-laying behaviours among *Leptoxis* species: randomly laid single-eggs, single eggs laid in a line, and eggs laid in a cohesive clutch held together with mucus (Table 1). Species commenced oviposition at specific temperature cues as water warmed in the later winter or spring (Table 1). Among clutch-laying species, there were significant differences in average clutch size among species. The information from this chapter will be used to help inform conservation strategies and as potential synapomorphic characters for *Leptoxis* taxonomic revisions. This work has been accepted for publication in *Journal of Molluscan Studies*.

Figure 1: *Leptoxis compacta*

The second part of my dissertation was a molecular phylogenetic study of *Leptoxis* placed in the context of Pleuroceridae as a whole. I included every extant *Leptoxis* species—multiple populations of wide ranging species—and at least one representative of every other extant pleurocerid genus to test the putative polyphyly of *Leptoxis*. I employed four genes (mitochondrial COI and 16S, nuclear 28S and H3) and Bayesian phylogenetics (i.e. MrBayes and *BEAST) to test *Leptoxis* monophyly. I found *Leptoxis* to be conclusively polyphyletic, and both life history characters and non-conchological morphology appear to be useful synapomorphies for resolved clades (e.g. the presence of an ocular peduncle; Fig. 2). Taxonomic revisions will be forthcoming in a future manuscript. The results of my dissertation should enhance conservation efforts of imperilled pleurocerids and stabilize *Leptoxis* taxonomy. Ultimately, I hope this work will serve as a foundation for a larger, family-wide systematic revision of Pleuroceridae. I wish to thank the Malacological Society of London for their Annual Award, and I hope this will be one of my many contributions to malacology. The full dissertation is available at http://purl.lib.ua.edu/97271

Figure 2: *Leptoxis virgata*. The arrow points to a pronounced ocular peduncle.

Table 1: Egg-laying behaviour and approximate water temperature (in degrees Celsius) for initiation for species of *Leptoxis*.

Species	Egg-laying behaviour	Approximate start temperature (°C)
L. ampla	Clutch	14
L. taeniata	Clutch	14
L. picta	Clutch	20
L. foremani	Clutch	12
L. virgata	Single eggs	23
L. umbilicata	Single eggs	23
L. subglobosa	Single eggs	23
L. arkansensis	Single eggs	13
L. praerosa	Single eggs	26
L. compacta	Egg line	not available
L. plicata	Single eggs	24
L. carinata	Egg line	22
L. dilatata	Egg line	22

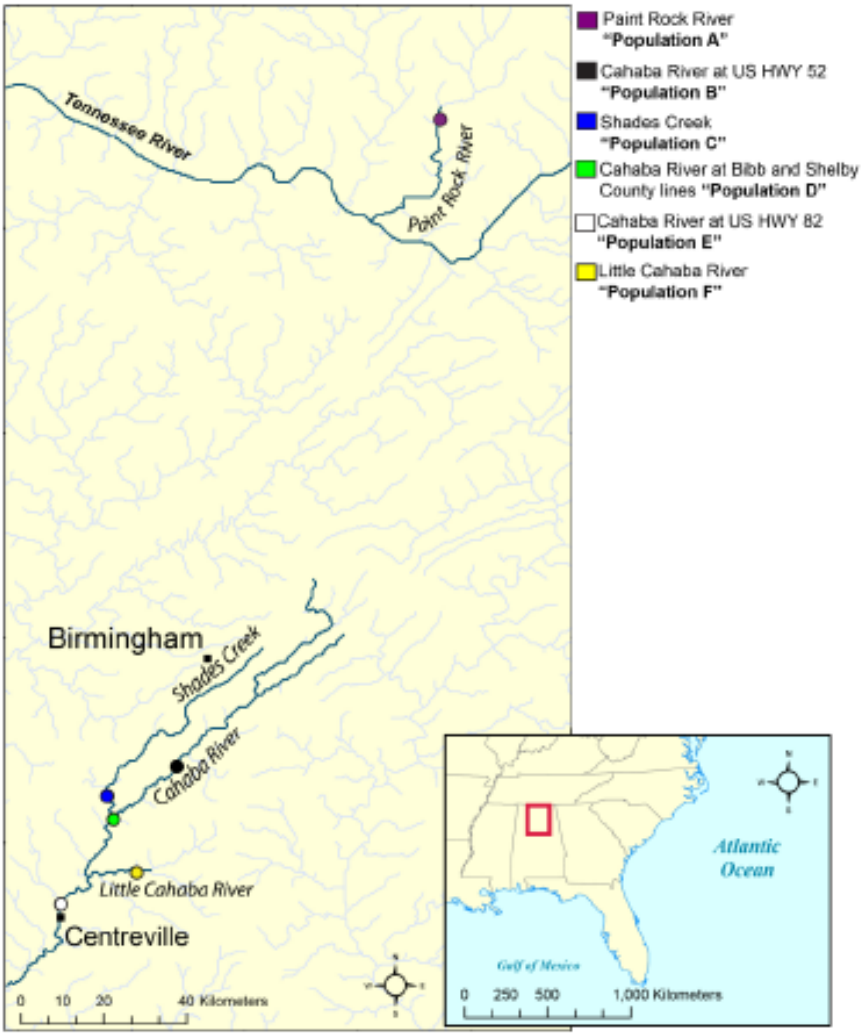


Figure 3 Sampling locations

Annual Report of Council for 2013,

delivered by the President, Professor Tony Walker

The President thanked David Reid for organising the meeting entitled "Sexual Selection in Snails" at The Natural History Museum, London, on Thursday 6th March 2014, during which the **121st Annual General Meeting** of The Society was held.

Membership (reported by Richard Cook)

The Society had 132 paid-up members in 2013. New members tend to join as students; of the 19 new members who have joined the Society since January 2013, 17 of them are student members. Sadly, two long-standing members of the Society, Stuart Bailey and Richard Petit, passed away in December 2013. Twenty-three members have not yet renewed their membership for 2014. Richard Cook is stepping down as Membership Secretary for the Society from 2014, and Rowan Whittle is assuming the role.

Finance, for the financial year ending 31 December 2011 (reported by Katrin Linse)

The finances of the Malacological Society have been more than satisfactory during 2013 with a gain of £23,914. Of our investments (comparing the position from 31 December 2012 to market value at 31 December 2013), the COIF Investment Fund made a gain of £19,224 while the COIF Fixed Interest Fund made a loss of £5,192 based on the decrease of interest rates in summer 2013. This decrease in interest rates in summer 2013 came unexpectedly; as in 2011 we had a loss in the COIF Investment Fund based on the economic downturn so that Council had to transfer £20k from the current account to the COIF Fixed Interest Fund to minimize potential further losses caused by the economic downturn in 2012. However, the profit-share from the publication of the Journal provided the Society with the major proportion of its income. The Editor of the Journal, Dr David Reid, and the assistant editors are to be commended for the hard work involved in the publishing our scientific journal. Sales of the digital archives provided over £10k of income despite the fact that OUP started to sell the journal's digital archive in a subject package. As stated in the previous years, future sales might reduce as OUP is planning to give free access to the digital archives of their journals. The Society slightly increased the values of its various Awards in 2013. More funds were used for the research and travel awards compared to 2012 and the travel awards to the Forum were slightly decreased. The Society's independent examiner, Steven Ellis from Staffords Chartered Accountants, examined the Society's accounts following the Charity Commission and SOFA rules.

Meetings

On behalf of the Society, Suzanne Williams organized a meeting on 'Species delimitation and chirality: molluscs and model organisms' at the Natural History Museum, London on 17th April 2013. This was also the place for the Society's 120th AGM. The 16th annual *Molluscan Forum* was organized by Jonathon Ablett and the President, supported by Andreia Salvador, and held at the Natural History Museum, London on Thursday 28th November 2013: 15 papers and 10 posters were presented from both UK and overseas participants. The Society provided lunch for all attendees and this served to create a cohesive meeting, with excellent opportunity to discuss the posters. The Forum was again held consecutively with the *Young Systematists' Forum,* affording an opportunity for students to attend both meetings.

Publications

The Malacologist (reported by Georges Dussart)

Issues 61 and 62 of *The Malacologist*, the Bulletin of The Malacological Society of London, were produced in August 2013 and February 2014. These were distributed to most members as pdfs, although a small number of paper copies were also produced and distributed to copyright and other libraries, some museums and a few members. Issue 61 was 34 pages long and included the Annual Report of Council from the AGM, six research reports, one obituary, and one annual award report. Issue 62 is in preparation and will be 29 pages long, primarily focussing on the November 2013 Forum. The only significant costs were for printing and sending the paper copies which amounted to £175. No *Malacologist Updates* were issued as no material was forthcoming that had not already been covered on the mollusca listserver or in August and February issues. *The Malacologist* is in good health but could always do with more submitted material.

Journal of Molluscan Studies (reported by David Reid)

The ISI impact factor for the *Journal* in 2012 rose to 1.358 (compared with 1.227 in 2011, 0.969 in 2010, 1.074 in 2009, 1.408 in 2008 and 1.032 in 2007). The *Journal* stands at number 55 in the ISI list of 149 zoological journals (up from 61 of 146 in the previous year). These trends are in the right direction but, at relatively low values of the IF statistic, fluctuations are to be expected.

Circulation for the *Journal* in 2013 was 86 institutional (of which 32 were online-only and 31 print-only) and 125 membership subscriptions (compare 95 and 150 respectively for 2012; 107 and 138 for 2011). In addition a further 2,473 institutions have electronic access to the *Journal* through publishers' consortia (includes migrated figures - compare 2,473 in 2012; 2,413 in 2011), and 1,205 (compare 1,141 in 2012; 1,044 in 2011) have access through OUP's Developing Countries Offer (for details see http://www.oxfordjournals.org/access_purchase/developing_countries.html). This means that the *Journal* is now available to 3,889 members and institutional subscribers (compare 3,859 in 2012; 3,702 in 2011).

The new pricing structure has been fixed for 2014. The cost for a combined print plus online institutional subscription is £460 ($875); online-only subscriptions are £375 and print-only subscriptions are £420.

Volume 79 (2013) contained 50 papers and research notes, totalling 385 pages (a decrease on the 400–420 pages of recent volumes). The delay between acceptance of a manuscript and electronic publication was 8 weeks. A total of 184 manuscripts was submitted in 2012 (an increase of 21% on the 152 in the previous year) and the acceptance rate was approximately 27%. One notable trend has been the continuing rise in submissions from China, 10 in 2013 (7 in 2012), which can be compared with the number of submissions from the UK—just 3. The spectacular image of *Lambis* eyes on the cover of Volume 79 was kindly donated by Burt Jones and Maurine Shimlock.

Members are reminded that they can access the entire electronic archive of *Journal of Molluscan Studies* (and its precursor *Proceedings of the Malacological Society of London*). Full instructions describing how to access this archive were published in *The Malacologist* in August 2007.

Our board of Associate Editors is now: Thierry Backeljau (molecular phylogenetics and genetics), Liz Boulding (population and reproductive biology), Robert Cameron (ecology and genetics of terrestrial gastropods), Richard Cook (agricultural malacology, physiology, feeding behaviour), Simon Cragg (life histories, sense organs), John Davenport (marine ecology and physiology), Mark Davies (marine ecology and behaviour), Villie Flari (physiology and behaviour), Dan Graf (freshwater bivalves), John Grahame (population genetics, morphometrics), Liz Harper (marine bivalves), Bernhard Hausdorf (terrestrial gastropods), Robert Hershler (freshwater gastropods), Kurt Jordaens (systematics, ecology and pest control of terrestrial gastropods), Yasunori Kano (systematics of vetigastropods, tropical ecology), Anne Lockyer (genomics), Manuel Malaquias (opisthobranchs), Pablo Martín (freshwater ecology, life history), Ellinor Michel (ecology, freshwater gastropods), Fred Naggs (systematics and conservation of terrestrial gastropods), Jeff Nekola (community ecology of terrestrial gastropods), Nicolas Puillandre (neogastropods), Ellen Strong (freshwater and marine caenogastropods), Mikael Thollesson (opisthobranchs), Janet Voight (cephalopods), Janice Voltzow (microscopic anatomy), Tony Walker (biochemistry, immunology, cytology), Suzanne Williams (molecular phylogenetics and genetics) and Nerida Wilson (opisthobranchs, deep-sea and Antarctic molluscs). I regret to report the resignation of Peter Mordan from the board and I thank him very much for his many years of service. I am extremely grateful for the hard work and support of all these colleagues.

The Society's website – Malacsoc.org.uk (reported by Tom White)

The MSL website continues to function satisfactorily, but it has become increasingly apparent that the system for updating and maintaining the content of the webpages is too cumbersome, time consuming and unreliable in its present form. Because of the way the site is constructed, there are numerous technical difficulties in updating pages using Apple Macintosh computers, which have led to problems with inactive links to important sources of information, notably on the Awards pages and issues of *The Malacologist*. Furthermore, although the charges levied by our current Internet Service Provider (ISP) remain competitive, discussions with web designers have highlighted that our website functions extremely slowly, despite the fact that it consists of relatively simple, largely text-based content. This lack of speed is due to the amount of traffic being directed to other websites sharing the same server, and could be remedied by changing ISP. In previous years, various statistics relating to web traffic using the Society's webpages have been presented in this report. It has not been possible to include these this year due to persistent problems accessing the administration pages provided by the ISP. This highlights the importance of finding a new host for the MSL's webpages as quickly as possible.

Consequently, I am arranging to have the webpages re-engineered and moved to a faster and more reliable ISP. The new web pages that have been built for for the forthcoming Euromal 2014 congress in Cambridge (***Euromal.malacsoc.org.uk***) were constructed using the Wordpress system, and I intend to adopt this for the main website. There are two advantages to this: firstly, the process of moving the basic information contained within the current webpages to the Wordpress system is relatively straightforward, and can be achieved with minimal cost. Secondly, subsequent updating of the content will be much simpler and will no longer require knowledge of HTML programming, which will be of long-term benefit to members of Council tasked with maintaining our webpages.

Progress in this endeavour will be reported at the next Council Meeting.

Awards (reported by Suzanne Williams)

Overall, the Society is very pleased with the number of applications that it receives for Travel Awards and Research Grants. The schemes seem to be achieving their global aim to enable young scientists to engage in malacological research activity both in the laboratory/field and at meetings. Reports from researchers funded through both schemes appear in *The Malacologist*.

The Society aims to make the following awards annually.

Travel Awards - at least 5 each of up to £500 for Society members, £300 for non-members

Research Grants - at least 5 each of up to £1500

Application forms and guidance notes for both schemes can be downloaded from The Society's website.

Travel Awards

Since the AGM in 2013 The Society has received nine applications for awards to travel to meetings, or to undertake field or laboratory research away from the applicant's home country. The Society was able to fund the majority of these requests. All Travel Award applications are reviewed by an Awards Committee. The Society is pleased to have announced the following six awards.

To attend I Congreso Argentino de Malacologia (1 CAM)", Argentina, 18–20 September 2013

Leonardo Santos De Souza **£210** Museu Nacional do Rio de Janeiro, Brazil

To attend 'International Biogeography Society Special Meeting' in Montreal, 15-17 November, 2013

Hanieh Saeedi **£500** The University of Auckland, New Zealand

To attend 'IOBC Slug and Snail Conference', in Bergen, Norway, 25th – 27th September 2013

Jenna Louise Ross **£300** Stellenbosch University, South Africa

To attend the '10th International Temperate Reef Symposium 12-17th January, Perth Australia

Clarissa May Lovell Fraser **£500** University of Sydney, Australia

To attend the 'Workshop on snail collection, preservation and conservation in Vietnam', in Vietnam National Museum of Nature, Hanoi and Cuc Phuong National Park, 4th September – 14th September 2013

Jonathan Fenn **£500** University of Manchester, UK

To attend the 'Mollusca 2014' meeting in Mexico 23-27 June 2014

Jéssica Beck Carneiro **£500** Universidade do Estado do Rio de Janeiro, Brazil

A total of **£2,510** was allocated by The Society for Travel Awards. All applicants have been notified of the outcome. Note that this amount does not necessarily reflect actual 'spend' as occasionally students withdraw from the intended visit.

Research Grants

By the closing date of 15th December 2013 the Society had received 21 applications from workers from 19 institutions in ten different countries. In general, the scientific quality of the research projects submitted was excellent.

On behalf of the Society, I would like to formally thank the members of the Grants Review Panel for their hard work in reviewing all applications. The following awards (in no particular order) have been agreed by the Panel.

Chong Chen (**£1500**) Oxford University, UK

'Characterisation of the extraordinary circulatory system of the scaly-foot gastropod'

Nico Malchus (**£1500**) Spain

'Larval to juvenile shells and novel characters of Mediterranean, Atlantic, and Australian bivalves '

Carmel McDougall (**£1216**) The University of Queensland, Australia

'Sequencing the chiton mantle transcriptome to shed light on molluscan shell evolution'

Edine Pape (**£1500**) University of Leeds, UK

'Chemosymbiosis in methane seep fossil bivalves from Japan'

Davide Faggionato (**£1221**) Iowa State University, USA

'Molecular and biochemical characterization of three Gq opsins from *Argopecten irradians'*

Clara Mackenzie (**£1500**) Heriot-Watt University, UK

'Vulnerability of *Modiolus* reefs to climate change: from mechanisms to management strategies'

Yaron Malkowsky (**£1100**) Stuttgart State Museum of Natural History, Germany

'Species delineation and distribution pattern in the stygobiont genus *Bythiospeum'*

Therefore seven Research Grants have been funded at a total cost of **£9,537**. The success rate was 33%. The Grants Review Panel would like to emphasise that the quality of all applications was high and that it funded as many excellent projects as possible. Applicants will be formally notified of the outcome of their application with the next three weeks.

The Annual Award

The Society received five nominations for the 2014 Annual Award. The five theses were all good and it was very difficult for the judges to make a decision. The majority vote of the Judging Panel was that the Annual Award should be given to Dr Whelan (The University of Alabama) for a thesis entitled 'Conservation, Life History And Systematics of *Leptoxis* Rafinesque 1819 (Gastropoda: Cerithioidea: Pleuroceridae)". The Society sends its best wishes and congratulations to Dr Whelan.

Officers and Council

This is my second AGM as President and it has been an absolute pleasure to work with all Society Officers and Councillors during my first two years in Office. All Officers and Councillors have worked extremely hard towards the continued success of the Society. This is no small task; the Society is responsible for two excellent publications, maintains a healthy membership, has an active website, provides significant numbers of grants and awards, organises stimulating scientific malacological meetings and has also managed to maintain good financial health. I therefore sincerely wish to thank all Officers and Councillors for their continued efforts, which is all the more notable given that each voluntarily gives their time and talents in support of The Society's objectives.

As many will know, Stuart ('Bill') Bailey passed away over Christmas (2013). Bill was an outstanding malacologist who touched the hearts of all who had the good fortune to meet him. He inspired generations of undergraduates and postgraduate researchers and gave much of his time to the Society. He acted as Council Member, President, Editor of The Malacologist and also Archivist. His love of malacology will live on in the memory all those who knew him and also through his work as a scientist. Bill will be very much missed.

There has been some shifting of roles during 2013 and from this AGM onwards:

The position of Archivist is vacant, although Council is currently under discussions regarding the on-going management of the Society's archives;

I am delighted to welcome Rowan Whittle who has kindly agreed to take on the role of Membership Secretary from Richard Cook who steps down from this role today. Richard has served as Membership Secretary for many years and on behalf of Council I would sincerely like to thank him for his hard work and dedication to the Society during this time. Not only has Richard excelled in this role but he has organized a highly successful AGM concerning the neurophysiology of molluscs and has engaged in Society meetings in general.

I am also delighted to welcome Andreia Salvador to Council. She has been instrumental in supporting the Molluscan Forum operationally over the past few years, and I am now looking forward to working with her in a more official capacity.

Over the coming seven months Society Officers and Council will play a key role in supporting David Aldridge with organizing the Congress of European Malacological Societies that will take place at St Catherine's College, University of Cambridge (7th – 11th September 2014). Plans are well advanced and I look forward to working with all those involved in this exciting meeting.

Members of Council for 2014-2015

President	Tony Walker
Vice Presidents	Fred Naggs
	Simon Cragg
Councillors	Mark Davies
	David Aldridge
	Andreia Salvador
	Liz Platts
	Richard Preece
	John Grahame
Hon. Secretary	Tom White
Hon. Treasurer	Katrin Linse
Membership Secretary	Rowan Whittle
Journal Editor	David Reid
The Malacologist Editor	Georges Dussart
Awards Officer	Suzanne Williams
Web manager	Tom White
Archivist	Vacant
Co-opt 1	Robert Cameron
Co-opt 2	Jon Ablett
Co-opt 3	Richard Cook

Annual General Meeting—Past Scientific Meeting

SEXUAL SELECTION IN SNAILS

An open meeting followed the AGM of the Malacological Society of London

Flett Theatre, Natural History Museum, London Thursday 6 March 2014

PROGRAMME

13.30 AGM

14.00 **David Reid (Natural History Museum): Introduction to sexual selection**

14.15 **Prof. Kerstin Johannesson (University of Gothenburg)**
Sexual selection and speciation in marine snails (*Littorina* spp.)
http://www.bioenv.gu.se/english/staff/kejo
Sexual selection is common among snails and, typically, males prefer somewhat larger females over females smaller than their own size. A reason for this may be that fecundity of females increase with female size, in particular in species with large eggs. In this talk the mechanisms of sexual selection, and also its consequences on mating patterns and gene flow, will be presented for some species of *Littorina*. The results support hypotheses of sympatric speciation in these snails.

15.15 Tea

15.45 **Dr Joris Koene (VU University Amsterdam)**
Sexual selection in hermaphrodites: the role of accessory gland proteins
http://www.falw.vu.nl/nl/onderzoek/ecological-sciences/animal-ecology/staff/joris-koene.asp
Ejaculates often contain compounds that nurture sperm, eliminate rival sperm, and alter female physiology. These substances are produced in male accessory glands and increase the male's chances of fertilising eggs. In species with separate sexes, many studies have focussed on the evolutionary impact of such proteins on female reproductive behaviour, while simultaneous hermaphrodites have remained underexplored in this respect. The evidence for sexual selection in hermaphrodites will be reviewed, showing some of its bizarre consequences, and new findings will be presented on accessory-gland proteins in snails. In contrast to species with separate sexes, a simultaneous hermaphrodite has the unique possibility to alter its mating partner's male as well as female functions to its own benefit.

16.45 Discussion
17.00 Wine reception

IN MEMORIAM

Ken Boss

Alan Kabat regrets to inform the malacological community that Ken Boss recently passed away. After graduate school at Harvard's Museum of Comparative Zoology, Ken spent several years at the Smithsonian Institution, before returning to Cambridge, where he spent the rest of his professional career as Professor of Biology and Curator of Mollusks. His malacological interests included the marine bivalve families Tellinidae and Vesicomyidae, among other taxa. He also published in the history of malacology, including biographies and catalogues for Charles Baker Adams, William Healey Dall, Eduard von Martens, and Johannes Thiele. His best-known publication was the lengthy family-level treatment of the Mollusca for the *Synopsis and Classification of Living Organisms* (1982).

Dick Petit

The latest issue of Conchologia Ingrata (no. 16) has been published. Entitled "*Conchologia Gratissima:* Remembering Dick Petit" it is a collection of reminiscences by his friends and colleagues. It is available free, together with numbers 1-15, at www.conchologia.com

PAST SCIENTIFIC MEETING

The Malacological Society of London was honoured to host the 7th Congress of European Malacological Societies. The Congress was held in the heart of the City of Cambridge at St Catharine's College. Founded in 1473, the College provides a wonderful mix of the old and the new, including a newly built conference centre and bar. Cambridge is a vibrant city with a wealth of museums, restaurants, pubs and other tourist attractions. London is just a 1hr train journey away. For unfortunate logistical reasons, EuroMal 2014 was strictly limited to 150 participants. For further information, please visit the website at
http://euromal2014.malacsoc.org.uk/

Guest speakers

Tom Wilke is an evolutionary biologist at Justus Liebig University in Giessen, Germany. He is Vice President of the German Malacological Society (DMG), Past President of the Society for Speciation in Ancient lakes (SIAL) and Director of the German-Colombian Center of Excellence in Marine Sciences (CEMarin). He published over 80 peer-reviewed papers, books and book chapters. Tom's major scientific interests are patterns and processes of speciation and radiation in space and time

Prof. Lloyd Peck (British Antarctic Survey, Cambridge)
Lloyd Peck is based at the British Antarctic Survey, where he is a leading Antarctic scientist with over 200 refereed papers, major reviews and book chapters. His career includes the giving of over 30 keynote speeches, the prestigious 2004 Royal Institution Christmas Lectures and 15 televised lectures in Japan, Korea and Brazil. Lloyd's major scientific interests are in identifying how animals are adapted to their environments and how those adaptations affect capacities to respond or resist environmental change.

Abstracts of this conference will appear in the February 2015 (No. 64)issue of *The Malacologist.*

FORTHCOMING MEETINGS

Ohio (River) Valley Unified Malacologists (OVUM)
The 8th annual Ohio (River) Valley Unified Malacologists (OVUM) meeting will be held at the Department of Geology of the University of Cincinnati on Saturday, September 27, 2014. This one-day meeting is free and open to professionals, amateurs, and students who are interested in any aspect of Molluscan Biology, Paleontology, Biogeochemistry and Conservation. The location for the meeting is 201-Braunstein Hall, Department of Geology University of Cincinnati, Cincinnati, OH 45221 For additional information please visit the OVUM 2014 webpage:
https://sites.google.com/site/yurenayanes/ovum-2014
Contact for further information:- yurena.yanes@uc.edu

Forthcoming meetings

Mollusks of the Eastern Asia and Adjacent Seas

The Russian Far East Malacological Society (RFEMS), jointly with the A.V. Zhirmunsky Institute of Marine Biology, Far East Branch of the Russian Academy of Sciences (IMB), the Institute of Biology and Soil Science, FEB RAS (IBSS) and the Primorye Branch of the Hydrobiological Society of the Russian Academy of Sciences (PB GBS), will hold a regional conference with international participation **on October 6–8, 2014**

The conference covers such aspects of regional malacology as faunal studies, distribution and biogeography, ecology, taxonomy and morphology of mollusks. It is the third conference on molluscs held by the RFEMS. The Reception party of the conference will be merged with celebration of the 20th anniversary of the RFEMS. The conference languages are both Russian and English. Russian-speaking participants are requested to provide a brief English summary and English captions in presentations. If you wish to participate in the conference, please send an abstract and contact data to the Secretary of the Organizing Committee, Dr. Elena M. Sayenko by e-mail (sayenko@ibss.dvo.ru).

Abstracts must not exceed 3 pages and be written in English. Format of abstracts is as follows: text should be arranged in MS Word, with 25 mm upper, lower, right and left margins, Times New Roman 12 font, single interval between lines; abstracts should start with a title, followed by author's full name (for example, Svetlana P. Ivanova or John A. Brown) and title of institution (for example, Institute of Biology RAS, Moscow 100100, Russia, e-mail). Lists of references and figures are not included. The conference languages are both Russian and English. Russian-speaking participants are requested to provide a brief English summary and English captions in presentations. A webpage of the conference is available at http://rfems.dvo.ru/

The registration fee for participants is 1000 rubles (about 31 USD), which includes a participant's file, abstract book, coffee breaks and reception dinner. The fee is paid at registration on the first day of the conference. Venues of the meeting – IMB and IBSS conference rooms. There are several hotels at the taxi distance of 7–10 min from both institutes. Vladivostok, the largest city and cultural, economic, and scientific capital of the Russian Far East, has about 600 000 inhabitants. The city is located on the Muravyev-Amursky Peninsula, surrounded by two large bays with a rich molluscan fauna. Direct flights to Tokyo, Beijing and Seoul make the city easily accessible for foreign participants. A majority of malacologists in the eastern Russia work at the institutions of the Russian Academy of Sciences, Far East Federal University and Pacific Fisheries Research Centre, all at Vladivostok.

Organizing Committee
Konstantin A. Lutaenko (Chair, A.V. Zhirmunsky Institute of Marine Biology, Far East Branch of the Russian Academy of Sciences)
Viktor V. Bogatov (Co-Chair, Institute of Biology and Soil Science, Far East Branch of the Russian Academy of Sciences)
Larisa A. Prozorova (Co-Chair, Institute of Biology and Soil Science, Far East Branch of the Russian Academy of Sciences)
Elena M. Sayenko (Secretary, Institute of Biology and Soil Science, Far East Branch of the Russian Academy of Sciences)
Alexey V. Chernyshev (A.V. Zhirmunsky Institute of Marine Biology, Far East Branch of the Russian Academy of Sciences and Far Eastern Federal University)
Tatyana Ya. Sitnikova (Limnological Institute, Siberian Branch of the Russian Academy of Sciences)
Yuri I. Kantor (Institute of Ecology and Evolution, Russian Academy of Sciences)
Irina E. Volvenko (Zoological Museum, Far Eastern Federal University)

Organizing Committee address:
A.V. Zhirmunsky Institute of Marine Biology FEB RAS
Palchevsky St., 17, Vladivostok 690041, Russia
Tel.: +7 (423) 2317-111, Fax +7 (423) 2310-900

Contacts:
Konstantin Lutaenko - lutaenko@mail.ru (information)
Elena Sayenko - sayenko@ibss.dvo.ru (information and abstract s

Sunday March 15th—Friday March 20th 2015

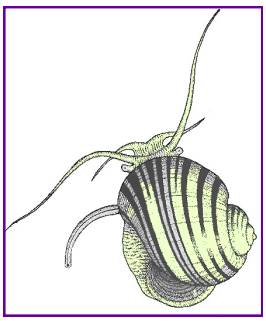
Invitation from the conference co-chairs

It is a pleasure to Chair the 10th International Conference on Molluscan Shellfish Safety in Puerto Varas, Chile and to welcome and host the best of the international molluscan safety community, including scientists, regulators and industry representatives. We hope that ICMSS 2015 provides a unique platform for developing and extending professional networks, discussing latest advances with colleagues and talking-face to face with producers, regulators and authors of peer reviewed journal articles from all over the world. For the first time, this conference will be held in a South American country, one of several in the region, working to share with the world the best products of our land and sea. We will try to bring together scientists from different countries actively involved in solving local challenges and facilitate the exchange of information leading to the improvement of food safety. The conference programme includes topics related to a range of contaminants in shellfish, presentations on latest advances on harmful algal bloom research, toxin methods, cyanotoxins, viruses and bacteriological contaminants, risk assessment and risk management strategies and heavy metals in shellfish from a regulatory and scientific view. We trust the programme will provide a stimulating platform for session discussions and for the development of new collaborations and ideas for future advancement of the field.

We have also planned an exciting series of extracurricular events to take advantage of the fantastic location in Puerto Varas, and to give our international visitors the best opportunity to experience one of the world´s beautiful Patagonia areas including the Open Conference in the beautiful Teatro de Frutillar. Participants will also be offered the chance to taste the German influence in Chilean population with a Kucken Te time, smoked Salmon and Shellfish, cheese local industry, Patagonian Lamb and of course sampling our famous winery featuring our re-discovery of Carménere and our best Cabernet Sauvignon varieties. Tours to the Volcano and Lakes areas are also possible, as well as technical tours to commercial shellfish producing facilities. We would like to take the companies and agencies supporting our efforts through the provision of funding and donations, and we sincerely thank you for your participation in this important forum highlighting the need to improve the safe and nutritious provision of bivalve molluscs to consumers. Finallly, welcome to all of you, we hope you enjoy what we expect will be an intellectually stimulating, professionally and socially fulfilling event.

Conference website — http://icmss2015.com

The Malacological Society of London
HTTP://WWW.MALACSOC.ORG.UK



Molluscan Forum

Thursday 20th November 2014
9:30 am – 6.30 pm
Flett Lecture Theatre
Natural History Museum, London

CALL FOR REGISTRATIONS AND PAPERS

This informal, annual, and successful meeting is designed to bring together people starting their research on molluscs, to give them the opportunity to present and discuss their work and to compare notes on methods and problems. **Again the Forum will be held the day before the Young Systematists' Forum (www.systass.org/ysf), also at the Natural History Museum.** This has been arranged so both meetings can be attended, although if attending both you will have to register for both meetings separately.

Attendance to the Molluscan Forum is open to all, but speakers and poster presenters should be **research students, post-doctoral researchers, undergraduate students** starting molluscan projects, and **amateurs** engaged in substantial projects that have not yet been published. Any topic related to molluscs is acceptable: palaeontological, physiological, behavioural, ecological, systematic, morphological cellular or molecular.

Short talks (~15 min) or posters may be offered. They need not be polished accounts of completed work; descriptions of new methods, work in progress, and appeals for assistance with unsolved problems are equally acceptable.

In addition to talks and posters there may be opportunities to acquire books and other items contributed by members of the Society. Lunch will be provided and The Forum will end with a wine reception, both sponsored by The Malacological Society of London.

THERE IS **NO** REGISTRATION FEE AND A LIMITED AMOUNT OF HELP WITH TRAVEL COSTS WILL BE AVAILABLE FOR PRESENTERS WHO CANNOT CLAIM THEM FROM ELSEWHERE.

Enquiries and registrations to:
Prof. Tony Walker, School of Life Sciences, Kingston University, Kingston upon Thames, Surrey, KT1 2EE, UK. Tel: UK +44 (0) 208 417 2466; e-mail: t.walker@kingston.ac.uk

Non-presenters: please let us know you will be coming so that we may estimate numbers.

For more information see: http://www.malacsoc.org.uk/MolluscanForum.htm

The Malacological Society of London

Molluscan Forum, Thursday 20th November 2014
9:30 am – 6.30 pm
Flett Lecture Theatre, Natural History Museum, London

REGISTRATION FORM

Return before 1st October 2014, by email to:

Prof. Tony Walker, School of Life Sciences, Kingston University, Kingston upon Thames, Surrey, KT1 2EE, UK. Tel: UK +44 (0) 208 417 2466; e-mail: t.walker@kingston.ac.uk

Name.....……

Address.....……..…

.....……

Tel. No.....…….....

Email.....…….....

Status: Research Student / Undergraduate / Post-doctoral researcher / amateur (delete as appropriate)

'Other' (please state) ……..

Will you attend the Young Systematists' Forum on 21st November 2014? ……..

I wish to give a paper / poster (delete as appropriate) entitled:

.....……

.....……...

Please attach, as a Microsoft Word attachment, an abstract of **not more than 350 words,** TOGETHER WITH TWO .JPG IMAGES SUPPORTING THE ABSTRACT. Abstracts of accepted contributions will be published in the Society's ISSN bulletin, *The Malacologist*, and on its website.

IT IS EXPECTED THAT ALL ORAL PRESENTATIONS WILL BE MADE USING POWERPOINT. IF YOU WISH TO MAKE ANY OTHER FORM OF ORAL PRESENTATION YOU MUST CONTACT TONY WALKER IN ADVANCE.

Posters should be roll-ups or mounted on stiff cards, and should require no more than a 1 metre x 1 metre display area. They will be mounted on boards (velcro supplied).

If you are unable to get financial support from elsewhere (students and amateurs only) and need assistance with travel costs, please enter here the cost of the cheapest possible public transport return fare to London.

£.....

Funding is not guaranteed but we shall endeavour to support as many presenters as possible. Late registrations may miss the opportunity for financial support. The support will be limited, so funding from elsewhere should be sought first. A provisional programme and confirmation of registration will be sent out late October.

Abstract submission

Abstracts submitted for the Molluscan Forum should be sent as Microsoft Word files.

Abstract submission

Please use the following format:

Title (12pt, left justified)
<blank line>
Authors (10 pt, left justified, presenting author underlined; use superscript numbers to indicate institutional affiliation)
<blank line>
Institutions (10pt, left justified; in this order: Number (superscript), Department, Institution, City, Country)
Presenting Author email
<blank line>
Abstract (11pt, no indentation, left justified, 350 words maximum)

EXAMPLE ABSTRACT

The geographic scale of speciation in *Stramonita* (Neogastropoda: Muricidae)

Martine Claremont[1,2], Suzanne T. Williams[1], Timothy G. Barraclough[2], and David G. Reid[1]

[1]Deptartment of Zoology, Natural History Museum, London, UK
[2]Department of Biology, Imperial College London, Berkshire, UK
Email: m.claremont@nhm.ac.uk

Stramonita is a relatively small, well-defined genus of muricid marine gastropods limited to the tropical Eastern Pacific and the Atlantic. The type species, *S. haemastoma*, is known to have teleplanic larvae and is estimated to remain in the water column for several weeks. *Stramonita haemastoma* shows regional variation, and this has led to the recognition of five geographical subspecies: *S. h. haemastoma*, from the Mediterranean and Eastern Atlantic to Brazil, *S. h. floridiana*, on the east coast of Florida and in the Eastern Caribbean, *S. h. caniculata* on the west coast of Florida and the Gulf of Mexico, *S. h. rustica* in the Western Caribbean and *S. h. biserialis* in the Eastern Pacific. The protoconch has been shown to be similar across the *S. haemastoma* complex, implying that all subspecies have equally long lived larvae. Within these subspecies, cryptic variation is suspected. For example, *S. h. biserialis* is suggested to be differentiated North/South on a small scale. In the presence of teleplanic larvae, speciation on such a small scale seems paradoxical. Various explanations for this paradox are possible. Actual (or realized) dispersal of *Stramonita* species may be more limited than presently believed, leading to allopatric differentiation. Alternatively, morphological differentiation may not be a reliable indicator of genetic differentiation, and *S. haemastoma* (*sensu lato*) might indeed prove to be a single taxa. It is also possible that ecological speciation could result in geographical speciation on a small scale in the presence of wide dispersal. My results suggest that five species of *Stramonita* are present in the Caribbean, at least three of which occur sympatrically. Gene flow is maintained between Caribbean and Mediterranean populations in at least one species, while no genetic differentiation was found along the Eastern Pacific coast. The implications of these results are discussed.

NOTE THAT ABSTRACTS ARE PUBLISHED IN *THE MALACOLOGIST* WHICH IS THE BULLETIN OF THE SOCIETY AND HAS AN ISSN NUMBER. IT IS CIRCULATED TO ALL MEMBERS.

BEFORE THE FORUM, PLEASE EMAIL TO THE EDITOR TWO IMAGES TO ACCOMPANY YOUR ABSTRACT. TRY TO MAKE THESE IMAGES ONES THAT YOU WOULD NOT USE IN AN EVENTUAL FULL PAPER.
EDITOR georges.dussart@canterbury.ac.uk

FORTHCOMING MEETINGS

The Malacological Society of London

Planktic gastropods:

biology, ecology and palaeontology

1st April 2015

With keynote talks from

Dr Katja Peijnenburg
Naturalis Biodiversity Center, Leiden

Dr Silke Lischka
Helmholtz Centre for Ocean Research, Kiel

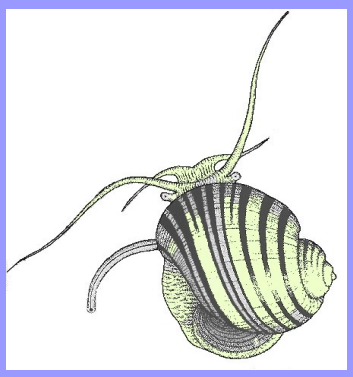
To register your interest in presenting a talk or poster, please contact Deborah Wall-Palmer **deborah.wall-palmer@plymouth.ac.uk**

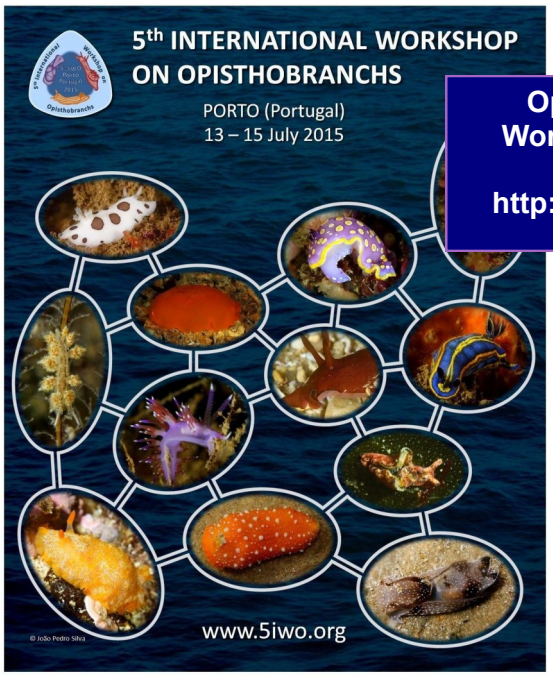
NATURAL HISTORY MUSEUM

The Leverhulme Trust

EXPLORE WITH PLYMOUTH UNIVERSITY MARINE INSTITUTE

...and AGM





Opisthobranch Workshop website

http://www.5iwo.org

Venue

U.PORTO INSTITUTO DE CIÊNCIAS BIOMÉDICAS ABEL SALAZAR UNIVERSIDADE DO PORTO

U.PORTO cimar

PRELIMINARY NOTICE

World Congress of Malacology

For 2016, the Council of Unitas Malacologica is pleased to have accepted the proposal of
Dr Aileen Tan Shau-Hwai to host the WCM 2016 in Penang, Malaysia.

Malacological Society of London Awards and Grants

The Malacological Society of London makes a number of Awards and Grants. These are in addition to financial support for meetings, including travel bursaries to the Molluscan Forum.

Research Grants

The Research Grants Scheme was established to commemorate the Society's Centenary in 1993. Under this scheme, the Society anticipates making at least five awards each year, each with a value of up to £1500 to support research on molluscs that is likely to lead to publication. The closing date for applications each year is 15th December. Grants are preferentially conferred on students and researchers without professional positions, without regard to nationality or membership of the Society. Preference is also given to discrete research projects that fall within the subject areas covered by the Society's Journal of Molluscan Studies. Applications will be assessed by scientific merit, value of the project, and the extent to which the research will benefit the applicant's scientific aspirations. The successful applicants will be notified by 31st March and announced at the Annual General Meeting. The conditions of the award, notes of guidance and an application form are on the Society's website at www.Malacsoc.org.uk

Travel Grants

Travel Grants are available as bursaries to support attendance at a conference or workshop relevant to malacology. Grants are preferentially conferred on students and researchers without professional positions. The value of each of these awards is up to £500, and the Society anticipates that at least five awards will be made annually. The application should have the support of the project supervisor. In years when a UNITAS Congress (i.e. World Congress of Malacology) is held, a number of these awards are likely to be used to support participation at this meeting. There are two closing dates each year, 30th June for travel starting between 1st September of the current year and 28th February of the following year, and 15th December for travel starting between 1st March and 31st August of the following year. The conditions of the grant, notes of guidance and an application form are on the Society's website at www.Malacsoc.org.uk Preference will be given to members of the Society.

Sir Charles Maurice Yonge Awards

Successful applications for Research Grants or Travel Awards that are concerned with the study of Bivalvia may be awarded as Sir Charles Maurice Yonge Awards.

Annual Award

This Award is made each year for an exceptionally promising initial contribution to the study of molluscs. This is often a thesis or collection of publications. The value of the Award is £500. Candidates need not be a member of the Society but must be nominated by a member. There is no application form: the nominating member should send the material for evaluation with a covering letter or letter of support to the Honorary Awards Secretary. The closing date each year is 1st November. The winner(s) will be notified by 31st March, and announced at the Annual General Meeting.

Applications

Applications for Research Awards and Travel Grants should be sent to the Honorary Awards Secretary, Dr Suzanne Williams, Natural History Museum, London, SW7 5BD, UK. Please note that all applications must be sent by email to MSL_awards@nhm.ac.uk.

Malacological Society of London—Membership notices

Objects

The objects of the Society are to advance education and research for the public benefit by the study of molluscs from both pure and applied aspects. We welcome as members all who are interested in the scientific study of molluscs. There are Ordinary Members, Student Members and Honorary Members. Members are entitled to receive a copy of the *Journal* and such circulars as may be issued during their membership. The society's Web Site is at:

http://www.Malacsoc.org.uk

Publications

The Society has a continuous record of publishing important scientific papers on molluscs in the *Proceedings*, which evolved with Volume 42 (1976) into the *Journal of Molluscan Studies*. The *Journal* is published in annual volumes consisting of four parts which are received by fully paid-up members and student members. Members also receive the The *Malacologist*, the digital Bulletin of the Society, twice a year.

Meetings

In addition to the traditional researches on taxonomy and systematics, new experimental, chemical and molecular techniques are amongst he topics considered for discussion meetings and papers for publication in future volumes of the *Journal*.

Subscriptions

The Annual Subscription is due on 1st January each year.

- Ordinary Members £45 (or US$ equivalent)
- Student Members £25 (or US$ equivalent)

Methods of Payment

(1) Sterling cheque to "The Malacological Society of London".

(2) Banker's standing order to: The Northern Bank (Sort code 95-01-49), 49-51 University Road, Belfast BT7 1ND, for the credit of "The Malacological Society of London" (a/c 70030422).

(3) Credit card: Overseas members ONLY may pay by credit card: the Society can accept VISA and MasterCard payments only. Please provide the Membership Secretary with your card number and expiry date, card type (VISA or MasterCard.), the name on the card, and the cardholder's address (if this differs from your institutional address). Receipts will only be sent if specifically requested.

(4) Overseas members wishing to pay electronically should contact the Membership Secretary (Dr R.Whittle at roit@bas.ac.uk for SWIFT/BIC and IBAN numbers of our bank.

Institutional Subscriptions to the Journal

Enquiries should be addressed directly to Oxford University Press, Walton Street, Oxford OX2 6DP, U.K.

Change of Member's Address

Please inform the Membership Secretary of a change of postal or email address. Alternatively, use the address slip on the *Journal* wrapper to inform us, through Oxford University Press, of a change of address.

APPLICATION FOR MEMBERSHIP OF THE MALACOLOGICAL SOCIETY OF LONDON

I wish to apply for Ordinary*/Student* Membership (*delete one)
I enclose a cheque payable to "The Malacological Society of London" for my first annual subscription.

Title . . . . Name . . . . . .

Department . . . . . Institution . . . . . .

Street . . . . . City . . . . . .

Post /Zip Code . . . . . Country . . . . . Email . . . . . .

Malacological Interests . . . . . .

Signature . . . . . Date . . . . . .

Please send the completed form and cheque to the Membership Secretary:
Dr Rowan Whittle, British Antarctic Survey, High Cross, Madingley Rd., Cambridge CB3 0ET roit@bas.ac.uk