ISSN 1759-1406

The Malacologist

The Bulletin of The Malacological Society of London

NUMBER 60 FEBRUARY 2013

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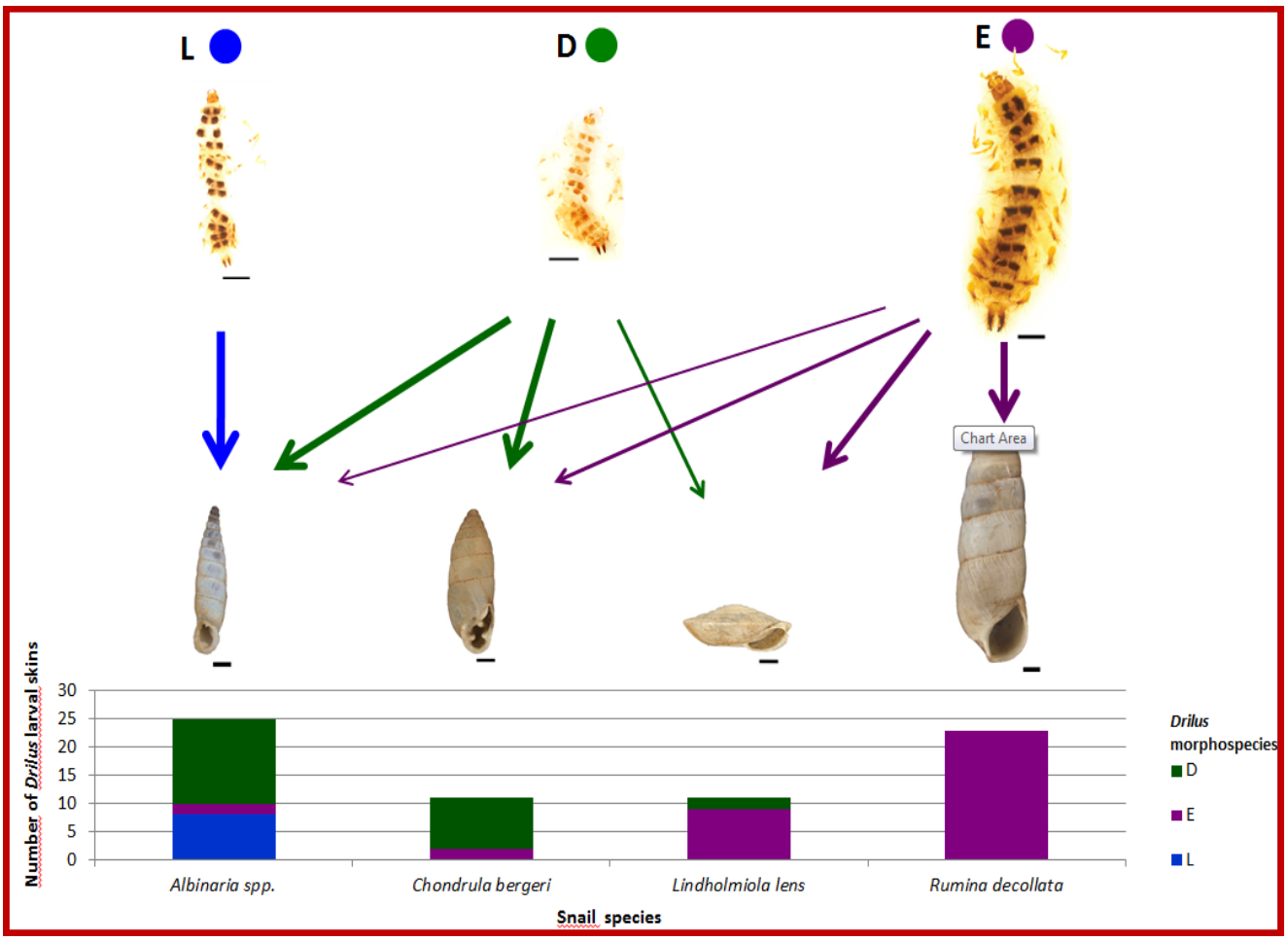

EDITORIAL

The main subject of this issue of *The Malacologist* is the Malacological Forum which took place at the Natural History Museum in November 2012. The Forum is a high point of the Societies calendar and is always well attended. The event is always a refreshing, eclectic stimulus in the life of the Society. Presenters come from a wide range of countries (13 in this case) so it represents a really international cross-section of Malacological interest. The Society hopes that these meetings will allow the students to forge relationships and build networks which will help them secure a good future for themselves and for the subject they study.

The focus of the Forum is on the work of early career research malacologists, usually but not always young. These are in effect the malacologists who will be carrying the torch of malacology through some difficult times., difficult for themselves and also for a taxonomic-interest Society. At the Forum, they present reports of work completed but also of work in prospect. If we are lucky, with repeat visits to the Forum, we see this work develop over the years, and if we are extra-lucky, the young presenter might then publish their work in our *Journal of Molluscan Studies*. If we are extra-extra lucky they might even become a member of Council.

It is only by this kind of continuing interest in the subject of malacology and maintained allegiance to the Society that the Malacological Society of London can maintain its good works—for example, publishing the Journal, supporting malacologists with travel awards (see pages 24 & 28) , helping to fund malacological research (see page 22) and convening open meetings concerning the study of molluscs (see page 26).

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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.*].

REVIEW

Catalogue of the Living Bivalvia of the Continetal Coast of the Sea of Japan (East Sea) (2012)
K.A. Lutaenko & R.G. Noseworthy
Vladivostok: Dalnauka
247 pp., 67 colour pls, 53 figs. Hardback, 18x25 cm.
ISBN: 978-5-8044-1261-7

The molluscan fauna of the Sea of Japan ('East Sea' in Korea) is among the most well-studied in eastern Asia, as a result of the long history of study in Japan, Russia and more recently in Korea. For the first time, this English-language volume brings together the knowledge of the bivalves of its continental western coast, from Korea to Primorye and the Tatarsky Strait. A total of 367 species and subspecies are included in the catalogue; this relatively large total reflects the division of the enclosed sea by a frontal system into temperate and subtropical parts. For each species the distribution is given and taxonomic issues discussed. About 250 species are illustrated by excellent colour figures and line drawings, but no descriptions are provided. A useful part of this work for all malacologists interested in the region is the comprehensive bibliography of over 1100 references.

David G. Reid

Molluscan Forum 2012

Natural History Museum, London 28 November 2012

ORAL PRESENTATIONS

Schedule

9.15 - 9.45 Registration & coffee

9.45 - 11.10 **Session I: Phylogeny & Morphology**

9.45 TONY WALKER: Welcome and introduction to the day

9.50 LISA-MARIE BRAUN: Determining the origin of Antarctic calliostomatids: a molecular phylogeny of carnivorous deep-sea gastropods

10.10 THANIT SIRIBOON: Systematics of terrestrial snails of the family Streptaxidae Gray, 1860 in Thailand

10.30 MARTIN R. SMITH: Ontogeny, morphology and taxonomy of the soft-bodied Cambrian 'mollusc' *Wiwaxia*

10.50 GARY MOTZ: Morphologic variation as a potential driver of taxonomic richness: Venerid Bivalves of the Indo-Pacific

11.10 - 11.30 Coffee & poster viewing

11.30 - 13.10 **Session II: Population & Distribution**

11.30 SÉVERINE FOURDRILIS: Contemporary population genetic differentiation in *Melarhaphe neritoides* (Gastropoda: Littorinidae), a long-lived planktonic-dispersing mollusc

11.50 NATHAN A. M. CHRISMAS: An association of mitochondrial haplotype with shell shape in an intertidal gastropod

12.10 VANYA PRÉVOT: Characterization of the Colonizing Decollate Snail, *Rumina decollata* (Mollusca: Pulmonata: Stylommatophora)

12.30 ONDREJ KORÁBEK: Restoration of a long forgotten name *Helix straminea* (Pulmonata: Helicidae) for a new recognised species widely distributed in Italy and Balkans

12.50 HALIME D. ARICAN: Parasitic influences on the host genome using the Molluscan model organism *Biomphalaria Glabrata*

13.10 - 14.00 Lunch break & poster viewing

14.00 - 15.40 **Session III: Ecology & Environment**

14.00 TIMOTHY WHITTON: The effect of macrofauna on the success of cockle (*Cerastoderma edule*) post-larval colonisation

14.20 FERNANDO ANEIROS: Bivalves in the mud: a comparative approach to temporal variation in shallow subtidal bottoms

14.40 ISABEL CASILLAS BARRAGÁN: Displacement patterns of intertidal consumers of a subtropical rocky shore

15.00 DINARTE TEIXEIRA: Spatial predictive distribution modelling of Madeira's endemic land snail species

15.20 MANUEL LOPES-LIMA: Conservation status of freshwater Bivalves in Europe: state of the art, perspectives and future challenges

15.40 - 16.00 Tea break & poster viewing

16.00 - 17.30 **Session IV: Life History & Behaviour**

16.00 VAINORA ZUKAITE: PKC and *Lymnaea stagnalis* embryogenesis

16.20 RENATE A. HELWERDA: Predation on greek *Albinaria* (Pulmonata: Clausiliidae) by *Poiretia* (Pulmonata: Oleacinidae) and by an unknown organism making circular holes

16.40 ELS BAALBERGEN: Predative pressure of *Drilus* (Coleoptera: Elateridae: Drilini) beetles against land snails in Greece and the Netherlands

17.20 - 18.30 Wine social & final poster viewing

POSTERS

Katie Clements: Do barnacles act as a potential reservoir for pathogenic bacteria on commercial shellfish beds?

Jana Dvořáková: Are there any similar patterns in species composition and richness between grassland snail and plant assemblages?

M. Arantzazu Elejalde: Microsatellite markers for analysis of parentage and sexual behavior of banana slugs (Pulmonata: Arionidae: *Ariolimax*)

David GonzalezGarcia: The lost snail of Captain Spratt: mapping *Albinaria eburnea* in the high summits of the Mediterranean island of Crete (Gastropoda: Pulmonata: Clausiliidae)

Cátia Gouveia: How will climate change affect the potential distribution of Madeira's land snail species?

Renate A. Helwerda: Vetigastopoda (Mollusca: Gastropoda) from the Plio-Pleistocene of the Philippines.

Masaki Hoso: Cost of autotomy drives ontogenetic switching of anti-predator mechanisms under developmental constraints in a land snail.

Alena Kocurková: Succession of mollusc assemblages in quarries of Bohemian Karst, Czech Republic.

Adam Lynch: Methods to explore the immune-effects of pollution on parasite-host interactions.

Rodrigo Brincalepe Salvador: Fossil pulmonate snails from Brazil and their potential for biogeographical studies.

Rense Schelfhorst: Adaptive conchology in *Albinaria* (Pulmonata: Clausiliidae): the effects of shell shape on defense against *Drilus* (Coleoptera: Elateridae: Drilini) and *Poiretia* (Pulmonata: Oleacinidae) predation.

Maria Taylor: The effect of artificial diets on the growth and development of the tropical marine gastropod *Turbo argyrostoma.*

Dinarte Teixeira: Land snail species of Porto Santen islets - the LIFEproject experience.

Nikitavan Zeijl: The effect of urban heat islands on the composition of snail communities in a large urban area.

Molluscan Forum 2012

Organised for **The Malacological Society of London** and the **Natural History Museum**, London by
Professor **Tony Walker**, Kingston University
(email: tony.walker@kingston.ac.uk) &
Jonathan Ablett, Natural History Museum
(email: j.ablett@nhm.ac.uk)

ORAL PRESENTATIONS

Determining the origin of Antarctic calliostomatids: a molecular phylogeny of carnivorous deep-sea gastropods

Lisa-Marie Braun[1, 2], Pat Dyal[1], Katrin Linse[3], Suzanne T. Williams [1,]
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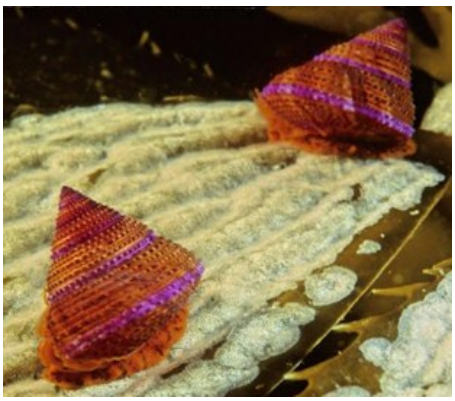

Calliostoma annulatum

The trochoid family Calliostomatidae was traditionally comprised of two subfamilies: Calliostomatinae and Thysanodontinae. A third subfamily, Margarellinae, was recently described based on molecular studies that show *Margarella* spp. from Antarctica, traditionally assigned to the trochid subfamily Cantharidinae, also form a clade within the Calliostomatidae. The understanding of systematic relationships among these subfamilies is still in flux. In this study we use Bayesian inference based on sequence data from four genes to 1) examine the systematic relationships of subfamilies within the Calliostomatidae, 2) use DNA sequence data to delimit species within the most speciose genus, *Calliostoma*, and 3) investigate the historical biogeography of Antarctic species from *Margarella*, *Calliostoma* and *Falsimargarita* and assess the role of Antarctica as a source of diversity. This study represents the most comprehensive molecular phylogeny of the gastropod family Calliostomatidae to date, in terms of numbers of taxa and of gene sequences. A total of 470 sequences were obtained from representatives of the subfamilies Calliostomatinae, Margarellinae, and Thysanodontinae, together with nine species belonging to the Trochidae as outgroup taxa. One fossil record of *Calliostoma* was used to calibrate a molecular clock to examine patterns of divergence in calliostomatids. The phylogeny demonstrates that all three recognised subfamilies are highly supported. Furthermore it was found that within the family Calliostomatidae there is strong support for three new subfamilies, including species of the genera *Venustatrochus, Falsimargarita* and an unnamed calliostomatid genus. Within the Calliostomatinae, a total of 55 *Calliostoma* species were identified using statistical methods to analyse DNA sequences. Analyses also showed that both Antarctica and tropical deep water are origins of species diversity in Calliostomatidae. The Antarctic species *Calliostoma nudum* clustered within the *Calliostoma* clade, but was sister to a clade from the East and West Pacific, with a divergence about 23 Ma. This coincides with the establishment of the northward movement of Antarctica bottom water that is thought to have aided dispersal in many marine taxa (20 – 5 Ma).

Systematics of Terrestrial Snails of the Family Streptaxidae Gray, 1860 in Thailand

Thanit Siriboon[1], Somsak Panha[1], Fred Naggs[2] and Chirasak Sutcharit[1]
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[2]Department of Zoology, The Natural History Museum, London, UK
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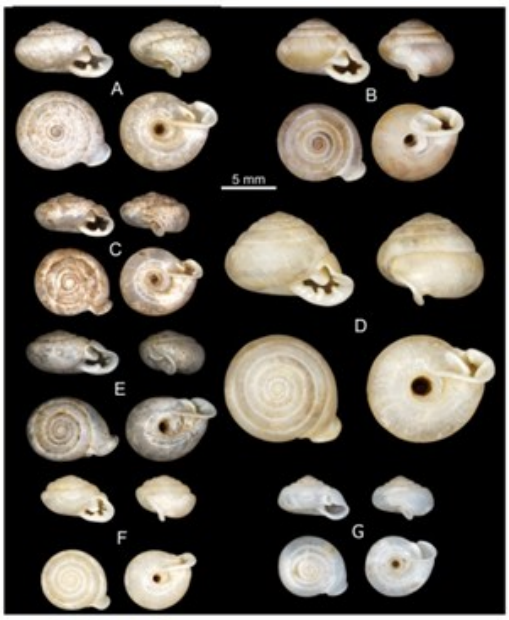
Carnivorous terrestrial snails of the family Streptaxidae though poorly known are among the most remarkable of living pulmonates, they are highly specialized predators hunting various kinds of prey but principally land snails from other families, slugs, earthworms and some insect larvae. They are distributed across tropical areas of South America, Africa and Asia. Streptaxids can be distinguished from other land snail groups by a combination of their shell characters, lanceolate radula teeth and yellow to bright orange body. Shells may be flattened, heliciform to high spired, often with whorls following an

oblique axis, thin to solid, generally glossy, sometimes transparent and often with apertural barriers. The majority of species are known only from their shells and internal anatomy has rarely been used for discriminating different taxa. Live specimens were collected from 91 localities in 28 provinces throughout Thailand. Reproductive organs, especially penis, penial sheath, vas deferens, vagina, gametolytic sac and duct, free oviduct and talon were examined under a stereo-microscope. On streptaxids the penis possesses cat-like claws that are supposed to differ in size and shape and pattern of distribution between taxa but these have not been studied systematically. One difficulty is that they have a minute and of a similar pale colour to surrounding tissue and thus difficult to see under a light microscope. On the basis of shell and reproductive organ characters 29 species in 5 genera were recognized. The examples of each species were prepared by critical point drying. After critically investigation on penial and vaginal walls of streptaxids under SEM, we found the penial hooks that differ in size and shape. Vaginal walls possess complementary structures such as surface pits and vaginal hooks were firstly discovered. In addition, the Thai streptaxid genera will be added to an existing molecular phylogenetic tree of the Streptaxoidea.



Mouthparts and scleritome of the Cambrian fossil *Wiwaxia*: evidence for a molluscan affinity?

Martin R. Smith[1]
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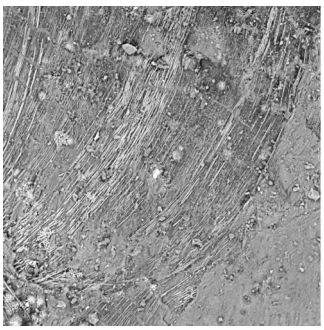
Email: ms609@cam.ac.uk

The soft-bodied Cambrian organism *Wiwaxia* is a long-standing taxonomic conundrum. A molluscan affinity has recently been reasserted based on the identification of an unusual radula, but its position within Mollusca and its implications for molluscan evolution remain unclear. Indeed, its imbricated dorsal scleritome is difficult to compare with any mollusc, and somewhat resembles that of certain annelid worms. This study of 476 new and existing fossil specimens from the 505 million year old Burgess Shale casts fresh light on *Wiwaxia*'s sclerites and scleritome. My observations clarify that the scleritome was not moulted, as previously thought, but developed gradually by the piecewise addition of individually-secreted sclerites. Mineral-filled chambers within the sclerites are described for the first time; these may reflect microvillar secretion, but also resemble the aesthete-like canals found in other Cambrian sclerite-bearers. *Wiwaxia* (along with similar Cambrian molluscs) can be accommodated within the Aculifera (Polyplacophora + Aplacophora) without too much difficulty. However, a morphology-based phylogenetic analysis supports the traditional account of molluscan evolution. In this alternative framework, *Wiwaxia*'s bizarre morphology could represent the ancestral Molluscan body plan – and perhaps even the ground plan of Conchiferan molluscs and of other Lophotrochozoan phyla.



Morphologic variation as a potential driver of taxonomic richness: Venerid bivalves of the Indo-Pacific

Gary Motz[1]
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Studies of modern taxonomic richness look increasingly to the fossil record for information about the formation and development of biodiversity. As a hotspot of modern diversity in marine habitats, the Indo-Pacific has been recognized as a persistent centre of origination for the majority of the Cenozoic. In this context, I am investigating the evolution of venerid-bivalve biodiversity throughout the Indo-Pacific with the goal of understanding causal mechanisms for the development of the tremendous molluscan diversity observed in terms of both species richness (i.e. *biodiversity*) and morphologic variation (i.e. *disparity*). I hypothesise that closely constrained biotic interactions, such as the agonistic relationship between venerid bivalves and their predators, shell-drilling naticid gastropods, may cause directional changes in shell shape and form as a heritable phenotypic response. Further, this evolutionary response may contribute to genetic differentiation and promote speciation within pre-existing clades. As an initial step, I report here on a preliminary assessment of morphological variation among several Cenozoic venerid genera from the Indo-Pacific in a stratigraphic and geographic context, taking into account frequency of naticid drilling as a potential function of morphological variation. Digital photographs of fossil material from the Natural History Museum (London), the Muséum National d'Histoire Naturelle (Paris), Naturalis Biodiversity Research Center (Leiden), and the National Museum of Natural History (Washington D.C.) were obtained for Neogene specimens from Indonesia, Japan, Malaysia, Australia, New Zealand, and the Philippines. Shape analyses of these bivalve specimens were conducted using biologically significant and homologous landmarks preserved on the shell and also gross shell shape, by means of the overall shell outline. Shell outlines were captured using an automated image recognition process, decomposed into Fourier ellipses and compared across regional geographic scales and through time using Principal Components Analysis. In an initial examination of morphologic attributes of several common venerid genera, taxa are randomly distributed throughout shape space with respect to geographic and temporal distributions. However, when predation instances (i.e. drilled specimens) are superimposed on the ordination in shape space, a potential bias in prey selectivity is observed.

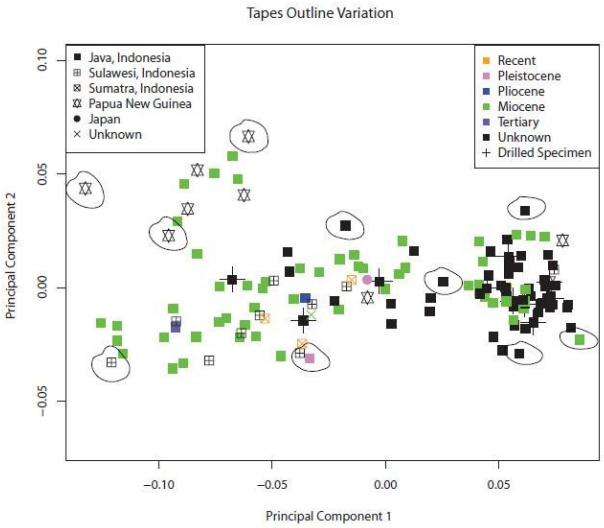
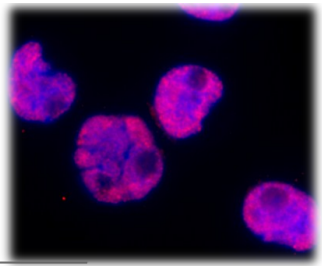


Figure
Synthetic outlines are overlain on an ordination of shell shape parameters for specimens of the genus *Tapes*. Colours denote stratigraphic position (specimen age) and shape denotes geographic distribution of each specimen. Specimens with a large cross (+) behind the symbol have been killed by a predator. Drilled specimens are highly concentrated in the lower right of the graph. *Tapes* specimens demonstrate some degree of morphologic variation across geographic regions and geologic age.

Parasitic influences on the host genome using the molluscan model organism *Biomphalaria Glabrata*



Halime D. Arican[1], Matty Knight[2], Joanna M. Bridger[1]
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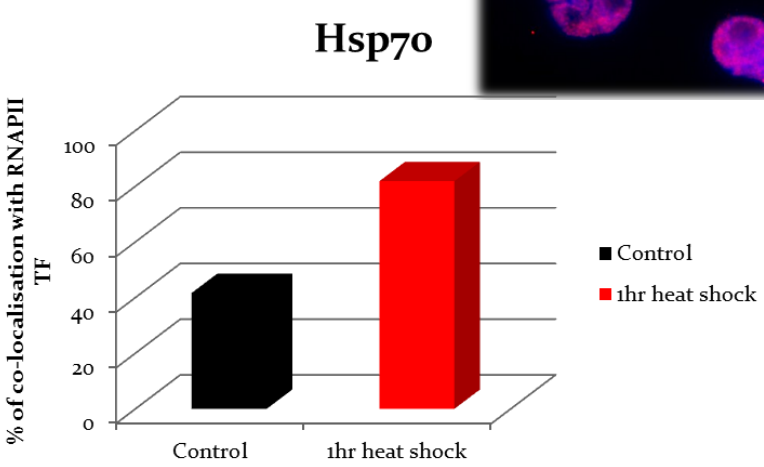
Biomphalaria glabrata is the intermediate snail host for schistosoma parasites, causing Schistosomiasis (Bilharzia) in humans. Due to its importance in the spread of this disease *B. glabrata* has been selected for whole genome sequencing and thus becomes a molluscan model organism. In this study we are investigating the response of *B. glabrata* genes after a parasitic infection or stress caused by heat shock. A proportion of genes that are up-regulated soon after an exposure to parasite or heat shock non-randomly alter their nuclear location. We are investigating how these genes get to their new locations and what nuclear architecture they are interacting with in their new positions.



Contemporary population genetic differentiation in *Melarhaphe neritoides* (Gastropoda: Littorinidae), a long-lived planktonic-dispersing mollusc

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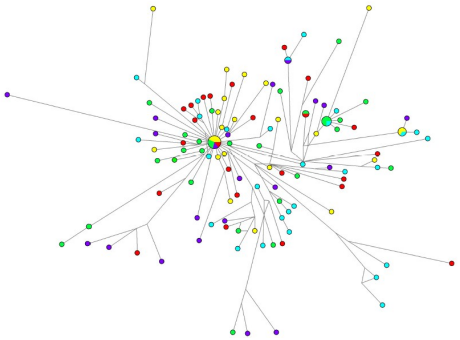
Marine invertebrates with planktonic-dispersing larvae are assumed to be good dispersers over long distances. This high dispersal capacity implies a high gene flow between populations and a homogeneous population genetic structuring over wide geographic scales. The marine gastropod *Melarhaphe neritoides* has a long-lived planktonic larval dispersal stage and allozyme data suggest that it is genetically homogeneous over its whole European distribution area. By contrast, preliminary mtDNA sequence data uncovered a remarkable degree of genetic diversity and genetic structuring on smaller geographic scales. In order to explore this mtDNA diversity and structuring in *M. neritoides*, we started to survey sequence variation at COI and 16S rDNA all over the Azores archipelago. These data reveal that the Azorean populations share very few haplotypes. Hence, it seems that *M. neritoides* with its long-lived planktonic larval stage nevertheless shows a strong local population genetic structuring and thus challenges the current paradigm that correlates modes of larval development with levels of genetic structuring. It also stresses the importance of the sampling intensity (both in terms of numbers of specimens and genetic markers) to avoid experimental biases when assessing genetic diversity.



An association of mitochondrial haplotype with shell shape in an intertidal gastropod

Nathan A. M. Chrismas[1*], Bruno Torres[2], Craig S. Wilding[3], John W. Grahame[2]
[1]Ocean and Earth Science, National Oceanography Centre, Southampton SO14 3ZH, UK
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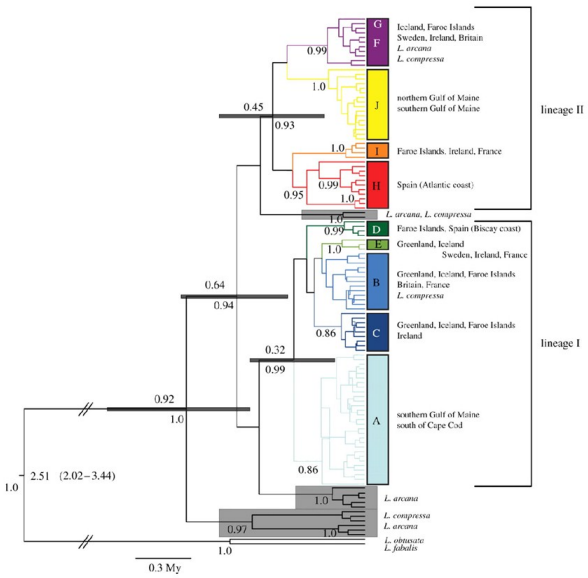
The high rates of substitution and assumed neutrality of mitochondrial polymorphisms encourage the use of mtDNA in phylogenetic and evolutionary studies. However the true nature of the mitochondrial genome and its influence upon processes of adaptation and speciation are not fully understood, particularly where associations appear to exist between 'neutral' mitochondrial haplotypes and characteristics under direct selection. In snails, one such characteristic is shell shape and in this study we investigate the relationship between mitochondrial haplotypes and shell shape in the rough periwinkle *Littorina saxatilis* (Olivi). *L. saxatilis* forms two distinct ecotypes, a high shore (H) morph which has a thin shell and wide aperture allowing for a larger foot and greater adhesion to the substratum in the face of increased wave action, and a mid-shore (M) morph with a larger, more robust shell and smaller aperture offering increased protection against crab predation. On a UK shore, these ecotypes are found to associate with mitochondrial lineages forming a distinct cline in mtDNA, suggesting a significant intraspecific reproductive barrier. This relationship appears not to be universal and is not observed on any other shores studied. Possible processes involved in the formation of the cline are discussed. Additionally, a mitochondrial haplogroup is found to be confined at one end of the spectrum of shell variation in the H ecotype. We put this forward as evidence for hitherto unexpected selection and perhaps even some reproductive isolation between this group and the rest of the population, proposing intergenomic coadaptation as a possible mechanism through which this occurs.



Characterization of the colonising Decollate Snail, *Rumina decollata* (Mollusca: Pulmonata: Stylommatophora)

Vanya Prévot1, Kurt Jordaens2,3 and Thierry Backeljau1,3
[1]Department of Invertebrates, Royal Belgian Institute of Natural Sciences, Brussels, BELGIUM
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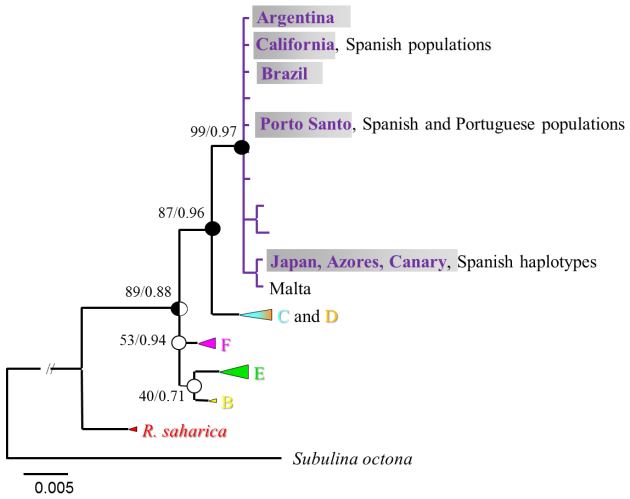
The hermaphroditic, facultatively selfing, land snail *Rumina decollata* is a common, widespread species indigenous in the western Mediterranean region, that has been introduced in many other parts of the world. Recent DNA sequence analyses have shown that *R. decollata* is a complex of several (phylogenetic) species, two of them corresponding to previously distinguished allozyme strains with different body colours (light vs. dark). Therefore, considering this new taxonomic interpretation, we attempt to identify which, and how many, species of the *R. decollata* complex have been introduced outside their native area. Comparative DNA sequence analysis of introduced populations from South America, North America, Japan and the North Atlantic Islands vs. native populations from the Mediterranean area, revealed that all introduced populations belong to one single phylogenetic species, previously recognized as the dark strain. Therefore, the colonizing and invasive character of *R. decollata* is mainly, if not entirely, due to this dark strain. Furthermore, the Iberian Peninsula seems to be an important source for introduced *R. decollata* populations outside Europe. Here we discuss the invasive character of the dark strain and the possible source areas of the introduced populations.



Bayesian tree of concatenated nuclear (ITS1, ITS2) data. ML bootstrap values (left) and BI posterior probabilities (right)

Restoration of a long forgotten name *Helix straminea* (Pulmonata: Helicidae) for an newly recognised species widely distributed in Italy and Balkans

Ondřej Korábek[1], Adam Petrusek[2], and Lucie Juřičková[1]

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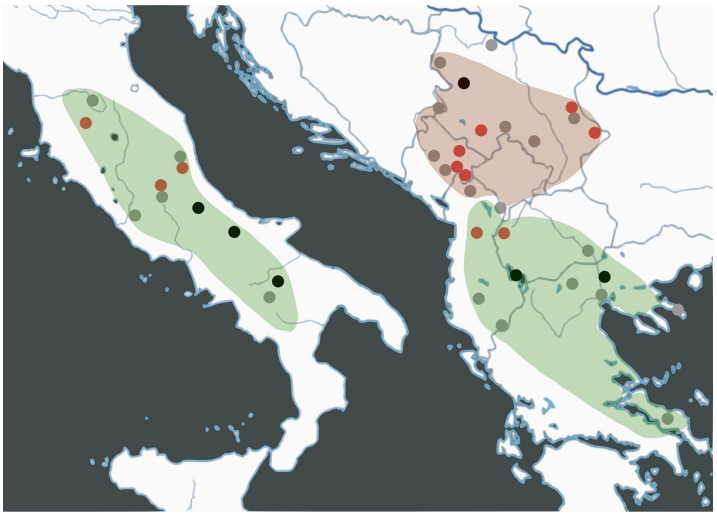
[2]Department of Ecology, Charles University, Prague, Czech Republic
Email: korabeko@natur.cuni.cz

The familiar genus *Helix* Linnaeus, 1758 comprises the largest European pulmonate snails. In Italy, five species are currently recognised. One of them is *H. lucorum* Linnaeus, 1758, a species with large range extending from Iran in east to Italy in west. In collections from Italy, two conchologically distinct forms can be encountered under the name *H. lucorum*. Whereas in the north of the country lives a typical *H. lucorum*, the form from central and southern Italy can be conchologically distinguished as different and was described as *Helix straminea* Briganti, 1825. However, it has been then considered as conspecific with *H. lucorum* to this day. The putative *H. straminea* shells resemble Balkanian species *H. vladica* (Kobelt 1898) instead of *H. lucorum*. The main conchological differences to *H. lucorum* are larger protoconch in *H. straminea* and shell coloration. Based on shell morphology, we propose that *H. straminea* is a valid species, different from *H. lucorum* and close to *H. vladica*. We test this hypothesis by means of 16S and COI phylogeny. Two distinct lineages were found within Italian *H. lucorum*, one of them representing true *H. lucorum* and the second corresponding to *H. straminea*. *Helix vladica* is a junior synonym of *H. straminea*, which this has a disjunct trans-adriatic distribution. The haplotype distribution suggests that the colonisation of Apennine peninsula may have taken place from south. *Helix straminea* is not closely related to any other Italian species, the closest relative among them is *H. pomatia* Linnaeus, 1758. Two problematic balkan taxa, *H. volensis* Kobelt, 1906 and *H. vardarica* Knipper, 1939, are placed in synonymy with *H. straminea* solely on the basis of shell characters. The range of *H. straminea* in Balkans extends from Montenegro to eastern Central Serbia and to Albania and Greece.



The effect of macrofauna on the success of cockle (*Cerastoderma edule*) post-larval colonisation

Timothy Whitton[1], Chris Richardson[1], Jan Hiddink[1], Stuart Jenkins[1] and Bryan Jones[2]
[1]School of Ocean Sciences, Bangor University, Menai Bridge, UK
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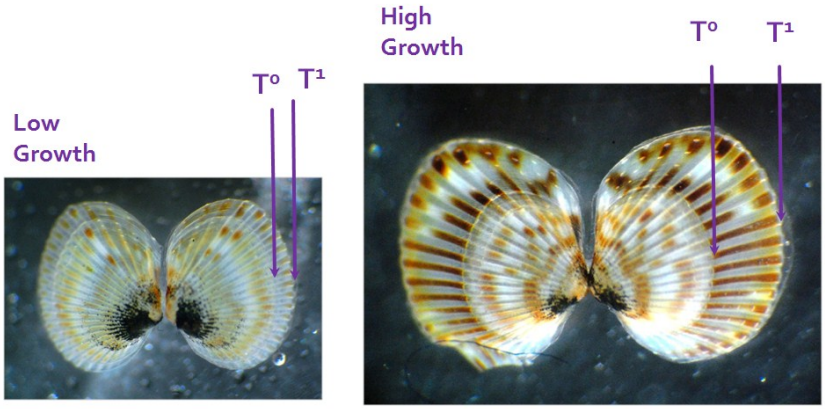
Cockle populations often have highly patchy distributions. High densities of filter feeders and/or bioturbators have been thought to reduce the success of larval settlement. However, current studies on the common cockle (*Cerastoderma edule*) indicate that the post-settlement stage maybe more important for post-larvae interactions with macrofauna than larval settlement. Two field manipulation experiments which excluded the presence of adult cockles and lugworms (*Arenicola marina)* separately, in two locations (Dee estuary and Traeth Melynog respectively), were established from the time of initial larval settlement to late summer in 2012. Each experiment consisted of six control, procedural control and exclusion plots, each 1 m^2 in area. From May to August an increasing trend of higher colonisation in plots where lugworms were excluded was observed. By August post-larvae density in the exclusion plots were significantly higher than in the control treatments, over double at 544 post-larvae per m^2. The field experiment excluding adult cockles produced the opposite trend. Colonisation of post-larvae were lower in the adult cockle exclusion plots. Due to methodological problems the results of the laboratory based experiments were inconclusive. The mechanisms controlling the trends seen in the field experiments are still unclear from the laboratory experiments and warrant further investigation. We conclude that the presence of adult cockles and lugworms influences the colonisation success of *C. edule* post-larvae. The relationships observed increased in their strength over time. However the causal processes remain unclear. From the current results we suggest the density, distribution and population dynamics of macrofauna, such as those tested, may have significant implications on the success and spatial distribution of cockle recruitment.



Bivalves in the mud: a comparative approach to temporal variation in shallow subtidal bottoms

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Thanks to their wide variety of adaptations, life habits and feeding strategies, bivalves are usually one of the most important faunal groups in subtidal muddy bottoms. The diversity of the group in this kind of habitats is commonly high, and species like *Thyasira flexuosa* (Montagu, 1803) or *Kurtiella bidentata* (Montagu, 1803) are frequently among the most abundant ones in these communities. Because of this, the study of the temporal variation of the bivalve assemblages in muddy bottoms is essential to understand the functioning of these ecosystems, which remains intriguing due to their peculiar environmental conditions. With this aim, two muddy bottoms located in two different embayments in the NW of the Iberian Peninsula (Ensenada de Baiona and Ría de Aldán) were sampled monthly from May 1996 to May 1997 and from May 1998 to May 1999, respectively. Five replicate samples for the study of the bivalve assemblage and an additional one for the characterization of the sediment were taken by means of a Van-Veen grab, the former being then sieved through a 0.5mm mesh. In the case of the Ría de Aldán, physicochemical features of the water column and the sediment were also measured using a portable microprocessor. A total of 38 bivalve species were found, being 13 of them shared by both sites. In general terms, the site located in the Ría de Aldán, which is deeper and muddier, showed a higher diversity, whereas the one in the Ensenada de Baiona, less exposed but more affected by human impact, had higher values of total density. In both sites, the features of the bivalve assemblage correlate mainly with the grain size of the sediment, especially with gravel and mud contents In neither of the studied bottoms did the assemblages show a clear seasonal structure, except for marked shifts happening by the beginning of the summer and characterized by lower densities of the most abundant species.

Displacement patterns of intertidal consumers of a subtropical rocky shore.

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The present study assesses the influence of tide, photoperiod and extreme subtropical temperatures on the linear displacement of two subtropical intertidal gastropods. The study characterises the maximal activity period in relation to the tides, photoperiod and the spatial scale of locomotion of three intertidal consumers from different trophic level. Displacement of the predator dogwhelks changes according to variation in air temperature while orientation of displacements of limpets was associated with the tidal cycle. This displacement shows diurnal activity in contrast with previous literature. A logarithmic scale of displacement and the relative locomotion rate of the three consumers are here described, which are a key quantitative data to interpret the causality of the interspecific relationships and the ecosystem functioning. This study contributes to the better understanding of the relevance of the environmental factors on the locomotive performance of the subtropical intertidal consumers, less known when compared with organisms from temperate rocky shore.

Spatial predictive distribution modelling of Madeira's endemic land snail species

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The potential distribution of 68 terrestrial endemic land snails species from the Madeira Island - Portugal were modelled by use of MAXENT software. Species distribution data from BIOBASE database and from field surveys made on 2007 and 2008 were crossed with twenty-two variables (climate, geology, land use, hydrology, disturbance, geographic location and altitude) in order to identify the species distribution patterns of endemic land snail species. We recognise a marked geographical differentiation among faunas from coastal, forest and alpine regions in Madeira Island. The coastal zone comprises three sub-areas of distribution, South coast, North coast and S. Lourenço's Eastern Cape, contradicting the early assumptions of Cameron & Cook. Compared with the coastline area, the forest and alpine regions are more homogeneous. Furthermore, the model allowed the identification of endemic species with an anthropogenic distribution such as *Disculella maderensis taeniana* and *Disculella maderensis maderensis*. The model also validated the importance of altitude and slope in the distribution of species with fusiform shell as postulated by Cameron & Cook. New potential distribution areas for vulnerable *taxa* such as *Discus guerinianus guerinianus*, *Craspedaria moniziana* and *Leiostyla cassidula* were identified, enhancing the value of predictive models as a tool for management and conservation of land snail species. Future work should include predictive modeling with historical data, ecological and species life histories, as well as future climate scenarios in order to fill information gaps regarding environmental variables.

Conservation status of freshwater bivalves in Europe: state of the art, perspectives and future challenges

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Freshwater ecosystems are at risk and invertebrates are particularly vulnerable. However, this situation is not recognized since major conservation efforts are directed to vertebrate species (particularly birds and mammals). Given this situation mollusks and freshwater bivalves in particular, deserve conservation attention. Although some attention is been given to the situation in North America (particularly on unionid species). Europe still does not give too much attention to this faunistic group. Therefore in Europe there is an urgent need for a more integrated and holistic conservation approach on these taxa. Specific areas of research are required from taxonomy and systematics, through biological research (with emphasis on ecological aspects and life history traits) to more effective applied conservation and propagation strategies. In the present work several European experts on freshwater bivalves was gathered to bring input on the distribution and conservation status of freshwater bivalves in their countries. The integration of all these data is here presented as well as directives and opportunities for cooperative European conservation with regard to freshwater bivalves. These challenges will require the participation of as many affected and interested groups, from local communities to governmental and European agencies for successful implementation and management.

PKC and *Lymnaea stagnalis* embryogenesis

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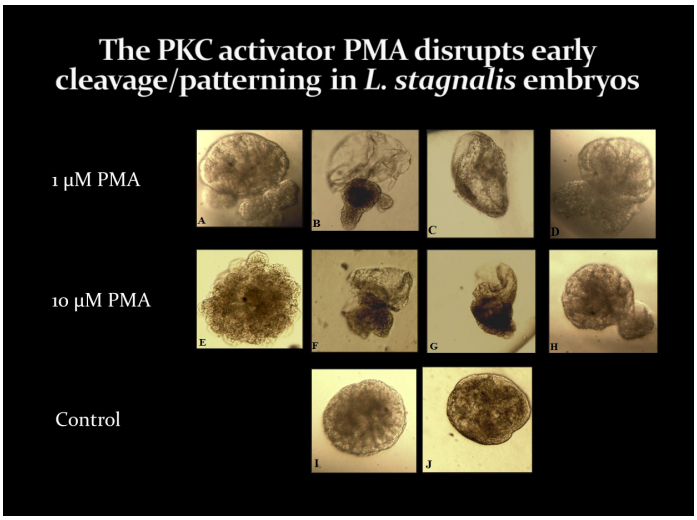
Embryonic development and morphogenesis rely on the co-ordination of complex cell signalling mechanisms. In this study, embryos of the freshwater pond snail *Lymnaea stagnalis* were used as a model to study Protein kinase C (PKC) signalling during molluscan embryogenesis. Using anti-phospho-specific antibodies against conventional PKC isoforms and confocal immunofluorescence microscopy, phosphorylated (activated) PKC was found in early 1-24 cell and late 24-36 cell embryos. In early embryos, PKC activation appeared transient and cyclical; in addition, PKC activation was observed in the nuclear region during cell division. The PKC inhibitor GF109203X blocked PKC activation in developing embryos providing a tool to explore the role of PKC during embryogenesis. Early-cleaving embryos were exposed to different concentrations of either GF109203X or the PKC activator phorbol-myristate acetate (PMA). Results revealed that early cleaving embryos which were exposed to 1 µM and 10 µM PMA did not develop further and appeared abnormal after 24 hours; however when exposed to 1 µM and 10 µM GF109203X embryo development proceeded. Chronic PMA treatment (0.01 µM and 0.1 µM) of early cleavage stage embryos during development resulted in 20% death prior to hatching whilst exposure of later embryonic stages produced 60% embryolethality. Chronic GF109203X treatment showed no lethal effects on later stage embryos, although 20% death was observed with 10 µM GF109203X treatment during development of cleavage stage embryos. Cleavage stage embryos exposed to GF109203X displayed delayed hatching whereas PMA did not affect duration to hatching; GF109203X had the opposite effect when used with later stage embryos. During these experiments rotation, heart beat and gliding were observed. Results revealed that early cleavage stage embryos exposed to PMA throughout development had significantly increased rotation, gliding, heartbeat, whereas GF109203X treated embryos showed significantly lower rotation and gliding, as well as slower heartbeat. GF109203X and PMA had considerably less effect on these parameters when short term incubations (0 – 60 min) were performed, demonstrating that the effects seen following exposure of early cleavage stage embryos are likely due to developmental defects. From these findings it can be concluded that PKC plays an important role during early embryogenesis of *L. stagnalis*.



Predation on Greek *Albinaria* (Pulmonata: Clausiliidae) by *Poiretia* (Pulmonata: Oleacinidae) and by an unknown organism making circular holes

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Albinaria is an extremely speciose genus of land snails, with about a hundred species occurring in limestone habitats in Greece. These snails, being present in rather high densities on exposed rock faces, are predated by many organisms. Among these predators are other terrestrial snails, of the genus *Poiretia.* This genus is represented by *P. dilatata peloponnesica* on the Peloponnese and by *P. compressa* on the Ionian islands. Their mode of predation is rather interesting; they are said to sit on the shell of their prey for two days and create a large, elongated hole in it by excreting an acid. These predation marks were investigated in samples of empty *Albinaria* shells, in order to compare predation rates in different *Albinaria* populations. Additionally, *Poiretia* specimens were dissected and studied histologically to investigate how the excreted acid is produced.
Another type of predation mark frequently found on *Albinaria* shells, is a small, circular or nearly circular hole. These holes are assumed to be predation marks, or marks made by a parasite, because of their occurrence in "fresh" non-eroded shells and their consistency in size and circularity. The rate of occurrence in *Albinaria* shell samples and previous reports of these holes were examined to gain insight in the distribution of this phenomenon. Unfortunately, no observations of organisms making such a hole have been reported and no remains of possible predators have been found inside shells with circular holes, so the identity of the so-called Circular Hole Organism remains a subject of speculation.

Predative pressure of *Drilus* (Coleoptera: Elateridae: Drilini) beetles against land snails in Greece and the Netherlands

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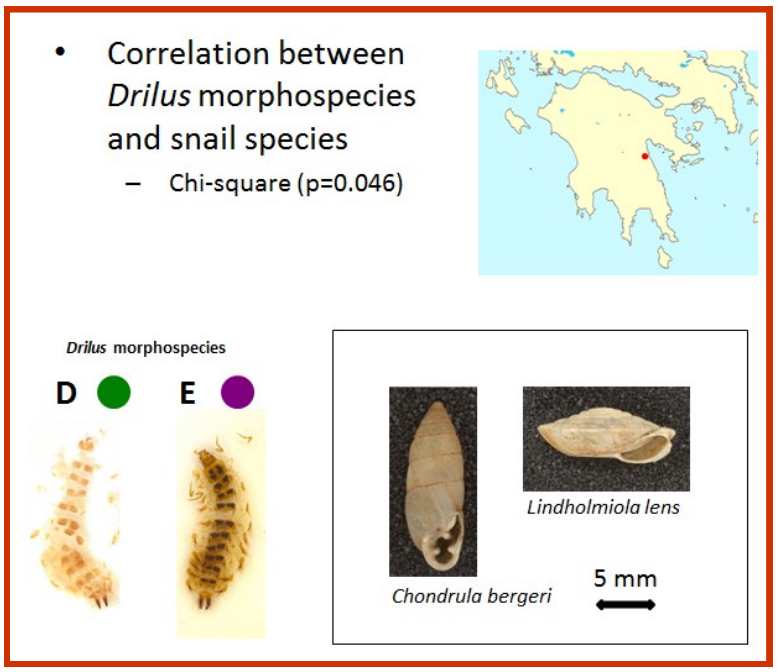
Drilus beetles occur in various habitats together with populations of terrestrial molluscs, upon which their larvae feed. *Drilus* larvae are specialised predators of land snails; they bite and paralyse a snail, after which they eat the snail from inside out. The larvae shed their skin inside the shell of their prey and use the shell for protection. During fieldwork in Greece (2011) and the Netherlands (2012), a number of larvae have been collected and observed while attacking various species of land snails. In addition to living larvae, a large number of empty shells have been collected. Because *Drilus* larvae leave their skin inside their host, species specificity could be measured by using morphological and DNA analysis of the excuviae. A number of different patterns have been observed. In Greece, the main host of some small Greek *Drilus* species are aestivating *Albinaria* snails (Clausilidae). These snails have a clausilium, a door-like-structure in the aperture, which might hinder a *Drilus* larva to enter the shell. In order to predate *Albinaria* snails, a hole is made in some occasions, but *Drilus* larvae are also able to open the clausilium without damaging the shell or clausilium. In addition to these small *Drilus* species, which might be specialized in predating clausilids, there are larger *Drilus* species which might be adapted to larger snails such as helicids. The larvae of these *Drilus* species have a body widened towards the end which fits better into helicid snails. These, and other patterns, show a possible arms-race between *Drilus* larvae and their hosts. During this presentation a number of video´s and photo´s will be shown to illustrate the interaction between *Drilus* beetles and their prey.



POSTER PRESENTATIONS

Do barnacles act as a potential reservoir for pathogenic bacteria on commercial shellfish beds?

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The monitoring of bacterial levels in commercial bivalve shellfish destined for human consumption is a common global practice designed to preserve both public health and the future economic prosperity of the shellfish industry. Recent research has focused primarily on identifying the sources of bacterial contamination affecting shellfish beds globally, aided by the development of new molecular tools. This study adopts a different perspective, by attempting to identify potential bacterial reservoirs among shellfish symbionts. Previous studies have shown that on intertidal mussel (*Mytilus edulis*) beds, sediments can act as a significant reservoir for bacteria with up to 1.5 billion *Escherichia coli* per kilogram of sediment. Anthropogenic activities as well as natural events such as storms, re-suspend the bacteria allowing the subsequent uptake by bivalve shellfish. This study examined the importance of encrusting barnacle species on three intertidal *M. edulis* beds in North Wales, UK. Results demonstrated that across all sites, encrusting barnacles had significantly higher coliform levels respective to their associated symbionts. Coliform levels ranged from 2 to 5 times higher in the barnacles suggesting that barnacles represent a significant bacterial reservoir on commercial mussel beds. This has important implications for the shellfish industry, particularly where commercial shellfish are marketed as "natural" and sold complete with their associated organisms. This study illustrates the need for an extensive *in situ* analysis of global shellfish beds to identify and quantify bacterial fluxes on a localised scale to improve commercial shellfish quality and preserve public health.

Are there any similar patterns in species composition and richness between grassland snail and plant assemblages?

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We studied plant and snail assemblages at 62 plots in dry grasslands and mesic meadows of three nearby regions: Southern Moravia (SM), southern (SWC) and northern (NWC) part of the White Carpathians (Czech Republic). As is generally known, the SWC region supports grasslands of the highest plant alpha-diversity in Europe, contrary to the grasslands in SM and NWC regions which have a lower species richness. In this study we explore whether snail assemblages reflect the same patterns of species richness and composition as vegetation. Detrended correspondence analysis detected one strong gradient of snail species composition change, mainly associated with altitude, temperature, annual precipitation and longitude. This main gradient in snail species composition was also strongly associated with that of vegetation. Canonical correspondence analysis revealed significant differences both in plant and snail species composition between SM and the White Carpathians (SWC and NWC); a significant difference between SWC and NWC regions was found only for vegetation. We also documented several differences in species richness of plant and snail assemblages among the regions. While the highest gamma diversity of plants was recorded in the SWC region, the highest gamma diversity of snails was found in the SM region. Alpha diversity of plants was also the highest in the SWC region. The SWC region had the highest number of live snail species whereas the SM region had the highest number of species if empty shells were included.

The effect of urban heat islands on the composition of snail communities in a large urban area

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The concrete of cities has a high heat storage capacity. Cities are usually warmer than their rural surroundings, forming urban heat islands (UHI). For city residents, this can lead to an increase of heat-related health problems in summer (heat stress), but ecological effects and evolutionary pressure of UHI formation were hardly studied. There has not been known much about the UHI in Dutch cities until recently. Weather stations were traditionally placed outside the cities; therefore few observations were available in urban areas. In 2009, heat islands were mapped in Rotterdam (NL), showing that on a hot summer day parts of the city could be up to 7°C hotter than other parts of the city. We expect that the number of native species will be depleted in the urban areas; whereas some introduced Mediterranean species may be favored. Selection may further be on other traits including average shell size of communities (overall water content, or refuge use). Several other Dutch cities (such as Arnhem) have also been mapped for UHI formation, allowing a replication of the results is possible. In this project, the aim is to detect the signature of adaptation to so-called "heat islands' in urban areas. The question we are trying to answer is: What is the impact of UHI conditions (heat stress) on snail populations in urban areas? Sub questions will be: Will the number of species decrease? What traits (phenotypes, biological strategies) are influenced by UHI conditions and how do the traits change along the temperature gradient?

Microsatellite markers for analysis of parentage and sexual behavior of banana slugs (Pulmonata: Arionidae: *Ariolimax*)

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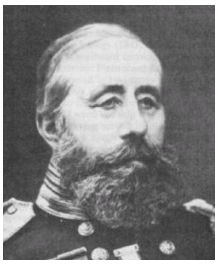
Terrestrial pulmonate slugs are hermaphroditic and often are capable of both outcrossing and self-fertilization. This mixed breeding system may severely affect population genetic structuring and taxonomic differentiation. Currently little is known about the breeding system(s) of Banana slugs (*Ariolimax*), a group of taxonomically ill-defined slugs living along the West Coast of North America, from California to southern Alaska. Based on genital morphology and mtDNA sequence data (COI, 16S and CytB), the genus *Ariolimax* is nowadays interpreted as a group of eight species level taxa, viz *Ariolimax columbianus*, *A. buttoni*, *A. stramineus*, *A. californicus*, *A. dolichophallus*, *A. brachyphallus* and two undescribed species. These species appear to be closely related as 19 microsatellite DNA loci identified from *A. californicus* consistently amplify in all of the described taxa and share many alleles. Hence, these microsatellites can help to clarify *Ariolimax* taxonomy. To this end, four microsatellite loci were used to study potential interspecific crosses of *A. californicus* x *A. dolichophallus*. This showed that none of these crosses produced hybrid offspring and that *A. californicus* reveals multiple paternity under natural conditions. Conversely, a panel of 28 microsatellites applied to cross-breeding experiment between two populations of *A. buttoni*, showed that all the parental specimens involved only three homozygous multilocus genotypes (MLG) and that offspring of pairs in which both parents had a different genotype, always were monomorphic for the same homozygous MLG of one of the parents. This confirms that *A. buttoni* is able to self-fertilize. Yet, to what extent self-fertilization is common in natural conditions remains to be investigated.

***Ariolimax dolichophallus* found on the University of California-Santa Cruz campus. The body can be up to 25 cm in length**

The lost snail of Captain Spratt: mapping *Albinaria eburnea* in the high summits of the Mediterranean island of Crete (Gastropoda: Pulmonata: Clausiliidae)



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Albinaria eburnea is a clausiliid snail of Crete scarcely represented in museum collections: the knowledge we have to date is similar to what we had for other Cretan species in the 1870's mainly due to the inaccessibility of its distribution range in the White Mountains.

Two subspecies were collected in 1851 by Captain T. A. B. Spratt of the Royal Navy at 5000 and 6500 ft. altitude with no concrete locality data. Since then nobody has been able to locate the animals again. One of these two, the nominate subspecies lot that was used by Pfeiffer in 1854 to describe the species, is formed by only four shells in the world: the syntypes held at the Natural History Museum of London. Over the last decades a few other distant, patchy and non-connected localities have been recorded but none above the 4000 ft. altitude line. Being *A. eburnea* an eminently montane animal, doubts have been expressed about its current taxonomical subdivision with four subspecies. It is suspected that gradual and continuous morphological changes can happen within this species over the distribution range, questioning its taxonomical arrangement as has been shown with many other Cretan *Albinaria*. In order to find this "lost snail of Captain Spratt" of taxonomical interest, two collecting trips were done in Crete in 2011 and 2012. From his own accounts, we reconstructed the routes most likely used by Spratt when he visited the heart of the White Mountains and we designed several high altitude transects partially using 19th century mule tracks. Over 100 continuous stations were covered for morphometrical and molecular study, being half of them at 3300-7000 ft. altitude. Some populations from the summits, when compared to the original type material sent on loan to the Natural History Museum of Dublin from London, allowed us to determine with a low error margin the locality where the snails of Captain Spratt were collected 160 years ago. Preliminary observations from the work in progress and its taxonomical implications for the species are discussed in a poster with maps and photographs.

How will climate change affect the potential distribution of Madeira's land snail species?

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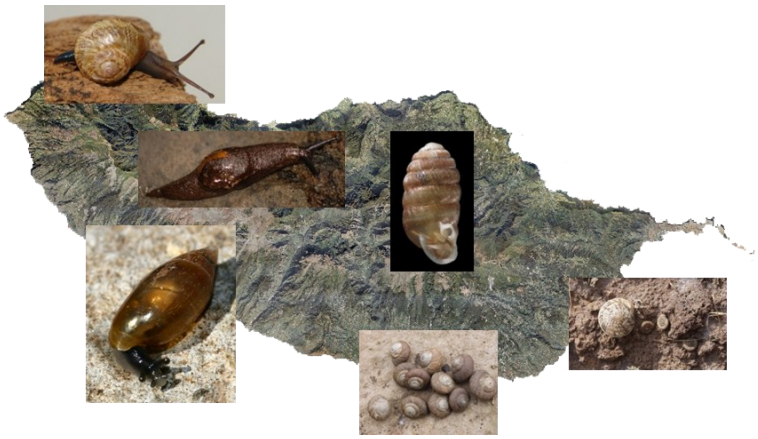
The number of studies on the impacts of climate change on global biodiversity has increased in recent years. However, the biological and ecological responses of a wide range of life forms require progressively more advanced tools in the creation of action plans and other conservation strategies. In order to properly understand this issue and provide preliminary data for future studies concerning the archipelago's malacofauna, we aimed to evaluate the performance of various native and exotic species of terrestrial molluscs, facing a changed climate scenario for Madeira Island, and considering how the distribution of these populations can be affected. Seven species of land snails were selected based on their ecological characteristics. *Actinella armitageana*, *Plutonia marcida*, *Disculella maderensis taeniana* and *Leiostyla vincta vincta* represented alpine, laurel forest and two costal distribution species. To evaluate the impact of invasive species on native fauna, the potential distribution of *Actinella nitidiuscula* was modelled and compared with *Theba pisana*. We also included *Leiostyla colvillei*, a vulnerable specie according to IUCN Red List, to represent a species with a particular geographical distribution. We intend to improve the significance of the use of predictive models in the conservation of land snails. The use of predictive models demonstrates a high efficiency in the identification of the variables that limit the distribution of the target species, also providing important evidence about the assessment of the conservation status of their populations over the next 80 years. The results should provide an integrative platform for the development of action plans and establishment of mitigation procedures preventing the fragmentation of populations and habitats, and subsequently the loss of biodiversity in one of the world's most remarkable hotspot, minimizing the impact of climate change on Madeira's land snail species.



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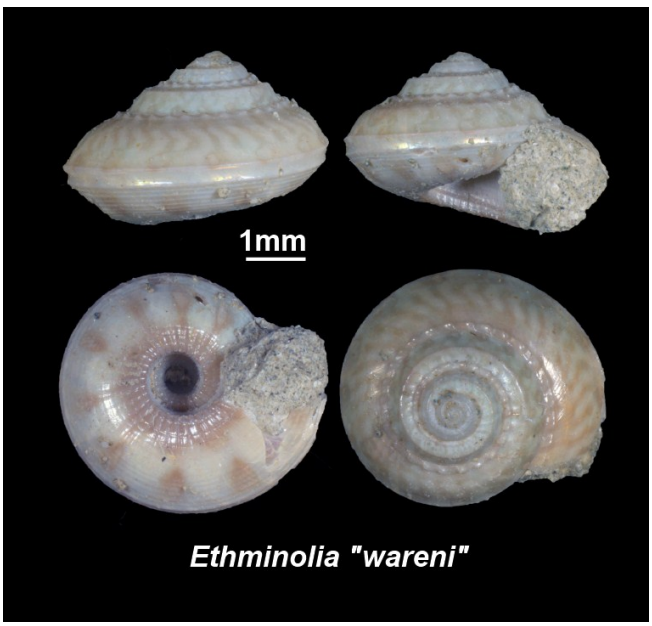

An extremely well-preserved Plio-Pleistocene mollusc fauna was found in the north-western Philippines. The heteropod and pteropod species in this fauna were previously studied and their species number was found to be higher than in any other fauna found to date. Subsequently, several vetigastropod families were studied and systematically described. The paleoenvironmental and paleobiogeographical character of the fauna is explored; the fauna indicates relatively deep water (c. 200–300 m paleodepth) depositional settings. Twenty six species of gastropods were studied, three of which are described as new; *Halystina conoidea, Calliotropis arenosa* and *Ethminolia wareni*. An additional number of four new combinations are proposed; *Pseudotalopia taiwanensis* (Chen, 2006), *Solariella segersi* (Poppe, Tagaro & Dekker, 2006), *Zetela tabakotanii* (Poppe, Tagaro & Dekker, 2006) and *Ilanga konos* (Vilvens, 2009). Thirteen species are known living and another five are possibly ancestors of modern species, giving the fauna an overall modern resemblance. Most modern species still occur around the Philippines. In addition, two of the species are shared with Neogene deposits from southwestern Pacific islands. The new fauna offers insights into the character of deep water Indo-West Pacific mollusc faunas prior to the onset of the Quaternary ice ages. The fauna also contains many other molluscan species still waiting to be studied.

Cost of autotomy drives ontogenetic switching of anti-predator mechanisms under developmental constraints in a land snail.

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Autotomy of body parts offers various prey animals immediate benefits of survival in compensation for considerable costs. I found that a land snail *Satsuma caliginosa* of populations coexisting with a snail-eating snake *Pareas iwasakii* survived snake predation by autotomising its foot, whereas those out of the snake range rarely survived. Regeneration of a lost foot was completed in a few weeks but imposed a delay in shell growth. Imprints of autotomy were found in greater than 10 per cent of *S. caliginosa* in the snake range but in only less than 1 per cent out of it, simultaneously demonstrating intense predation by snakes and high efficiency of autotomy for surviving snake predation in the wild. However, in experiments, mature *S. caliginosa* performed autotomy less frequently. Instead of the costly autotomy, they can use defensive denticles on the inside of their shell apertures. Owing to the constraints from the additive growth of shells, most pulmonate snails can produce these denticles only when they have are fully grown. Thus, this developmental constraint limits the availability of the modified aperture, resulting in ontogenetic switching of the alternative defenses. This study illustrates how costs of adaptation operate in the evolution of life-history strategies under developmental constraints

Succession of mollusc assemblages in quarries of Bohemian Karst, Czech Republic

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Molluscan succession was studied in 18 abandoned limestone quarries of different age in Bohemian Karst, Czech Republic. The number of species in studied quarries increases with time. Fewest species were found in the oldest quarries. This trend was probably caused by habitat diversity decline although it is not conclusive. The best predictors of molluscan species composition are the type of surrounding vegetation, light and age. It is important to take into account correlations of the other environmental variables with light and the tree canopy cover. Compositions of molluscan assemblages of north and south-facing slopes differ, but these differences diminish with ongoing succession. Quarries represent suitable model sites for the study of succession.

Methods to explore the immune-effects of pollution on parasite-host interactions

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The trematode *Schistosoma mansoni* is a significant human parasite with a global impact considered second only to malaria. It is transmitted to humans via tropical freshwater snails of the genus *Biomphalaria* which can often be found in areas highly polluted by a range of anthropogenic contaminants. Various chemical pollutants have previously been shown to influence the immune systems of molluscs, which in turn may alter the dynamics of disease transmission. We report here the development and adaptation of *in vitro* techniques for use in assessing the effects of selected contaminants on cellular immune functions in *B.glabrata* including processes related to infection with *S.mansoni*. Phagocytosis is a key function of the immune system in molluscs, as in many species, and represents a well-established biomarker for immunotoxicity. To assess effects of chemicals on phagocytosis we have developed a novel method for *Biomphalaria* haemocytes using imaging flow cytometry. Brightfield and fluorescent channel images were obtained from haemocytes exposed to latex beads. An automated method for quantifying the phagocytosed beads and excluding non-internalized (free) beads was developed using the analysis software. Differences within haemolymph pools (*intra* assay) and differences between pools (*inter* assay) for the phagocytosis assay showed coefficients of variation of 3 and 9.6% respectively. The automated data analysis showed 99.8% agreement with visual observations regarding classification of phagocytosisng and non-phagocytosisng cells as well as the number of beads within each cell. Another important feature of immunity in *B.glabrata*, directly related to *S.mansoni* infection, is the ability of haemocytes to encapsulate sporocysts for subsequent killing. To investigate the effects of chosen chemicals on the encapsulation process we have used a sporocyst encapsulation assay as well as assays designed to measure cell motility. To date preliminary results from these and a range of other assays suggest that certain pollutants can have immunomodulatory effects on *B.glabrata* haemocytes *in vitro* at environmentally relevant ranges. Given the role of *Biomphalaria* as intermediate host to a major human parasite any factors modulating immune functioning could potentially lead to a disruption in the parasite-host balance altering transmission rates and resulting in possible human health implications.

Fossil pulmonate snails from Brazil and their potential for biogeographical studies

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The Brazilian fossil record of pulmonate snails is not very diverse, with only about ~30 species. Nevertheless, such a record might be extremely important on biogeographical grounds, for it encompasses the most ancient records known for some families and also a few "distributional oddities". Itaboraí Basin (Middle Paleocene), Rio de Janeiro, has the most diverse and abundant pulmonate record in the country, with about 2/3 of the Brazilian diversity. This basin harbors the oldest records for the families Orthalicidae, Strophocheilidae (genus *Eoborus*, with three species) and Ferussaciidae (*Cecilioides sommeri*). The basin's diversity of orthalicids is remarkable: the subfamilies Bulimulinae (genera *Bulimulus*, *Leiostracus* and the endemic and monospecific *Itaborahia* and *Cortana*) and Odontostominae (genera *Cyclodontina* and *?Plagiodontes*) are present and together make up for ~35% of the basin's fauna. Orthalicidae is the most speciose Recent family in the country (~40% of its pulmonate diversity), and Itaboraí's record show that it was already so during the early Tertiary. Other Itaborahian fossils are among the most ancient in the world, but some also have an additional biogeographical importance, for they occur in a place far removed from these families' recent distribution: these comprise the Cerionidae (the endemic genus *Brasilennea*, with three species), Clausiliidae (*Temesa magalhaesi*, also the oldest record of subfamily Neniinae) and Urocoptidae ("*Brachypodella" britoi*). The remaining Brazilian fossil pulmonates are very sparsely distributed, but some are also of interest, especially the Cretaceous basommatophorans: the Ilhas Formation (Aptian-Albian), Bahia, houses the oldest record of *Biomphalaria* (*B. monserratensis*); and the Diamantina Formation (Senonian), São Paulo, houses two species of *Physa*. This gathering of distributional and stratigraphic data was the first step of a broader project on the paleobiogeography of the South American pulmonate fauna. These fossils show a great potential and therefore we expect they will help elucidating many biogeographical issues of the Neotropical land snail fauna.

Adaptive conchology in *Albinaria* (Pulmonata: Clausiliidae): the effects of shell shape on defense against *Drilus* (Coleoptera: Elateridae: Drilini) and *Poiretia* (Pulmonata: Oleacinidae) predation

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Albinaria snails are extremely common inhabitants of limestone habitats in Greece. Different species vary from one another in distinctive shell characters, including the thickness and pigmentation of the shell, the radial ribbing, the shape and angle of the aperture, the ornamentation of the cervix, and the position of the lamellae and folds in the aperture. It is likely that many of these conchological features are under natural selection by the environment. *Albinaria* snails have three main predators: the larvae of *Drilus* beetles, other terrestrial snails of the genus *Poiretia* and an unknown Circular Hole Organism (discussed in more detail by Renate Helwerda). The larvae of *Drilus* beetles bore holes in the shell and bite and paralyze the snail, after which they eat the snail from the inside out. Consequently, they use the shell for protection while they shed their skin, and emerge by boring a new hole in the now empty shell. The presence of these bore holes on the empty shells has been used as a measure for *Drilus* predation. *Poiretia* snails have a different mode of predation: they sit on the shell of their prey and most likely excrete an acid to dissolve the shell and gain excess to the snail, leaving a distinctive, shallow, elongated hole in the shell. During fieldwork in Greece in 2011, large samples of empty *Albinaria* shells have been collected from five different localities in the Peloponnese. Five widespread *Albinaria* species were selected, differing in clausilial apparatus and shell characteristics. For each collected adult shell, the presence of *Poiretia* predation marks and the number and positions of *Drilus* bore holes have been determined. In addition, several relevant shell characters have been measured. Statistical analysis of these measurements can be used to show correlations between *Drilus*/*Poiretia* predation and *Albinaria* shell shape, and help to understand shell evolution in *Albinaria*, which may involve an 'arms-race' with *Drilus* and/or *Poiretia* predation.

Drilus larva attacking *Albinaria menelaus*

***Drilus* larva making a hole *in Albinaria sp.*, Greece**

The effect of artificial diets on the growth and development of the tropical marine gastropod *Turbo argyrostoma*

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Turbo argyrostoma is a marine gastropod found on tropical reefs across the Indo-Pacific and Indian Ocean. In the past they have been widely harvested for their shells and their meat however, they are becoming increasingly important within the marine aquarium trade. Traded animals are being taken directly from reefs which are already being heavily impacted by overharvesting, so the establishment of culture methods for this species could help reduce pressure on their natural habitat. The main aim of this project was to investigate the effect of prepared diets on the growth rate and gonad development of *T. argyrostoma*. One-hundred and fifty *T. argyrostoma* were purchased from the Tropical Marine Centre in Manchester. Three isoenergetic diets were created; Diet A was protein based, Diet B was macroalgal based and Diet C was microalgal based. Twelve to thirteen individuals were fed on each of these diets over an elven week period and their growth and weight were measured every two weeks. At the end of the experiment, survival rates were recorded and some individuals sacrificed to measure gonad development. Results showed that *T. argyrostoma* had a significantly higher growth rate on the protein based diet compared to the microalgal based diet. There is also evidence that *T. argyrostoma* fed a protein based diet gained weight at a faster rate than either of the algal based diets. Despite this, the significantly poor survival rate on the protein diet indicates that this diet would be unsuitable in its current form for use in the mass culture of this species. Also, the diets used did not encourage substantial gonad growth, with female gonads appearing degraded by the end of the experimental period. Further research is needed into the effect of mixed diets on growth and gonad development in *T. argyrostoma* over a longer time period.

NEWS

Past President of the Malacological Society of London

GROSS OUT!

A SLIMY FACIAL

Some people do wild things for beauty—like pay to have giant snails crawl all over their face! A salon in Siberia, a region in eastern Russia, claims that the slime of the giant African land snail helps to regenerate skin and eliminate wrinkles.

Snail slime's antimicrobial properties protect the *gastropod*'s skin from bacteria. But there's no scientific evidence that the slime benefits people's complexions in any way.

A snail's slime is mostly water. The other major component is *glycoconjugate*, which gives the slime its snotlike feel, says Mark Davies, a biologist at the University of Sunderland in Great Britain.

A person receiving a snail facial may feel a cooling sensation as the water in the trail of slime left behind by the snail evaporates, says Davies. But that's about it.

Even if snail slime did have proven beautifying effects, it wouldn't penetrate the skin deeply enough or last long enough to make a difference, according to Dr. Dee Anna Glaser, a dermatologist at the St. Louis University School of Medicine in Missouri. "Our skin is a great barrier," she says. "It's designed to keep things out."

Snail slime is also extremely sticky. Once the facial is over, the slime would be tough to remove—even with scrubbing.

What does Davies think about the snail facial? "It's absolutely bonkers." —*Monica Rozenfeld*

SCIENCE WORLD 23

NEWS OF MEETINGS

MEETING REPORT

Cephalopod International Advisory Council Symposium (CIAC'12), Florianopolis, Brazil, 27th October – 2nd November 2012.

Isobel Bloor

The CIAC'12 conference was held in Florianopolis, Brazil between 27th October and 2nd November 2012. The conference began with two days of workshops where groups of international cephalopod scientists (including PhD students and established scientists) met to discuss several key topics that are considered of importance to the advance of cephalopod science. The outputs from these workshops will be written up as review papers published next year in Advances in Marine Biology.

The symposium itself is held only once every three years, and is a fantastic opportunity to meet and discuss current and future research plans with members of the cephalopod community. Attendees met from 27 different countries with a total of 89 oral and 133 poster presentations, with topics ranging from the new discoveries of behaviours and footage of deep sea cephalopods, to air borne flying squid, tagging of cephalopods, cephalopod genomics and to topics as diverse as cephalopod visual communication and modern art. There was also a range of invited key speakers, which included a novel presentation by Louise Allcock on '*The role of women in cephalopod research: past and* present' that highlighted in particular the research of two ladies, Anna Bidder and Grace Pickford whose work and achievements played key roles in both CIAC and in historical cephalopod research as a whole.

Another event of note during the symposium was the foundation and inaugural meeting of the *Young Cephalopod Researchers* (YCR). YCR consists of international students and earlier career researchers from nine different countries who decided to unify efforts and organize a group to share and discuss experiences and research results whilst also promoting networking amongst early career scientists and senior scientists. Twelve young cephalopod students and researchers were involved in the first reunion which resulted in a big brainstorming session and enthusiastic participation. For anyone interested in getting involved with YCR please contact Rigoberto Rosas Luis (rigoberto@icm.csic.es) to be added to the mailing list.

The hospitality and cultural aspects of the conference were fantastic right through from the welcoming reception to the two poster evenings and the final conference dinner to which all participants were invited and from which the highlight was the traditional Brazilian dancing and music display. The venue for the next CIAC symposium was set for Japan and I would highlight the great opportunity that this event presents for all young cephalopod scientists to get involved with and become an active part of a small and welcoming international scientific cephalopod community.

'Young Cephalopod Researchers' Group Top row: Rodrigo Martins (Br), James Wood (USA) and Jose Xavier (Pt). Middle row: Silvia Lourenço (Pt), Charles Le Pabic (Fr) and Georges Safi (Fr). Bottom row: Jorge Ramos (Mx/Au), Rigoberto Rosas Luis (Mx/Sp), Steffi Keller (Ge/Sp), Augusto C. Crespi -Abril (Ag), KatjaTrübenbach (Ge/Pt), Isobel Bloor (UK).

MEETING REPORT

First International Meeting on Biology and Conservation of Freshwater Bivalves: a perspective from South America. Bragança, Portugal, September 2012

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The freshwater mussels fauna in South American fauna is poorly known. Much information is lacking and several species are known only from the original descriptions. South America has a potential undescribed fauna and several basins like the Amazon and Tocantins-Araguaia rivers basins are virtually unexplored. Thus, improving the knowledge about this fauna is important but few mussels researchers are active in South America. Several researchers are now retired and a new wave of mussels research is necessary. We are trying to continue the work, but we are certainly only at beginning.

In this context, taking part in an international congress about freshwater bivalves was a valuable experience. The first International Meeting of Freshwater Bivalves Biology and Conservation (IMFBBC 2012; http://esa.ipb.pt/bivalves/) took place in the first week of September-2012 in the beautiful city of Bragança (north region of Portugal). The meeting was a great opportunity to learn, with speeches from renowned researchers. In addition to invited speakers, there was more than one hundred oral presentations and posters showing tools and points of views on the same issues that concern us.

We learnt a lot about *Margaritifera margaritifera* (L.). In Europe the knowledge about the biology of the species that occur in their territory is deeper than for South America. For example, it was possible for us to learn about the fish hosts of *M. margaritifera* but we don´t have the same information for several South American species. These works have never been done. It is one of several gaps in our knowledge. Another great opportunity that IMFBBC 2012 provided was to see the mussels in their own habitat. A field trip to Tua and Tuela rivers allowed us to see some of the Portugese fauna.

ICM is a PhD student in Brazil at Universidade do Estado do Rio de Janeiro (= Rio de Janeiro State University). The scope of his work is a revision of the genus *Diplodon* Spix in Wagner, 1827. At IMFBBC 2012, ICM presented some results of a taxonomical review of *Diplodon ellipticus* Spix in Wagner, 1827. *Diplodon* is a genus with several taxonomical problems and this is a first step in order to try an re-organize the taxonomy of the genus.

CC is Master's degree student in Uruguay at Universidad de la República, and works as volunteer in the National Museum of Natural History - Montevideo (Uruguay). He is trying to resolve taxonomic problems of native and exotic Corbiculidae in Uruguay using morphological, anatomical and molecular tools. Moreover, CC is working to implement conservation tools and environmental education. At the IMFBBC 2012, CC presented some results about the conservation of freshwater bivalves in Uruguay and the opportunities and challenges that it represents; he also presented results on the critical reduction of the distribution of *Cyanocyclas* and the influence of invasive *Corbicula* spp.

Of more than a hundred participants at the meeting, only four were from South America (Fig. 1). We are few researches but we are trying to coordinate our efforts. Before and during the meeting wae developed the idea of building a Network of Freshwater Research in South America. Sometime after, at the International Congress of Medical and Applied Malacology in Rio de Janeiro (southeast Brazil), we had our first symposium to discuss a joint agenda.

We would like to thank to The Malacological Society of London that partially funded our travels to the IMFBBC 2012 . It was a great opportunity to learn. The initiative of the Malacological Society of London is a great opportunity for young researches around the world.

Figure 1 - South American Team at IMFBBC 2012. From left to right: Cintia Pinheiro dos Santos, Maria Cristina Dreher Mansur, Cristhian Clavijo and Igor Christo Miyahira.

RESEARCH GRANT REPORT

Towards an Annotated Catalogue of the Terrestrial Molluscs of Canada

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The terrestrial mollusc fauna of Canada is not large. There are perhaps just over 200 species of terrestrial molluscs (including some 50 or so introduced species) (Figures 1, 2) are known from the nearly 10 million square kilometres of land that is Canada. There are clearly areas of greater and lesser diversity, but the majority of the fauna is comprised of broadly distributed (Nearctic or Holarctic) species, although there is also some clear east–west division of the fauna, especially in southern Canada. As expected, the greatest diversity is in the south, with centres of diversity on the west coast (British Columbia) and in the Great Lakes region of southwestern Ontario. Known endemic species are few. On the coast of westernmost province of British Columbia lives the glacial relict slug, *Staala gwaii* Ovaska, Chichester & Sopuck, 2010, recently described from Haida Gwaii (Queen Charlotte Islands) (Ovaska *et al.* 2010). On the opposite side of the country is *Vallonia terraenovae* Gerber, 1996, known only from the limestone areas on the west coast of the Island of Newfoundland (Gerber 1996). One or more of poorly known Arctic vertiginids could also be endemic.
Many species of land snails and slugs are range-edge species that occur in Canada just north of the border with the United States, which occur (or occurred) in southern areas, where human development has been the greatest; industrial-scale forestry, urbanization, and agriculture have eliminated and fragmented natural areas, and invasive species have become established as well. Currently nine species have been assessed by the Committee on the Status of Wildlife in Canada (COSEWIC 2012). Beginning in 2015, the 2015 "Wild Species: The General Status of Species in Canada" (http://www.wildspecies.ca) report will include terrestrial snails and slugs for the first time.

However, terrestrial molluscs (and actually most molluscs, for that matter, with the exception of unionids and commercially important marine species) have been long neglected in Canada and largely overlooked by efforts to conserve Canada's biodiversity. This is no doubt due to few taxonomic experts on the group in Canada, sporadic collecting efforts, and a large number potentially incorrect and spurious identifications, but the absence of a modern species list does not help. Given the conservation concerns, and a recent interest in the terrestrial molluscs, a current and complete catalogue of terrestrial molluscs is much needed.

Figure 1. In Canada *Cepaea hortensis* (Müller, 1774) occurs natively in the Maritime Provinces, Quebec, and Newfoundland but is believed to be a recent introduction to eastern Ontario. This snail was photographed in Ottawa, Ontario.

Since the early part of the 1800s, just over 400 works have been published on the terrestrial molluscs of Canada. The earliest works were those of Rackett (1821) and Say (1824), who described new species, and Sheppard (1830), who made a good first attempt at a regional list. Many of the older publications were simple checklists, providing nothing more than names of species identified from a single location or excursion. However, the first attempt to enumerate the terrestrial molluscs for the whole of Canada was by George W. Taylor (1892) who recorded 95 species.
Malacologists in North America owe a great debt to the exceptional work of Henry A. Pilsbry, and in particular, rely heavily on his monographic "Land Mollusca of North America (north of Mexico)" (Pilsbry 1939–1948). Pilsbry summarized most of what was known about the terrestrial molluscs of Canada at that time. While not a checklist itself, this monograph formed the basis for Aurèle La Rocque's "Catalogue of the Recent Mollusca of Canada" (La Rocque 1953). This is the last checklist that covers the whole of the country and includes about 175 species, subspecies, and forms. Now 60 years old, it is now out-of-date. Since the 1950s, new Canadian records have been added and some gaps filled so that over 200 species are known.

Names change over time, or misidentifications are made, and there is often uncertainty as to what species was meant by the original identifier or author. Although obfuscated by time, there is still a wealth of information in old records, and a useful catalogue of species will link together new data with the discoveries of the past. The complications of incorrect identifications can be overcome if the original specimens can be found. As an example, Fox (1962) recorded *Milax gagates* (Draparnaud, 1801) from Nova Scotia. Over the few decades since no additional records were found (Davis 1992). During my visit to the Canadian Museum of Nature (CMN) in September 2012, one of Fox's specimens was located and determined to be a darkly pigmented *Limax maximus* (Linnaeus, 1758). With no other records (just suppositions that it may occur in various places) in Canada, the species can probably be removed from the list; that is a good thing because it is not native. While it is nearly impossible to check all determinations, attempts are being made to at least confirm a species' presence in Canada, or subnationally, in a province or territory.
The catalogue under preparation records in which provinces or territories species occur. With regards to terrestrial molluscs, few regions of Canada, however, are well known. Of the ten provinces and three territories, only British Columbia, Ontario, Nova Scotia, and perhaps Alberta and Newfoundland are well collected. These malacologically better known provinces have benefited from the interest by a "local" specialist.

One of the more serious complications encountered is the rather large number of problem taxa (potentially spurious species), those that never occurred in Canada (or subnationally) where they were said to occur. The largest number of such species originate from the work of the late F. Wayne Grimm (1941–2005). He came to Canada from the United States in the 1970s and donated his collection to the National Museum of Canada (now the Canadian Museum of Nature, Gatineau, Quebec) (Grimm *et al.* 2010).

As a volunteer, Grimm worked on the terrestrial molluscs in the national collection, but lost interest after several years. In the 1990s, he resumed his studies in terrestrial molluscs and in 1996 contributed to the *Assessment of species diversity in the Mixedwood Plains Ecosystem* (Grimm 1996). In this report he recorded 172 species or subspecies. In the introductory material he wrote "Descriptions and illustrations are being prepared for new taxa in the genera *Vertigo, Columella, Cochlicopa, Catinella, Oxyloma, Succinea, Novisuccinea, Discus, Pallifera, Glyphalinia* [*sic*]*, Webbhelix,* and *Neohelix*. Illustrated reviews are being prepared for Succineidae and selected Polygyridae." However, nothing was ever published on these. Specimens (with manuscript names) have been found for some of his new taxa in the Canadian Museum of Nature, but few illustrations and fewer descriptions or notes have been found. Also in the Mixedwood Plains report, Grimm identified a number of species recorded from the province of Ontario, and Canada, for the first time but he gave very few or no details. Most of these are much more southern species (for example, *Carychium riparium* Hubricht, 1879; *Strobilops texasianus* Pilsbry & Ferriss, 1906; *Helicodiscus notius* Hubricht, 1962; and *Glyphyalinia luticola* Hubricht, 1966). Except for a few species present in the Canadian Museum of Nature, his specimens have yet to be found but those that have been found, have usually been determined to be wrongly identified. That his skill in making determinations had deteriorated in his last years is clear (he often repeatedly changed his determinations, not always for the better, it seems). For example, specimens of "*Helicodiscus notius"* where originally identified by Grimm as *H. parallelus,* then *H. notius,* and then "new species". But not all of his identifications can be discounted. Grimm was the first to recognize the European species *Succinella oblonga* (Draparnaud, 1891), *Carychium minimum* Müller, 1774, and *Cecilioides acicula* (Müller, 1774) in Canada (Forsyth *et al.* 2008; Grimm *et al.* 2010). And he did identify (apparently correctly) *Patera pennsylvanica* (Green, 1827), a rare species found only twice in southwestern Ontario.

Figure 2. *Oreohelix subrudis* is one of two or three species of mountainsnails, family Oreohelicidae, that occur in British Columbia, Alberta, and peripherally in Saskatchewan. The photograph was taken in the Flathead Valley of southeastern British Columbia.

Work continues compiling and verifying where possible literature records and problem taxa. Currently, 22 species are excluded due to wrong identifications or the absence evidence (specimens and documentation) supporting their presence in Canada. About 210 species remain, but at least 23 of these require further confirmation.

Acknowledgements

I thank Dr Jean Marc Gagnon, Chief Collections Manager, Invertebrate Collections, Canadian Museum of Nature (CMN), Gatineau, Quebec, for supporting this work by allowing access to the molluscs collection under his care. I am most grateful to the Malacological Society of London for its financial support that allowed for travel to the CMN.

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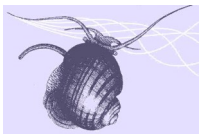
COURSES

FRIDAY HARBOR LABORATORIES ACCEPT APPLICATIONS FOR COURSES IN SUMMER AND AUTUMN 2013

Credits are earned through University of Washington but students come to Friday Harbor Labs from all over the world. Students may apply for financial assistance from Friday Harbor Labs.
Contact — **Stacy Markman fhladmin@uw.edu**
http://www/depts.washington.edu/fhl/studentInfo2013.html

GRANTS & AWARDS

JUNE 30 2013



MALACOLOGICAL SOCIETY OF LONDON TRAVEL AWARDS & RESEARCH AWARDS

Contact—Dr Suzanne Williams,
Natural History Museum, Cromwell Rd., London. SW7 5BD
s.williams@nhm.ac.uk

DECEMBER 15 2013

MALACOLOGICAL SOCIETY OF LONDON TRAVEL AWARDS

Contact—Dr Suzanne Williams,
Natural History Museum, Cromwell Rd., London. SW7 5BD
s.williams@nhm.ac.uk

FORTHCOMING MEETINGS

JULY 2–14 2013

Terrestrial Mollusks of the Southern Appalachians

with Amy Van Devender & Wayne Van Devender (Appalachian State University)
The southern Appalachian region is a biodiversity hotspot for land snails and slugs. This course concentrates on morphology, systematics, ecology and biogeography. Following introductory lectures introducing students to terminology and common species, most days will be devoted to field trips and learning collection techniques. Identification workshops will occur in the evenings. Those with personal collections are encouraged to bring unusual or problematic species to share with the class.
Contact - www.highlandsbiological.org

JULY 21-28 2013

18th Unitas Malacologica / 6th World Congress of Malacology

University of the Azores, Ponta Delgada, Sao Miguel.

Contributing societies – Malacological Society of London, Sociedad Espanola de Malacologia, American Malacological Society.
There will be thematic symposia, open contributed papers and a poster session; posters will remain on display during the congress. As in previous congresses, only one oral and one poster per presenting author will be allowed.

End of abstract submission: 31st May 2013
Contact Dr Sandra Monteiro, Departamento de Biologia da Universidade dos Açores, 9501-801 Ponta Delgada, Açores, Portugal
Website - www.wcm2013.com

Registration and fees (1)	Before 30 April (€)	After 30 April (€)
Full registration, UM-members or members of affiliated society in good standing	220	270
Full registration, non-UM-members	280	330
Student, UM-member or member of affiliated society in good standing (2)	110	150
Student, non-UM-member (2)	150	200

The following symposia are planned:

- "Living in the extreme: molluscan communities of chemosynthetic habitats"–
- "Tempo and mode in land snail evolution: the origins and limits of diversity"-
- "Molecular phylogenetics and paleontology"-
- "Biodiversity and evolution of pulmonate taxa" -
- "Who are the 'Aculifera'?"
- "How did they get here?: (Palaeo)Biogeography of marine molluscs"
- "There's something about Opisthobranchia"
- "Gains and Losses of Freshwater Bivalves and their consequences for ecosystems"
- "Mudflat mollusks"
- "Climate Change and Molluscan Ecophysiology"
- "Invasive mollusks"
- "Colour in Molluscs"
- The role of cephalopods in the world's oceans: a symposium in honor of Malcolm Clarke
- Taxonomy and ecology of freshwater mollusks in the molecular age

The Malacological Society of London

Species delimitation and chirality: molluscs as model organisms

&

MALACOLOGICAL SOCIETY OF LONDON AGM

17 April 2013

Provisional Programme

1.30-2.00pm Malacological Society of London AGM
2.00-3.00pm Nico Puillandre: 'Large scale species delimitation method for hyperdiverse group'
3.00-3.30pm coffee & tea
3.30-4.30pm Menno Schilthuizen: "Through the looking glass: mirror images in animal form"
4.30-5.30pm wine and discussion

Contact details

The symposium is open to non-members.
Registration is free, but please email the organizer, Suzanne Williams (s.williams@nhm.ac.uk) to advise that you will attend the meeting.

Dr Suzanne Williams
Zoology Dept
Natural History Museum
Cromwell Rd
London SW7 5BD
United Kingdom
Tel: + 44 (0) 207 942 5351 (office) 5774 (lab)
Fax: +44 (0) 207 942 5867

JUNE 23 - 26 2013.

First announcement for the 46th Annual Meeting of the Western Society of Malacologists
Held at the Courtyard by Marriott in San Diego:
8651 Spectrum Center Blvd.
San Diego, CA 92123
http://www.marriott.com/hotels/travel/sancy-courtyard-san-diego-central/
Further information, registration opportunities and schedule
Contact—http://biology.fullerton.edu/wsm/

SEPT 7—11 2014

EUROMAL 2014 European Conference of Malacology
Organisation for this meeting is led by Dr David Aldridge on behalf of the Malacological Society of London. It will take place at St Catharine's College, University of Cambridge 130 rooms have been reserved comprising approximately 50 en-suite and 80 standard. There should eventually be a conference portal on the College website for room bookings. There are no double rooms, so those bringing partners will need to find alternative places to stay. There will be provision for about 60 posters, which could be permanently in place

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 Malacologist*, the 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 (R.COOK@KINGSTON.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

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 Richard Cook, School of Life Sciences, Kingston University, Penrhyn Road, Kingston-upon-Thames, Surrey KT1 2EE, U.K.

Society 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 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.

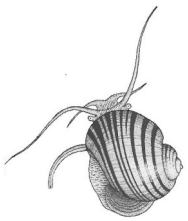
Applications

Applications for Research Awards and Travel Grants should be sent by post, not email, to the **Honorary Awards Secretary,** Dr Suzanne Williams, Natural History Museum, Cromwell Rd., London. SW7 5BD
Enquiries may be made by post, or by email to s.williams@nhm.ac.uk

AGM

THE MALACOLOGICAL SOCIETY OF LONDON

Registered Charity No. 275980



17 April 2013

The 120th Annual General Meeting of The Malacological Society of London will take place at 1300 in the Flett lecture theatre of the Natural History Museum during the lunch break of The Society's meeting on *Species delimitation and chirality: molluscs as model organisms*

Agenda for AGM

1. Apologies for absence
2. Minutes of the last (119th) AGM
3. Matters arising
4. Financial report, including approval of Auditors
5. Annual report of Council (delivered by the President)
6. Awards
7. Election of Council

	CURRENT	**PROPOSED**
	2012-13	**2013-14**
President	Tony Walker	Tony Walker
Ex-officio	Mark Davies	
Vice Presidents	David Aldridge	Fred Naggs
	Simon Cragg	Simon Cragg
Councillors	Fred Naggs	Mark Davies
	Liz Platts	David Aldridge
	Richard Preece	Vacant
	Robert Cameron	Robert Cameron
	Jon Ablett	Jon Ablett
	John Grahame	John Grahame
Hon. Secretary	Tom White	Tom White
Hon. Treasurer	Katrin Linse	Katrin Linse
Membership Secretary	Richard Cook	Richard Cook
Journal Editor	David Reid	David Reid
The Malacologist Editor	Georges Dussart	Georges Dussart
Awards Officer	Suzanne Williams	Suzanne Williams
Web manager	Tom White	Tom White
Archivist	Bill Bailey	Bill Bailey
Co-opt 1		Liz Platts
Co-opt 2		Richard Preece