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from the ...

## Molluscan Forum 2014



Flett Theatre  
Natural History Museum, London  
20th November 2014



ORGANISED BY:  
THE MALACOLOGICAL SOCIETY OF LONDON  
NATURAL HISTORY MUSEUM, LONDON



EDITORIAL

Because the Molluscan Forum in November produced so much material for this issue, the abstracts from the Cambridge meeting of the European Malacological Societies are reserved for the August issue of The Malacologist. Unusually, for reasons of serendipity, two speakers at the Molluscan Forum fell outside the usual remit for Molluscan Forum speakers, namely early-career presenters. These exceptions comprised Stephen Atwood who was on a visit from China, and David Kipling who is an amateur diver with a malacological interest. Both presented fascinating talks which sat comfortably in the relaxed ambience of the Forum.

As usual, an eclectic range of subjects was presented with verve and assurance. The standard of presentation of oral and poster contributions was high, with many of these young presenters giving the impression that they has been teaching for years. I believe the standard of presentation has increased enormously since my young malacological days, and not just because of the improved visual aids available for both oral and poster presentations. In a break from the past, speakers now seem to recognise to a much greater degree the need to gain the enthusiastic attention of the audience. There is also a commendable attention to the need for precise time-keeping. I remember one international conference some years ago where the keynote speaker went on so long that some members of the audience were playing cards. Speaking personally, the Molluscan Forum is a highlight in my calendar and 2014 did not disappoint.

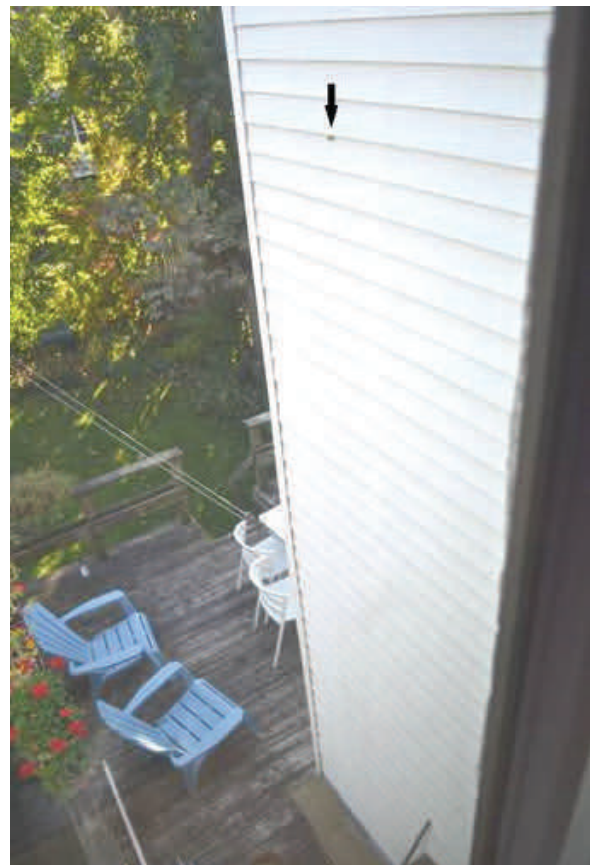
See the picture below. I hope Ronald Chase will keep us updated on progress.

Prof. Georges Dussart  
Canterbury Christ Church University  
North Holmes Rd.,  
Canterbury  
Kent CT1 1QU  
U.K.

**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 3<sup>rd</sup> Edition (1985), edited by W.D. Ride *et al.*].



“Are we nearly there yet?”  
“Where?”  
“At a point where molluscs are sexy!”



“Snails usually climb up when they encounter a vertical surface, but this poor fellow is going to have a hell of a time getting back down.”

Ronald Chase  
Professor Emeritus  
McGill University  
Montreal, Québec, Canada



# Molluscan Forum 2014

Natural History Museum, London

20 November 2014

## ORAL PRESENTATIONS

### Schedule

09.45 - 10.30 Registration & coffee

10.30 - 13.00 **Session I: Phylogeny & Geography**

10.30 Prof. Tony Walker (President): Welcome and introduction to the day

10.40 Stephen Attwood: The Triculinae: a remarkable freshwater snail biodiversity - remarkably neglected

11.10 Vinicius Padula: do you believe in colour? Cases of cryptic diversity in Atlantic sea slugs (Gastropoda: Heterobranchia)

11.30 - 11.50 Coffee & poster viewing

11.50 Chris Hughes: Where bivalves bite back: trophic shifts in the deep sea

12.10 Ludmila Sromek: Phylogeographic pattern in the cockle *Cerastoderma glaucum* across Europe, new insight from epic marker and multivariate analysis

12.30 Martin Hughes: The disparity of Palaeozoic bivalves

12.50 Prof. Tony Walker: Announcements, Arrangements and Awards etc.

13.00 - 14.00 Lunch break

14.00 - 15.20 **Session II: Ecology & Behaviour**

14.00 Yumi Nakadera: Multiple mating in natural populations of the simultaneous hermaphrodite, *Lymnaea stagnalis* (Gastropoda: Lymnaeidae)

14.20 Beatriz Alvarez: Adaptive benefits of Pavlovian conditioning of feeding behaviour in the garden snail (*Cornu aspersum*)

14.40 William J. Foster: Palaeoecology of mollusc communities in the wake of the Late Permian mass extinction event

15.00 Professor David Kipling: The role of volunteer divers in nudibranch recording

15.20 - 15.40 Tea break & poster viewing

15.40 - 17.00 **Session III: Biology & Physiology**

15.40 Lauren Sumner-Rooney: The evolution of eye reduction: lessons from a family of deep-sea gastropods

16.00 Jamie Bojko: Mapping the pathogen profile of the rough periwinkle, *Littorina saxatilis*, on Robin Hood's Bay (UK)

16.20 Thomas Neil: Wake structure in scallops during jet propulsion swimming

16.40 Laura Bentley: Optimised predation on unionid bivalves and the impact of a zebra mussel infestation

17.00 Prof. Tony Walker: closing remarks.

17.10 - 18.30 Wine social & final poster viewing

## POSTERS

KIMBERLY BERGLOF: The incidental predator - nudibranchs are trophic parasites of host hydroid

FRANZISKA S. BERGMEIER: Comparative 3D-microanatomy of mesopsammic Meiomeniidae (Pholidoskepia, Solenogastres)

AMY GARBETT: Diversity and Resolution: The Impact of Taxonomic Rank of Measuring Species Diversity in the Present and Deep Time

CHRISTOPHER HOBBS: The Ecology, Life Cycle, Population Genetics, and Habitat of the Shining Ramshorn Snail, *Segmentina nitida*

RYAN HWANG: Population of *Lamprotula coreana* endemic to South Korea

SHANNON O'GERAN: The Effects of Reef Health on the Abundance and Diversity of Nudibranchs Species in the Wakatobi National Park.

CLAUDIA SLEVIN: Wood treated with Furfurylated Alcohol inhibits attack by Marine wood borers

ALICE WALKER: Using micro-CT to reconstruct land snail soft tissue anatomy



# Molluscan Forum 2014

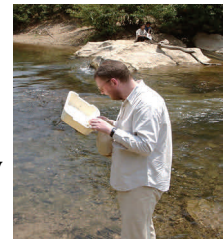
Organised for the  
**Malacological Society of London**  
 and the  
**Natural History Museum, London**  
 by  
**Dr Jonathan Ablett**, Natural History Museum  
 &  
**Professor Tony Walker**, Kingston University  
 (email: [tony.walker@kingston.ac.uk](mailto:tony.walker@kingston.ac.uk))



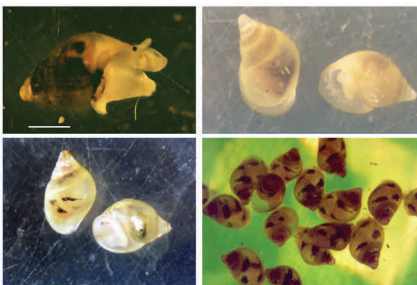
## The Triculinae: remarkable freshwater snail biodiversity - remarkably neglected

Stephen Attwood

State Key Laboratory for Biotherapy, Sichuan, China PR  
 Email: [swahuaxi@yahoo.com](mailto:swahuaxi@yahoo.com)



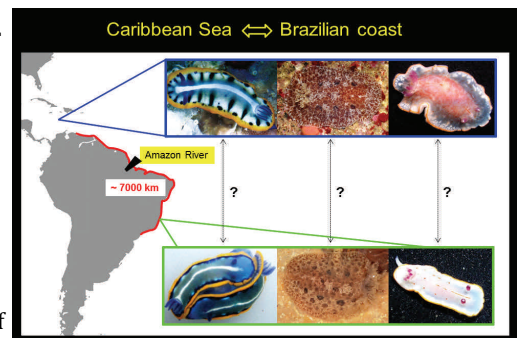
Based on 20 years experience of work on the Triculinae (Gastropoda: Pomatiopsidae), their biodiversity is outlined, to discuss how this biodiversity arose and to highlight the urgent need for research and intervention to protect this fascinating molluscan radiation. The story of this remarkable sub-family of tiny freshwater snails is told with reference to a lifelong programme of field, molecular systematic and taxonomic work aimed at understanding this amazing fauna. The Triculinae have a mainly southeast Asian distribution which includes over 90 species occurring along a 300 km stretch of the lower Mekong river in Thailand, Laos and Cambodia. Radiations of Triculinae also occur in Yunnan/Sichuan (Southwest china), 11 species; and Hunan (Southeast china), 13 species. As a single sub-family, the biodiversity of the Triculinae may exceed that of any other endemic freshwater molluscan fauna. Most of the chinese species, and some of those from Thailand and Laos are restricted to the clear, well oxygenated, alkaline primary streams of karst springs or to seepages on karst cliff-faces. All have poor dispersal capabilities. Most known species are potentially classifiable as vulnerable to critically endangered and 4 species can no longer be found; however, only one species is listed by the IUCN. In addition, the planned dam at Don Sahong (Laos) lies directly in the centre of Mekong river biodiversity. Many potential habitats for Triculinae are predicted in unsurveyed (inaccessible) regions of Yunnan, Guangxi, Sichuan and Laos and this makes the true biodiversity of the group uncertain. Most Triculinae are less than 3 mm long and few researchers are trained in their identification. There is considerable taxonomic confusion and this again hampers biodiversity assessment. Triculine snails do not breed outside their natural habitat; this, coupled with their intolerance to disturbance and low vagility make them a particular conservation challenge.



## Do you believe in colour? Cases of cryptic diversity in Atlantic sea slugs (Gastropoda: Heterobranchia)

Vinicius Padula & Michael Schrödl  
 SNSB-Zoologische Staatssammlung München/Department Biology II  
 Geobio-center, Ludwig-Maximilians-Universität, Munich, Germany  
 Email: [viniciuspadula@yahoo.com](mailto:viniciuspadula@yahoo.com)

When identifying a sea slug, especially a nudibranch species, the shape of the body and its colour pattern are the first and the main characters considered. Internal anatomy, especially the examination of the radula and reproductive system, complements traditional taxonomic study. One of the main difficulties, however is the interpretation of colour pattern differences among similar specimens. Do they represent intraspecific variation or interspecific differences? Can a nudibranch species be highly variable in colour? What is the significance of colour in the taxonomy of sea slugs? Based on potential cases of complexes of species including Atlantic representatives, we conducted an integrative study using multi-locus markers for phylogenetic and other species delimitation approaches. Molecular results are compared with specimen morphology and body colour pattern. Although the colour pattern can be a good character for species separation in some cases, our results indicate it can be less reliable in sea slug taxonomy than previously thought. A single chromatic species can be highly variable in colour. On the other hand, identical or similar patterns may be present in different species. This study points to the need to reinterpret the value of colour as an informative character and reinforce the importance of the search for additional characters in sea slug taxonomy.



## Where bivalves bite back: trophic shifts in the deep sea

Chris Hughes<sup>1,2</sup>

<sup>1</sup>Department of Life Science, Natural History Museum, London, UK

<sup>2</sup>Department of Biology, Imperial College London, London, UK

Email: c.hughes@nhm.ac.uk

The Anomalodesmata are a highly diverse group of bivalves that have radiated successfully in the deep sea. Their move into this environment is thought to coincide with a shift from filter-feeding or deposit feeding to active carnivory. This study looked at whether carnivory has evolved once or repeatedly in the anomalodesmatans by using mitochondrial genomes and nuclear genes. I carried out shotgun sequencing of genomic DNA using an Illumina MiSeq to obtain complete or nearly complete mitochondrial genomes for ten species. The mitochondrial protein coding genes were used in combination with three nuclear genes (18S, 28S and Histone H3) to produce robust phylogenies. These phylogenies were used to improve our understanding of the internal relationships of the Anomalodesmata and the evolution of trophic shifts. Innovative techniques were used to determine trophic level using stable isotopes and these, along with reports based on literature, were considered in a phylogenetic framework. The results of the stable isotope analysis and the nuclear gene phylogenies suggest that carnivory has evolved on more than one occasion within the Anomalodesmata. This study showed that mitochondrial genes alone were not able to resolve deep relationships within Anomalodesmata. However, by using amino acids or concatenating with amino acids the trees produced better reflected the relationships expected based on previous studies. This study has enabled us to shed light on important topics, which increase our understanding of the evolutionary pressures affecting not just bivalves but other major orders.



## Phylogeographic pattern in the cockle *Cerastoderma glaucum* across Europe – new insight from EPIC marker and multivariate analysis

Ludmila Sromek<sup>1,2</sup>, Didier Forcioli<sup>2</sup>, Rafał Lasota<sup>1</sup>, Paola Furla<sup>2</sup>, Katarzyna Tarnowska<sup>3</sup>, Maciej Wołowicz<sup>1</sup> & Anne Chenuil<sup>4</sup>

<sup>1</sup>Laboratory of Estuarine Ecology, Institute of Oceanography, University of Gdansk, Gdynia, Poland

<sup>2</sup>Equipe Symbiose marine, UMR 7138 Systématique Adaptation Évolution, Université Nice-Sophia-Antipolis, Nice, France

<sup>3</sup>Labex OT-Med, Europôle Méditerranéen de l'Arbois, Aix-en-Provence, France

<sup>4</sup>Institut Méditerranéen de Biodiversité et d'Écologie marine et continentale (IMBE) – CNRS – IRD – UAPV, Aix-Marseille Université, Marseille, France

Email: ludmila.sromek@unice.fr

The lagoon cockle *Cerastoderma glaucum* inhabits sea bottom habitat across Europe from the Atlantic coast of Norway to the Caspian Sea. The distribution of *C. glaucum* is strongly fragmented and usually restricted to isolated, shallow, non-tidal lagoons. A high level of genetic structuring was found in the European populations of this species based on COI mtDNA sequences, as well as allozymic and microsatellite markers but the strengths and geographic locations of the major divisions differed according to the marker used. In the present study we analysed the diversity of a new, potentially universal EPIC (Exon Primed Intron Crossing) marker (i34) for 13 *C. glaucum* populations. The discovery of a diagnostic allele for the Ponto-Caspian and Aegean Sea region implies a long-term isolation of the Eastern Mediterranean populations and confirmed the hypothesis that the eastern and western Mediterranean evolutionary units of *C. glaucum* deserve a species or subspecies status. Multivariate analysis of these new data together with previously published results revealed a genetic structure consistent with a stepping-stone model, following a geographical gradient, with some spatial clustering within each basin. A PCA analysis grouped together populations from the Mediterranean Sea against the others and separated populations from the Ionian Sea and Ponto-Caspian region; it also distinguished the different character of the Baltic Sea populations. Some non-congruent patterns among nuclear loci have been detected, which may reflect either differential introgression along the genome at the hypothetical contact zone, or local adaptation.



*Cerastoderma glaucum*  
Azerbaijan, Baki, 100 km N of Baku  
NMR 33030. Common size 30 mm



### The disparity of Palaeozoic bivalves

Martin Hughes<sup>1</sup>, Matthew Wills<sup>2</sup>, and Joseph G. Carter<sup>3</sup>

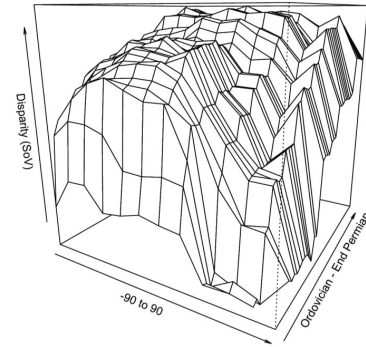
<sup>1</sup>Department of Zoology, Natural History Museum, London, UK

<sup>2</sup>Department of Biology, University of Bath, Bath, UK

<sup>3</sup>Department of Geological Sciences, University of North Carolina, North Carolina, USA

Email: martin.hughes@nhm.ac.uk

With a fossil record spanning the Phanerozoic, bivalves have, in combination with other taxa or in isolation, been valuable in identifying changes in Phanerozoic diversity and used to address issues of macroevolution including latitudinal trends. Despite their usefulness, there are still big gaps in our knowledge. The majority of estimates of bivalve diversity have only looked at the taxonomic aspect. Little is known of how bivalve morphological variation (disparity) has changed with time, especially during the Palaeozoic. This Era posed many challenges for bivalves to overcome, shifting continents, changes in climate, sea level, changes in faunal composition and mass extinctions, all the while continuing to grow in taxonomic diversity. I present data on how bivalve morphological variation (disparity) changed across this period, how this compares with the diversity at that time and what role latitude had to play



### Multiple mating in natural populations of the simultaneous hermaphrodite, *Lymnaea stagnalis* (Gastropoda: Lymnaeidae)

Yumi Nakadera, Janine Mariën, Nico van Straalen & Joris Koene

Section of Animal Ecology, Department of Ecological Science, Faculty of Earth and Life Sciences, VU University Amsterdam, the Netherlands

Email: yumi.dera@gmail.com

How many times do snails mate in the wild? It is an essential question, for example, to investigate the strength of sexual selection. If they mate only once, the opportunity for sexual selection is quite limited. In addition, given the ability of selfing in simultaneous hermaphrodites, copulation may not be necessary at all to reproduce. In contrast, if they mate multiply, they compete against each other for successful reproduction via mate choice, sperm competition and so forth. Thus, in the latter case, mating frequency is a basic and important parameter for further understanding of sexual selection, but understandably, the direct observation of copulation events in natural populations is practically limited. Alternatively, one can estimate mating frequency using genetic variation of siblings, i.e., multiple paternity. Multiple paternity has been quantified in various vertebrates, but only in a few internally fertilizing hermaphrodites. Here, we examined the degree of multiple paternity in natural populations of the great pond snail *Lymnaea stagnalis*. We collected wild snails in several localities in the Netherlands, and allowed them to lay egg masses in the laboratory. Based on genotypic variation of siblings and mothers, the minimum number of fathers within clutch was estimated. In our results, (1) we did not find any self-fertilised offspring, implying extensive outcrossing, (2) we show that this snail species exhibits moderate multiple mating, copulating 1-3 times at least, and (3) we report that the degree of multiple mating positively correlates with density. Our results indicate the potential for sexual selection in natural populations of this species, and the central role of mate availability and sperm competition.



### Adaptive benefits of Pavlovian conditioning when it comes to feeding behaviour in the garden snail (*Cornu aspersum*)

Beatriz Alvarez<sup>1</sup>, Ignacio Loy<sup>1</sup>, and Karen Hollis<sup>2</sup>

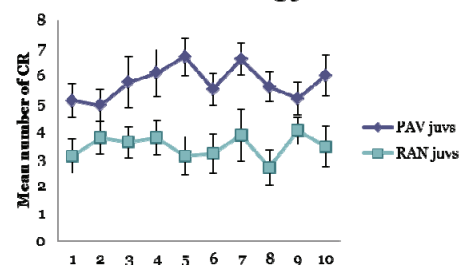
<sup>1</sup>Departamento de Psicología, Universidad de Oviedo, Oviedo, Spain

<sup>2</sup>Department of Psychology and Education, Mount Holyoke College, South Hadley, Massachusetts, USA

email: alvarezbeatriz@hotmail.com

Snails have already been shown to be able to learn by means of associative learning. In the procedure used in our lab, an odour cue (conditioned stimulus) is paired with access to food (unconditioned stimulus), which results in an increase in the number of tentacle lowering responses (conditioned response). Learning associations between stimuli that are biologically relevant has been shown to promote benefits for the animals in terms of biological function in aspects such as reproductive efficacy or growth. In the present work we examined how learning can provide an advantage to snails in the biological function of growth. In the first experiment we show that juveniles (1-5 g of weight) that learn to anticipate the arrival of food by means of conditioning show a better use of the limited time for food ingestion, which ultimately translates into a lower loss of weight compared to the control group. In young adults (5-10 g), however, we did not obtain the same results. In a third and fourth experiments, we increased the amount of time allowed for food consumption, finding similar results. Evidence of improvement on the biological function and hence, fitness, due to learning can contribute to a broader understanding of the role that psychological aspects may play in the process of evolution. Furthermore, it may have practical implications for snail farming.

### Tentacle lowering juveniles







**The role of volunteer divers in nudibranch recording**

Professor David Kipling<sup>1,2</sup>

<sup>1</sup>School of Medicine, Cardiff University, Cardiff, UK

<sup>2</sup>Trustee, Marine Conservation Society, Ross-on-Wye, Email: KiplingD@cardiff.ac.uk

Many recreational divers view sea slugs as “charismatic” species. They are often brightly coloured, and come in a wide range of interesting shapes and morphologies that are not seen for their terrestrial equivalents exposed to the force of gravity in air. Being small and slow moving, nudibranchs also make ideal photographic subjects. Indeed, it is digital photography that has made the biggest change to nudibranch recording in the last decade, with the widespread use of housed compact digital cameras. For many of us, identification of many species is done after the dive, based on the photos, thus maximising time on the

dive for locating specimens to record. These digital “specimens” play a number of roles. They can act as an “underwater microscope”, allowing one to zoom in on details that would be impossible to see by eye when diving. They also allow sharing, with an immediacy and reach that film-based photography never allowed. In this presentation I describe the recording of UK nudibranchs via the Marine Conservation Society Seasearch scheme. This predominantly volunteer diver-based sub-littoral recording scheme is the largest single contribution to the nudibranch records on NBN, with over 8,000 records (41% of the total) covering 90 different nudibranch species, a figure that is just less than the total for the UK. In addition to exploring what species are being recorded (and why), I also explore the use of underwater digital photography and in particular the ability of social media to provide a new community based routes for experts and amateurs alike to “crowd source” their identifications. I illustrate this with examples of several nudibranch species recorded in the UK for the first time in recent years, where the input of overseas experts via social media was a key part of identifying these range extensions into UK waters.



**The evolution of eye reduction: lessons from a family of deep-sea gastropods**

Lauren Sumner-Rooney<sup>1</sup>, Julia Sigwart<sup>1</sup> & Suzanne Williams<sup>2</sup>

<sup>1</sup>School of Biological Sciences, Queen’s University Belfast, UK

<sup>2</sup>Department of Zoology, Natural History Museum, London, UK Email: lsumnerrooney01@qub.ac.uk

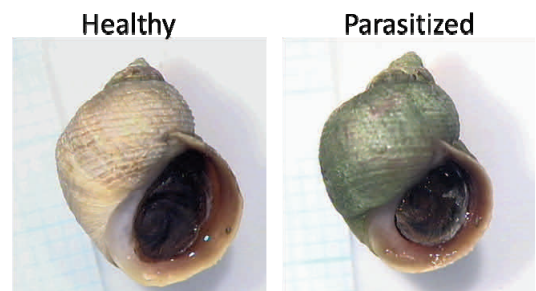
The family Solariellidae comprise marine trochoid gastropods found from the shore to more than 2,000m depth in seas around the world. The phylogeny of this clade is well known and loss of eye pigmentation appears in several deep-sea species, scattered throughout the family. Eye loss or reduction is known in many trogloditic, fossorial and deep-sea animals but there is no clear consensus on its evolutionary mechanism. We examined gross eye-morphology of 30 species throughout the family from preserved specimens and selected representative types. In nine of these species, we then studied the ocular microanatomy across their taxonomic and ecological range in order to compare the nature and extent of eye reduction. Using three dimensional tomographic reconstruction from semi-thin serial sections, we have described both the eyes and their context within the anterior nervous system. Importantly, we have identified multiple distinctive anatomical forms of eye reduction. These are variable not only within the family, but two different forms can occur in an individual genus. In some cases, retinal pigmentation is lost, and in some the eye regresses into the eye stalk and becomes covered by epithelial tissue. In all specimens examined, the optic nerve is intact and connects the epithelium in the eye region to the central nervous system, though it may be in an early state of atrophy in the connection between the cerebral ganglion and the proximal end of the optic nerve in some species. The nine species we have studied microscopically were drawn from five of the eight deep sea groups across five genera. Eye loss and reduction have occurred at least five times independently within Solariellidae. In some cases this is convergent. However, our results support a hypothesis that there are multiple possible anatomical paths to loss of vision.



**Mapping the pathogen profile of the rough periwinkle, Littorina saxatilis, on Robin Hood’s Bay (UK)**

Jamie Bojko & John Grahame  
Faculty of biological sciences, University of Leeds, Leeds, UK  
Email: bs09jb@leeds.ac.uk

The rough periwinkle, *Littorina saxatilis*, is a well-studied species in the areas of evolution and speciation. By contrast, information about the future of *Littorina arcana* evolution is little researched. Genetic and morphological data have revealed that *L. saxatilis* populations are beginning to divide on several coastlines across the world, resulting in a ‘high-tide’ morphotype (H) and a ‘mid-tide’ morphotype (M).



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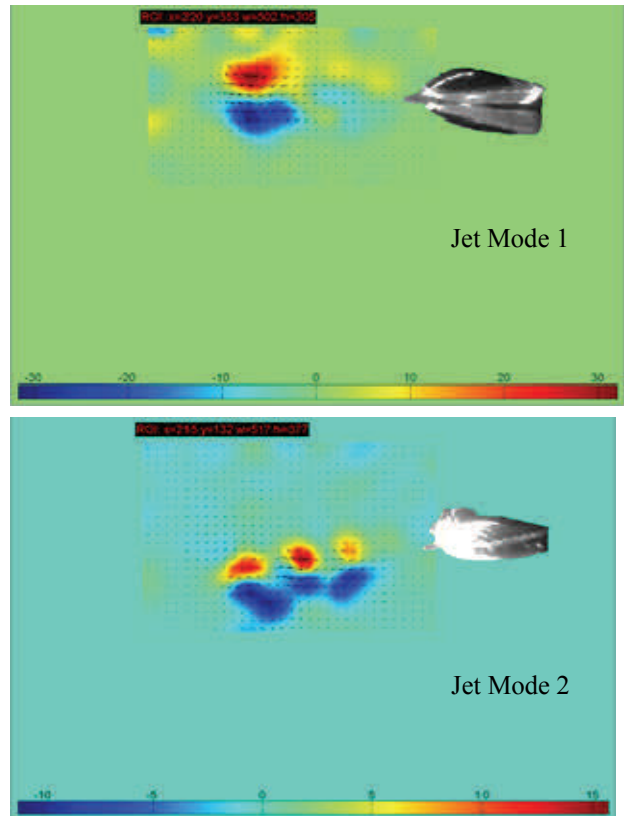
Morphological changes between these morphotypes include shell thickness and size distribution with genetic differences located in both mitochondrial and nuclear genomes. Information gleaned from this data set suggests that *L. arcana* are undergoing a similar set of habitat related polymorphisms as those seen in *L. saxatilis*. Selective factors influencing these changes have been suggested but are still under debate. Parasites known to infect *L. saxatilis* include a wide range of trematodes with few known microparasites: *Digyalum oweni* (Apicomplexa) and *Protophrya ovicola* (Ciliata). Debates are ongoing regarding the potential symbiotic nature of brood-pouch dwelling ciliates (*Protophrya ovicola*). The aspect of parasite-driven evolution as a reason for Littorina diversification has not yet been researched. Using histological screening techniques, this study has thus far identified that trematode parasites (*Renicola sp.*, *Microphallus pygmaeus* and *Microphallus similis*) and ciliates make up the pathogen profile of *Littorina sp.* (n=275) at Robin Hood's Bay (UK) with a single case of Apicomplexan infection noticed in the gut of *L. saxatilis*. The distribution of parasites throughout M and H morphs, the parasite species and life cycles and the consequence of parasite presence (size and shape effects) provide a useful addition to the ongoing debate on periwinkle evolution.



### Wake structure in scallops during jet propulsion swimming

Thomas Neil & Graham Askew  
 Faculty of Biological Sciences, University of Leeds, LS2 9JT, UK  
 Email: bs09tn@leeds.ac.uk

Scallops are bivalve molluscs that swim by jet propulsion. Contraction of their single adductor muscle closes their valves, compressing the mantle cavity and forcing water out of two jets located on the dorsal edge of the mantle. The effectiveness of their locomotion is determined by the proportion of muscular work performed by the muscle that is transferred into useful energy in the wake. Surprisingly little is known about the hydrodynamics of the jet structures produced during swimming. In this study the wake dynamics of queen scallop (*Aequipecten opercularis*) locomotion were quantified using particle image velocimetry during jet propulsion in tethered animals. Two distinct jet structures were observed which could be classified into two jet modes: jet mode 1, in which all the ejected fluid rolled up into an isolated vortex ring; and jet mode 2, where the leading vortex ring 'pinched off' from the jet and was followed by a trailing jet of ejected fluid. Thrust was found to be greater in jet mode 1, with a mean thrust of  $0.85 \text{ N} \pm 0.14$  compared with  $0.23 \text{ N} \pm 0.04$  for jet mode 2 jets. A non-dimensional time scale for vortex ring production was used to describe vortex structures, known as the 'formation number' (F). Scallops were shown to be able to produce isolated vortex rings at formation numbers ranging from 8–27, exceeding the previously suggested optimal conditions ( $F = 4$ ). The orifice area of the jet was shown to decrease in area by ~92% during the jet period. This suggests that scallops exploit variable mantle kinematics during swimming to produce vortex rings at formation numbers higher than would be possible with a constant jet orifice area. On-going free-swimming experiments will give an insight into the effects of co-flow on vortex ring formation and help determine the hydrodynamic efficiency of scallop swimming.



## Optimised predation on unionid bivalves and the impact of a zebra mussel infestation

Laura Bentley<sup>1,2</sup> & David Aldridge<sup>2</sup>

<sup>1</sup> St Catharine's College Undergraduate, University of Cambridge, Cambridge, UK

<sup>2</sup> Department of Zoology, University of Cambridge, Cambridge, UK

Email: [lb562@cam.ac.uk](mailto:lb562@cam.ac.uk)



Bivalves are a well-known as a source of prey for a variety of small mammals, and their presence in middens has been documented in both the US and Europe, including the UK. It is thought that brown rats (*Rattus norvegicus*) dive for the mussels, bringing them to the bank the shells are opened and subsequently accumulate. We hypothesise that such a behaviour, with a high handling time and energetic cost, would be subject to optimising selection with respect to both the size and species of unionid predated on, and we hypothesise that shell thickness will be a key variable in determining this selection. Roswell pits in Ely are partially owned by the Environment Agency. The unionid community there is dominated by *Unio pictorum* (UP) and *Anodonta anatina* (AA), but also contains *Unio tumidus* and *Anodonta cygnia*. The lakes are also home to a significant population of the invasive bivalve *Dreissena polymorpha*, the zebra mussel. All five species were found in the brown rat middens here. A comparison between the lake community and midden contents suggests a species selectivity in favour of AA, which we suggest is due to the thinner shells of AA relative to UP. In support of this hypothesis, the shells themselves show a characteristic break pattern which may be optimised with respect to shell thickness. This has implications for the level of predation we can anticipate for different endangered bivalve species. In addition to this, there is evidence that the presence of zebra mussels on the shells of unionids may increase their predation risk. Therefore, whilst zebra mussels are themselves being eaten by the brown rats in large numbers, potentially encouraging the spread of rats, there may also be an interaction between the presence of this invasive species and predation pressure, resulting in a greater threat of extinction for unionid species.



## POSTER PRESENTATIONS

### The incidental predator – nudibranchs are trophic parasites of host hydroids

Kimberly Berglof<sup>1</sup>, Fabio Badalamenti<sup>2</sup> & Trevor Willis<sup>1</sup>

<sup>1</sup>Institute of Marine Sciences, School of Biological Sciences, University of Portsmouth, Ferry Road, Portsmouth

<sup>2</sup>CNR-IAMC, via G. da Verrazzano 17, 91014 Castellammare del Golfo (TP), Italy

Email: [kimberly.berglof@myport.ac.uk](mailto:kimberly.berglof@myport.ac.uk)

The Mediterranean nudibranch *Cratena peregrina* feeds on polyps of the hydroid *Eudendrium racemosum* but the dynamics of the relationship between this obligate predator and its prey are unclear. How does the nudibranch avoid denuding its host hydroid colony of polyps, and thus eliminate its own food supply? Analysis of stable isotopes showed that the two species have similar  $\delta^{15}\text{N}$  values, indicating that they are on the same trophic level. A series of experiments were carried out to test nudibranch preference for hydroids fed with *Artemia* brine shrimp versus unfed colonies, and whether nudibranch feeding rate differed when presented with hydroids that had captured prey versus starved hydroids. Nudibranchs were generally more attracted to hydroids that had recently fed. The feeding rate, measured by polyp consumption  $\text{min}^{-1}$ , was higher when the hydroid had recently fed compared to if it had been starved in the laboratory for >12 hours. These data indicate that *C. peregrina* is not a predator of *E. racemosum* itself but is a trophic parasite, effectively utilising the hydroid colony to facilitate the collection of plankton. The polyps probably form a minor proportion of the nudibranch's calorific intake.



## Comparative 3D-microanatomy of mesopsammic Meiomeniidae (Pholidoskepia, Solenogastres)

Franziska Bergmeier<sup>1</sup>, Gerhard Haszprunar<sup>1,2</sup> Christiane Todt<sup>3</sup> & Katharina Jörger<sup>1,2</sup>

<sup>1</sup>Department Biologie II, Ludwig-Maximilians-University, Munich, Germany

<sup>2</sup>SNSB-Bavarian State Collection of Zoology, Munich, Germany

<sup>3</sup>University Museum of Bergen, Bergen, Norway

Email: franziska.bergmeier@campus.lmu.de

Solenogastres (Neomeniomorpha) are a clade of aplacophoran, vermiform molluscs with global distribution. They inhabit the marine benthos ranging from the shallow subtidal down to bathyal and abyssal regions. Certain lineages have most likely independently colonized mesopsammic environments and form a locally common part of the interstitial meiofauna. Data on these minute worm-molluscs are scarce and original descriptions have been largely limited to hard parts (i.e., scleritome and radula), whereas their anatomical diversity is poorly explored. We herein compare the microanatomy of three out of four valid species of the entirely mesopsammic Meiomeniidae Salvini-Plawen, 1985 (*Pholidoskepia*) from Bermuda, for a better understanding of the diversity of this unique clade and to possibly mine for new taxonomic characters. All major organ systems of representatives from both genera (*Meiomenia* and *Meioherpia*) were reconstructed 3-dimensionally based on semi-thin histological section series and we additionally carried out ultrastructural analyses of selected structures. The comparative microanatomy showed, for most parts, morphological uniformity and is largely in concordance with the general bauplan of Solenogastres: their tetra-neural nervous system is comprised of fused cerebral ganglia, pedal, buccal and lateral ganglia. Remarkable are the large amounts of precerebral 'accessory ganglia', and the 'pedal commissural sac' – a putative sensory organ. The reproductive system deviated from the general solenogastren gonopericardial system by the lack of a pericard, and the gametes exiting the gonads through separate gonoducts into the pallial cavity. Lacking a pericard, the site of ultrafiltration in Meiomeniids needs to be investigated by further ultrastructural studies. We found a novel distinguishing feature between the two reconstructed specimens, that is a bi-lobed vs. sack-like pallial cavity. However, its value as a diagnostic feature needs to be further evaluated. Using scleritome and radula characters, meiomeniids cannot reliably be discriminated, and their co-occurrence makes a taxonomic assignment of new material difficult. Hopefully, additional character sets (e.g., barcoding markers) will allow new material to be linked to the respective type material in the future. (Modified from a congress contribution to the 3rd International Conference on Invertebrate Morphology (ICIM3), 3rd - 7th August 2014, Berlin, Germany)



## Diversity and Resolution: The Impact of Taxonomic Rank of Measuring Species Diversity in the Present and Deep Time

Amy Garbett & Julia Sigwart

Queen's University Belfast, Marine Laboratory, Portaferry, Northern Ireland.

Email: agarbett01@qub.ac.uk

Biodiversity is often measured by species richness; this is often impractical as true alpha taxon resolution is rarely available in living systems, and almost never in fossil assemblages. An alternative approach is to use higher taxon categories, such as genera or families, as a surrogate for species. Here the aim is to examine global patterns in taxonomic diversity using representative groups of molluscs and other hard-shelled marine invertebrates. The four selected orders represent molluscs and two other phyla: chitons (Neoloricata), ark clams (Arcoida), bryozoans (Cheilostomatida) and brittlestars (Ophiurida). Each of these groups represents a high degree of morphological consistency through geological time, survival over multiple past mass extinctions, and the persistence of species today in temperate and tropical seas. Based on complete records for currently accepted species and genera in the authoritative database of marine animal systematics (World Register of Marine Species - [www.marinespecies.org](http://www.marinespecies.org)), several obvious patterns emerge in the taxonomic distribution of species among genera and families. Not unexpectedly, the numbers of species per genus are not normally distributed, thus the arithmetic mean for species/genus ratio is an inappropriate measure of central tendency. (Average values for species per genus in a given taxonomic group have been used to infer larger patterns in diversity for many groups including living plants and fossil molluscs.) All groups we examined contain a large proportion of monospecific genera, with 31% of chitons and 25% of arcoid bivalves. The taxonomic dominance of monospecific genera does not reflect the ecological reality of a species sampled at random from a natural system. In reality, the probability of selecting a species is affected by its distribution, and many monospecific genera have limited distribution ranges. Hence we consider it more useful to investigate the probability distribution of the size of the parent genus for a randomly selected species. Examining genus to species ratios in a diverse sample of appropriate recent organisms can estimate the error introduced through taxonomic surrogacy, and will inform interpretation of biodiversity throughout geological time.





## Ecology, life cycle, population genetics and habitat of the Shining Ramshorn snail, *Segmentina nitida*

Christopher Hobbs, Chris Harvey & Phil Buckley

School of Human and Life sciences, Canterbury Christ Church University, Kent, UK  
Email: chris.hobbs@canterbury.ac.uk

*Segmentina nitida* is a small, rare, freshwater snail predominantly found in drainage ditches and marshland in the UK, continental Europe and Scandinavia. Over the last 50 years there has been rapid decline in this species and it is now included in the UK Biodiversity Action Plan (BAP), as well as being included in the IUCN Red book (as per pre-1994 guidelines). *S. nitida* is now highlighted as seriously vulnerable to extinction; however there is no clear action plan for its conservation. This project will use GIS to map the distribution of *S. nitida* and molecular techniques to develop and assess the impact of a comprehensive reintroduction programme for this priority species. The changes in habitat between current and historical sites will also be analysed to identify the conditions that have influenced the changes in distribution of *S. nitida*. Using population genetics, we aim to provide insight into the dispersal history of *S. nitida* across Europe and support reintroduction efforts by revealing potential impact on wild gene pools following reintroduction of laboratory-reared individuals. Comparisons will be made between samples from Sweden, Germany, Poland and the UK. Tracing the dispersal patterns of *S. nitida* via population genetics will help to predict the viability and suitability of reintroduction plans. This project also aims to set up a laboratory-based breeding programme to assess the optimal conditions for breeding and survivability, as well as observe the life cycle of *S. nitida* and compare it with the cycle in the wild.



## Population of *Lamprotula coreana* endemic to South Korea

Ryan Hwang

EF International Academy, Torbay Campus TQ1 3BG  
drshell@naver.com

*Lamprotula coreana* was once a common freshwater mussel in Han River of South Korea but since the 1950s when Japanese army over-fished it to produce buttons from its nacre plus the influence of urbanization near Han River, it had gone extinct there by 1980. As it was thought to be an endemic of Han River, it was listed as extinct nation-wide. In 1999 however some dead specimens were recovered from the nearby Kum River. Motivated by this discovery, a research team was organised to search Kum River for *L. coreana*, yielding three live specimens. No more were seen until 2008, when two more were found in surveys. The present study is a more thorough follow-up survey of the Kum River to assess the current situation of the *L. coreana* population. From the survey we conclude that the entire wild population consists of about 100~150 individuals, distributed in very limited areas. This strongly suggests that *L. coreana* is critically endangered in the wild. Although individuals are currently kept in NFRDI for propagation, this is proving to have little success. Therefore, immediate conservation effort in their natural habitat is necessary and crucial to prevent the extinction of this recently rediscovered population.

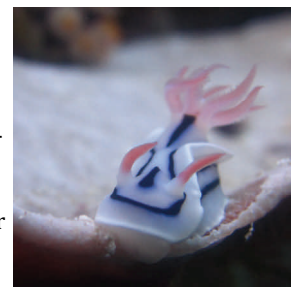


## The effects of reef health on the diversity and abundance of nudibranchs in the Wakatobi Marine Park

Shannon O'Geran & Simon Cragg

Institute of Marine Science, University of Portsmouth, Ferry Road, PO4 9LY

Nudibranchs, commonly known as sea slugs, are small gastropod molluscs, found in the order Nudibranchia, and are known for their beauty, with their external appearance varying greatly between genus and species. Data was collected on the reefs around Hoga Island in the Wakatobi Marine Park, lying southeast of the Indonesian island of Sulawesi. Habitat Assessment Scores were carried out at 3 sites around the island, Sampela, Pak Kasims and Buoy 3. The HAS scores revealed that Buoy 3 was the healthiest of the 3 reefs and Sampela the most degraded. 50m transects were laid out along the reef at depths of 3m and 9m and nudibranchs recorded. It was hypothesised that the healthier reefs would have a richer abundance and diversity of nudibranchs. When the data were collected it was clearly seen that not only did the healthier reefs have higher abundance of nudibranchs, but the diversity of species found was also greater than that of the degraded site. It was noted that there seemed to be a correlation between certain species of nudibranchs and the substrata they were found on. For example, *P. pustulosa* which was commonly found on or near sponge was also the most common nudibranch in Sampela which had a higher number of sponges than the other two sites.



## Wood treated with furfurylated alcohol inhibits attack by marine wood borers

Claudia Slevin, Simon Cragg & Tim Hebbes

School of Biological Science; Institute of Marine Sciences; Ferry Road, Portsmouth PO4 9LY

Email: claudia.slevin@port.ac.uk

Wooden structures in seawater are susceptible to attack from wood borers such as Teredinidae and Limnoriidae. Preservation with creosote or chromated copper arsenate has provided economically viable protection against borer attack, but recent legislation such as the EU directive (European Commission 2003), limits the use of such preservatives in the marine environment. Tropical hardwood species that display natural durability to borer attack often come from unsustainable sources and logging is therefore restricted. The aims of this project were to test the durability of two sustainable wood species treated with one of three chemical formulas. Both laboratory and field test conditions were used as laboratory trials are able to overcome many confounding factors that can often skew results of field based trials. Laboratory trials are also able to provide fast results under optimal conditions. Field trials provide a realistic comparison of results.



## Using micro-CT to reconstruct land snail soft tissue anatomy

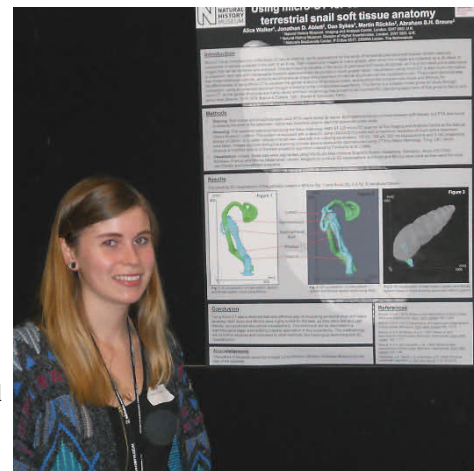
Alice Walker<sup>1</sup>, Jonathan Ablett<sup>2</sup>, Dan Sykes<sup>1</sup>, Martin Rücklin<sup>3</sup> & Abraham Breure<sup>3</sup>

<sup>1</sup> Natural History Museum, Imaging and Analysis Centre, London, SW7 5BD, U.K.

<sup>2</sup> Natural History Museum, Division of Higher Invertebrates, London, SW7 5BD, U.K.

<sup>3</sup> Naturalis Biodiversity Center, P.O.Box 9517, 2300RA Leiden, The Netherlands  
Email: alicewalker24@googlemail.com

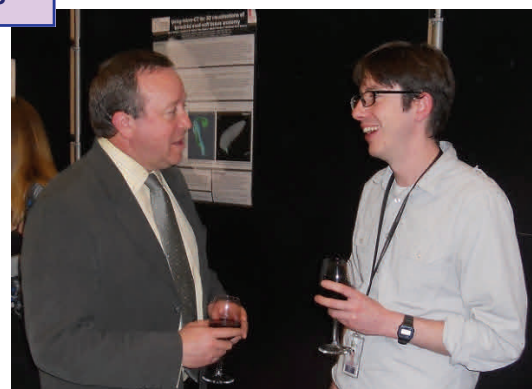
Traditional methods of studying internal structures of land snails are typically destructive, such as dissection and histological sectioning. Such techniques are unsuitable for type material, historical or rare museum specimens. Micro CT has been used as an alternative, non-destructive method for studying snail anatomy, and is especially useful for the examination of soft tissue structures such as the genitalia, as their proper shape and placement can be visualised *in situ*. The Orthalicoidae are a diverse superfamily of sub-hemispheric terrestrial gastropods, and are a suitable group for examination using micro-CT as the genital structures are highly varied and are important morphological characters for genus and family level placements. An undescribed specimen belonging to the Orthalicoidae, and thought to be from the genus *Satagembryon* was stained with the reversible stain iodine and scanned. Previous tests of the stain phosphotungstic acid (PTA) was also trialled but the shell of the specimen was found to partially dissolve and so this method has been discounted. Both VGStudioMax *Aviso* and *Mimics* were chosen as the software with which to proceed as they both produced more detailed results and were more time efficient than other packages. The resulting model represented the genital structures well, and was found to be a fast and effective method of visualising such soft tissue anatomical features. This methodology will be further explored and compared to other methods, such as histological staining and 3D reconstruction.



## Postscript pictures



William Foster (University of Plymouth) receives the Oxford prize from Society president Professor Tony Walker (right)



Past-president of the Society Professor Mark Davies (left) talking with Dr Jonathan Ablett, a key organiser of the Forum.

# Chemosymbiosis in methane-seep fossils from Japan

Edine Pape  
University of Leeds, UK

## Introduction

Modern molluscs, notably bathymodiolin, vesicomid, solemyid, lucinid and thyasirid bivalves can have an unusual nutritional strategy known as chemosymbiosis. These invertebrates live in symbiosis with chemosynthetic bacteria that use chemicals to obtain energy to produce food – either as sulphur-oxidizers (thiotrophy) or methane-oxidizers (methanotrophy). Chemosymbiosis allows bivalves to live in the inhospitable conditions of the deep sea, mainly at hydrothermal vents and methane seeps. Despite these important palaeo-ecological consequences, the origin and evolutionary history of chemosymbiosis is poorly understood. This is of particular importance for seeps over 50 million years old, which are not inhabited by bivalves with modern chemosymbiotic relatives, but have extinct bivalve groups and brachiopods as their dominant members. Ancient cold seeps provide well preserved fossils, but their suspected chemosymbiotic nature has thus far been extremely difficult to demonstrate.

To investigate the presence of chemosymbiosis through geological time, it is necessary to analyse the stable isotope values (carbon, sulphur and nitrogen) of small amounts of organic matter present in the shell. Biomineralizing organisms use these organic templates to guide the calcium carbonate minerals during shell formation. The shell-bound organic matter (SBOM) records the isotopic composition of the animal's diet, tracking their food sources and position the food chain, and allows chemosymbiosis to be identified in modern animals (O'Donnell *et al.*, 2003; Mae *et al.*, 2007; Dreier *et al.*, 2012). The grant awarded from the Malacological Society was used to enhance the suite of fossil material available for this research, by sampling fossil seep localities in Japan 0.5-15 million years in age, which are well known for their excellent preservation. In addition to studying the presence of chemosymbiosis in bivalves from this period, insights into the isotopic and molecular preservation of this material will also be very valuable for interpreting results from more ancient localities.

## Fieldwork in Japan

During the fieldwork conducted in April 2014, samples were collected from four fossil seep localities in Japan: the Miocene Izura seep (16.3/16.4 Ma, Uedo *et al.*, 2005), the Middle Pleistocene Kakinokidai seep (Shibasaki & Majima, 1997), the Late Pliocene Nakatsu seep (4.8-3.8 Ma, Futakami *et al.*, 2001) and the unpublished Kounandai seep from the Early Pleistocene, around 2 million years ago. The seeps are characterised by carbonates with extremely low <sup>13</sup>C values (for example the Izura seep in Fig.1), that confirm that the localities are chemosynthetic colonies dependent on methane. At many localities the articulated bivalves were preserved in life position, showing their excellent preservation.

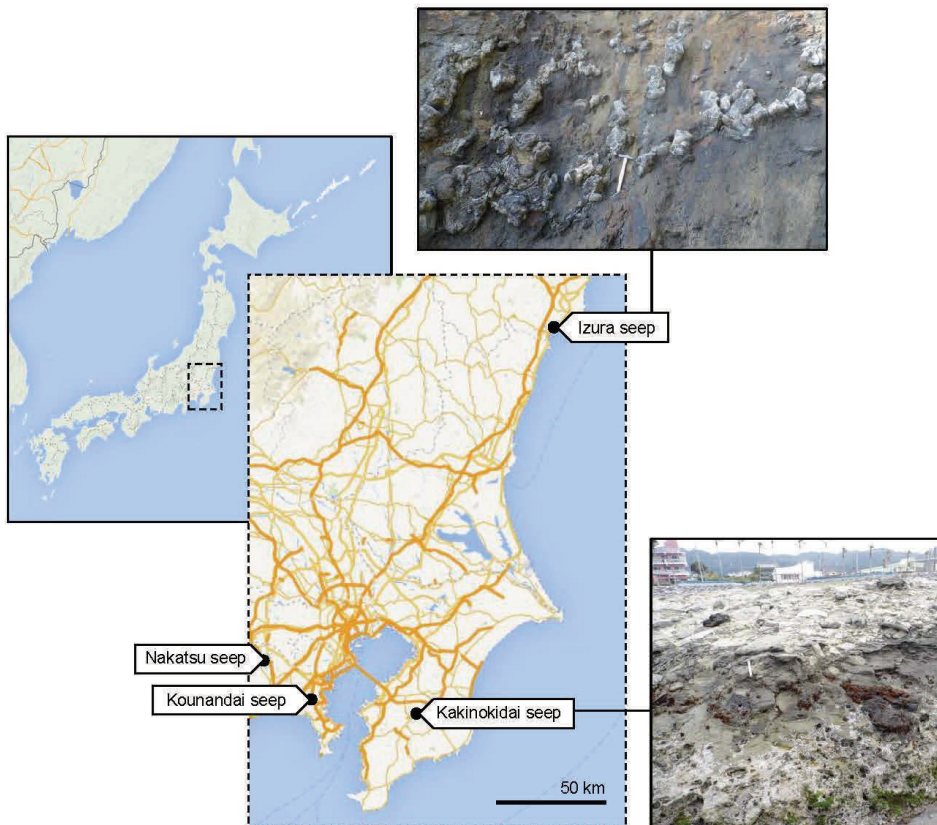


Figure 1. Fossil seep Localities visited in Japan (April, 2014)



The excavations at the seep localities allowed for the collection of suspected chemosymbiotic species, all thought to be thiotrophic. Species from multiple modern chemosymbiotic families were obtained, including: Lucinidae (*Lucinoma acutentilinum* at the Izura seep, *Lucinoma aokii* at the Kakinokidai seep, and *Lucinoma* sp. at the Kounandai seep), Vesicomidae (*Calyptogena* sp., at the Izura seep and the Nakatsu seep) and Solemyidae (*Acharax tokungai* at the Kakinokidai seep), as well as comparative heterotrophic mollusc specimens from the Izura seep and Kakinokidai seep. Additional fossil specimens were provided by Prof. Majima of the Yokohama National University. This material includes *Lucinoma*, *Acharax*, *Conchele* (Thyasiridae), heterotrophic species and *Terebratulida* (Brachiopoda) from various seep localities of a similar age range. Of particular importance are the relatively rare Solemyidae and Thyasiridae that could be added to our suite of material. Because we have obtained multiple species of various nutritional strategies of the same locality (i.e. thiotrophic versus heterotrophic), this gives us the opportunity to directly compare stable isotopic signals of different nutritional strategies, and it will give insight into how similar environmental factors influence different species.



**Fig2.** Suspected chemosymbiotic bivalves collected at Japanese fossil seep localities

By sampling multiple localities, we can create a time-series for several genera, and assess changing environmental parameters. Currently, the SBOM from the various specimens is being obtained and will be analysed for carbon, nitrogen and sulphur isotopic values. Together with samples from the Palaeozoic, Mesozoic and Palaeogene, this will allow investigation of the presence of chemosymbiosis through geological time, and its relation to changing seawater chemistry.

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## Has anybody encountered this little gastropod?

Anders Warén,  
Naturhistoriska Riksmuseet,  
Stockholm.  
Email: [anders.waren@nrm.se](mailto:anders.waren@nrm.se)

In connection with sampling for the “Finnish inventory programme for the underwater marine environment (VELMU)” in the Gulf of Finland, a surprise showed up, a small gastropod not previously mentioned from the Baltic area, nor from anywhere else. It belongs to a small and poorly known superfamily, the Murchisonelloidea with half a dozen genera and some 20-40 known species round the world. In Swedish (and British) waters there is a single known species, *Ebala nitidissima* (Montagu, 1804). A few additional species of the genera *Ebala* and *Murchisonella* occur in Southern Europe. It is still uncertain how to subdivide the superfamily since only three species have been sequenced and the differences in morphology are difficult to interpret (Warén 2013).

The recently found species lacks a name. It showed up in a brackish water area, salinity around 5‰, off the Finnish south coast, some 10 km S of Hamina (=Fredrikshamn) at the south eastern part of the coast. The rocky bottom is characterised by cirripedes (*Amphibalanus improvisus*), zebra mussels (*Dreissena polymorpha*), *Theodoxus fluviatilis*, and a total of some 40-50 additional species of brackish and freshwater macroinvertebrates. During the first year, it was found in densities up to 400-500 individuals per square meter but the recent observations of this year have been up to 4000 individuals per m<sup>2</sup>. Species of the superfamily Murchisonelloidea have been found mainly in fully marine environments with scattered records from hypersaline or slightly brackish environments. Nothing has been published on feeding biology but living specimens which now have survived 3 months in the fridge at *circa* 6°C seem to appreciate fragments of decaying lettuce.

The species is not yet named, but it seems highly unlikely that it should have been overlooked in the Baltic with its poor fauna. The Gulf of Finland has a thoroughly investigated fauna and we assume this to be a species which in one way or another has spread, perhaps by ships, perhaps via the Russian canal systems during very recent years. There exists a parallel in one of the most common gastropods in the Baltic, *Potamopyrgus antipodarum*, which originates from river mouths in New Zealand and survives both in fresh and brackish water. In Swedish waters this species occurs at the Baltic coasts, but does not enter Öresund and the Kattegat and Skagerrak, except a local population in Idefjorden at the Norwegian border. It seems thus to thrive in low but fairly stable salinities at or below 10‰.

Enquiries with malacological colleagues about whether they had encountered something similar, has not yielded any positive response. It should be fairly simple to distinguish this animal from all named species of *Murchisonella* by studying specimens of a fairly large size, *circa* 4 mm instead of a normal maximum size of 2-2.5 mm and a proportionally broader shell.



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in *Flora & Fauna* 2014.  
109:3 pp39-40

Thanks to David Reid for  
bringing this forward.  
Translated by the author.



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**Obituary**

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**Luitfried von Salvini-Plawen 1939 –2014**

Luitfried Salvini-Plawen passed away on 20th October, 2014 aged 75. He was professor at the University of Vienna, Faculty of Life Sciences, former Head of the Institute of Zoology, and President of *Unitas Malacologica* from 1998 to 2001. After his retirement in 2004 he stayed active in publishing and teaching. Luitfried was one of the most prominent and influential personalities in malacology during the past decades. His main interest was the early evolution of molluscs and the phylogenetic relationships of the major groups. He was one of the few experts in aplacophoran morphology and systematics and has described about half the number of known species of Solenogastres. His profound expertise resulted in intense international cooperations with, e.g., Spanish, Norwegian, and Japanese colleagues and institutions. Since the 1980s, Luitfried Salvini-Plawen and his students played a major role in revolutionising and modernising gastropod systematics and the understanding of their evolutionary history. The key to success was the integrating results from various fields such as electron microscopy and developmental biology in a broad comparative approach using phylogenetic methods.

Luitfried's biological field of action, however, extended beyond molluscs. He considered Rupert Riedl and Erich Reisinger most influential during his early career – both directed him to, and familiarised him with, the marine interstitial fauna. Not surprisingly, he worked on the interstitial Solenogastres, acochlidian and philinglossid opisthobranchs, but also on the systematics and development of cnidarians, kamptozoans and holothurians. His broad overviews on the convergent evolution of eyes and coelomic cavities in animals received much attention and sparked renewed research efforts in the respective fields. The former was achieved together with Ernst Mayr who had invited him as guest professor to Harvard University in 1975. His research is published in about 150 papers.

In his spare time, Luitfried graduated in History, with special focus on medieval history of northern Italy and Southern Tyrol, a region he felt deeply rooted in. His knowledge in cultural history and languages was impressive and, being an educated singer, his love for music was profound.

The scientific community has lost an outstanding zoologist and his unexpected death leaves a painful gap. He will, however, remain an inspirational example of intellectual acuteness and scientific conduct.

Gerhard Steiner  
Associate Professor  
Dept. Integrative Zoology  
Faculty of Life Sciences, University of Vienna  
A 1090 Vienna, Austria  
+43 1 4277 76347

Luitfried von Salvini-Plawen was a tremendous presence in my career and many, many others. It was only a few weeks ago that I was combing through an absolutely exhaustive review job that he provided for a manuscript I have in press (equal parts irritation, gratitude, and “oh god, there are so many things I still don't know about anatomy”). He certainly leaves an impressive legacy of publications, which broke new ground to bring tree-thinking to molluscs. That legacy clearly lives on in his many students and grand-students who lead the charge for molluscan evolution including understanding of the “difficult” groups.

Dr Julia D Sigwart  
Laboratory Director  
Queen's University Belfast, Marine Laboratory  
Portaferry, Northern Ireland  
e. [j.sigwart@qub.ac.uk](mailto:j.sigwart@qub.ac.uk) t. +44 (0)28 4272 7804 | m. +44 (0)7805 665 863





## NEWS

**2,400 Years of Malacology—2015 edition**

Gene Coan and Alan Kabat announce that the 2015 edition of “2,400 Years of Malacology” – a catalogue of biographical and bibliographical articles about those who studied and collected molluscs – is now on the website of the American Malacological Society: [http://www.malacological.org/2004\\_malacology.html](http://www.malacological.org/2004_malacology.html)

The 2015 edition is just over 1,160 pages. It includes two additional documents containing collations of a number of important references for malacological systematists, including a detailed collation of the Küster edition of Martini-Chemnitz (1837-1920) that synthesizes the data from a number of previously published collations. Also, the “Annotated Catalog of Malacological Meetings, Including Symposia and Workshops in Malacology” has been updated this year, and is on the AMS website: <http://www.malacological.org/epubs.html>

**Council member Richard Preece on Radio 4.**

Past-president Mark Davies brings to our attention the following:-

“Imagine my surprise when ‘Inside Science’ last night on Radio 4 in the UK had a feature on molluscs (albeit the last 4 min of the programme). I was then treated to a delightful exposition by none other than our own Richard Preece, who among other things, gave the listener ‘top tips’ for finding molluscs. Great publicity (for 4 min) and even Euromal was mentioned. Well done Richard! Definitely worth a listen on iplayer.”

**SEM images from the scissurellid monograph available on-line**

Over 13,000 SEM images taken for the scissurellid monograph (Geiger, 2012: <http://www.vetigastropoda.com/scissurellidae>) are now accessible on-line; images kindly made available by other persons/institutions are not included. There are just under 80 GB of highest quality jpeg images and zip-files. The plates and the text of the monograph are not included. The images are to be used in conjunction with the hard-copy monograph. Access is granted on a case-by-case basis for research/education purposes only. Access is intended for:

- Institutions to obtain the images of their specimens that I took.
- Researchers looking for additional, unpublished images.
- Advanced collectors for identification.

For further information and to request access, please submit the web form. From the following website

<http://www.vetigastropoda.com/scissurellidae/webimages.php>

Contact - Dr Daniel Geiger [dgeiger@sbnature2.org](mailto:dgeiger@sbnature2.org)

**Latest issue of Tentacle - Mollusc Specialist Group of the Species Survival Commission of the IUCN**

Tentacle is the Newsletter of the Mollusc Specialist Group of the Species Survival Commission of the IUCN (International Union for the Conservation of Nature). The latest issue - number 23 - of Tentacle (the newsletter of the IUCN - Species Survival Commission - Mollusc Specialist Group) is now available on the web.

Go to <http://www.hawaii.edu/cowielab/issues.htm>

The file is quite large and it may take a minute or two to download.

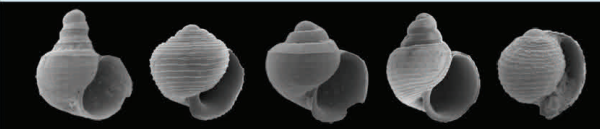
Many thanks to all the contributors to this latest issue, and especially to Associate Editors of Tentacle Justin Gerlach and Kathryn Perez.

Contact—Dr Robert Cowie [cowie@hawaii.edu](mailto:cowie@hawaii.edu)



FORTHCOMING MEETINGS

FORTHCOMING MEETINGS - AGM



The Malacological Society of London Spring meeting and AGM

## Planktic gastropods: biology, ecology and palaeontology


1st April 2015  
Flett Lecture Theatre  
Natural History Museum, London

*With keynote talks from*

**Dr Katja Peijnenburg**  
Naturalis Biodiversity Center, Leiden


**Dr Silke Lischka**  
Helmholtz Centre for Ocean Research, Kiel

Please register by the 17th February 2015 or contact Deborah Wall-Palmer for further information. [deborah.wall-palmer@plymouth.ac.uk](mailto:deborah.wall-palmer@plymouth.ac.uk)



**...and the  
Annual General Meeting  
of the**

**The Malacological Society  
of London**



**AT A PROVISIONAL TIME OF  
1.30-2.00pm**

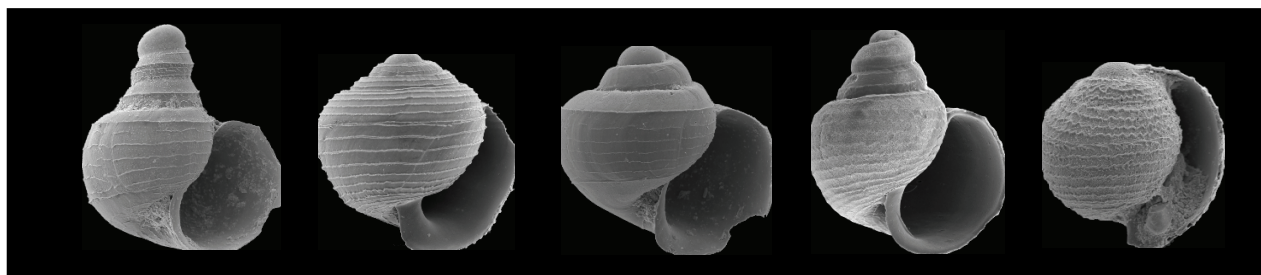
The 122nd Annual General Meeting of The Malacological Society of London will take place at 1330h in the Flett lecture theatre of the Natural History Museum during the lunch break of the Society's meeting on *Planktic gastropods: biology, ecology and palaeontology*

**Provisional Agenda for AGM**

- **Apologies for absence**
- **Minutes of the last (119th) AGM**
- **Matters arising**
- **Financial report,**
- **Annual report of Council (delivered by the President)**
- **Awards**
- **Election of Council**

NOMINATIONS FOR COUNCIL	CURRENT		PROPOSED	
	2014-15	121st meeting	2015-16	122nd meeting
President		Tony Walker		Suzanne Williams
Ex-officio				Tony Walker
Vice Presidents		Simon Cragg Fred Naggs		Fred Naggs John Grahame
Councillors		David Aldridge Mark Davies John Grahame Elizabeth Platts Richard Preece Andreia Salvador		Mark Davies David Aldridge Andreia Salvador Richard Preece Robert Cameron Simon Cragg
Hon. Secretary		Tom White		Tom White
Hon. Treasurer		Katrin Linse		Katrin Linse
Membership Secretary		Rowan Whittle		Rowan Whittle
Editor <i>Journal of Molluscan Studies</i>		David Reid		David Reid
Editor <i>The Malacologist</i>		Georges Dussart		Georges Dussart
Awards Officer		Suzanne Williams		Jon Ablett
Web manager		Tom White		Chong Chen/ Tom White

## The Malacological Society of London spring meeting and AGM



# Planktic gastropods: biology, ecology and palaeontology

Wednesday 1<sup>st</sup> April 2015

9:30 am – 6:00 pm

Flett Lecture Theatre

Natural History Museum, London

### *Call for registration and abstract submission*

The planktic gastropods are truly amazing zooplankton. Their weird and wonderful morphologies have led to a number of charming names, including the ‘sea angels’, ‘sea butterflies’ and ‘sea elephants’. Recently, research has increased our awareness of these charismatic creatures, highlighting their importance to the ocean food web and the grave sensitivity of shelled forms to ocean acidification.

To bring together the increasing research in this field and encourage collaborative relationships, the 2015 Malacological Society of London spring meeting and AGM will have a planktic gastropod theme. This meeting aims to draw an interdisciplinary audience from all over Europe and include talks on all aspects of planktic gastropod biology, ecology and palaeontology.

The meeting is open to all (members and non-members), is funded by the Society and is therefore free to register and attend; we may, however, request a small (£5 - £10) donation towards food, beverages and the wine reception on the day depending on numbers of delegates. We invite you to submit abstracts for short talks and posters with any planktic gastropod theme using the following registration form. We also ask that non-presenters also register so that we may estimate numbers.

**Enquires:** Deborah Wall-Palmer, email: [deborah.wall-palmer@plymouth.ac.uk](mailto:deborah.wall-palmer@plymouth.ac.uk)

Continued ...



**Planktic gastropods, Wednesday 1<sup>st</sup> April 2015 10:00 am – 6:00 pm**  
**Flett Lecture Theatre, Natural History Museum, London**

**REGISTRATION FORM**

**To be returned by email or post to:**

Deborah Wall-Palmer, SoGEES, 204 Fitzroy, Plymouth University, Drake Circus, Plymouth, Devon, PL4 8AA, UK. Email: [deborah.wall-palmer@plymouth.ac.uk](mailto:deborah.wall-palmer@plymouth.ac.uk)

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Tel. number: \_\_\_\_\_

Email: \_\_\_\_\_

I wish to present a talk/poster (delete as appropriate) entitled: \_\_\_\_\_

I wish to attend but not present: tick box if appropriate

Please attach your abstract (not more than 350 words) to your registration email using a Microsoft Word format (please see the abstract formatting guidelines below).

It is expected that all oral presentations (20 minutes including 5 minutes for questions) will be made using Powerpoint. If you wish to make any other form of oral presentation you MUST contact Deborah Wall-Palmer in advance.

Posters should be no larger than 1 metre x 1 metre and will be mounted on boards (velcro supplied). A provisional programme will be sent out in early March.

**Abstract submission**

Abstracts for talks and posters should be sent as Microsoft Word files using the following format:

Title (12pt Times New Roman bold, centred)

<blank line>

Authors (10 pt, bold, centred, presenting author underlined; use superscript numbers to indicate institutional affiliation)

<blank line>

Institutions (10pt, centred; in this order: Number (superscript), Department, Institution, City, Country)

Presenting Author email

<blank line>

Abstract (11pt, no indentation, justified, 350 words maximum)

Continued ...

EXAMPLE ABSTRACT

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

**Martine Claremont<sup>1,2</sup>, Suzanne T. Williams<sup>1</sup>, Timothy G. Barraclough<sup>2</sup>, and David G. Reid<sup>1</sup>**

<sup>1</sup>Department of Zoology, Natural History Museum, London, UK

<sup>2</sup>Department of Biology, Imperial College London, Berkshire, UK

Email: m.claremont@nhm.ac.uk

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

PLEASE DO NOT INCLUDE A REFERENCE LIST

Continued overleaf ....



**5th INTERNATIONAL WORKSHOP ON OPISTHOBRANCHS - PORTO (Portugal) 13-15 July 2015**

- Home
- Venue
- Programme
- Registration
- Presentations
- Abstracts
- Travel
- Accommodation
- Organisation
- Sponsors
- 5th IWO Poster
- Location
- Contact

All opisthobranch researchers are warmly invited to participate in the 5th IWO and contribute with oral or poster presentations. We expect a wide participation and lively discussions on all subjects related with opisthobranchs.

Hoping to see you all in Porto, in July 2015.

© João Pedro Silva

Like 45

Workshop website at <http://www.5iwo.org> for all kinds of useful information, programme,



# Conference Programme

**09:30** COFFEE AND REGISTRATION

**10:00** Welcome and introduction

## TAXONOMY AND MOLECULAR RESEARCH

**10:10** **Katja Peijnenburg** (Naturalis, Leiden) Keynote talk  
*Snails, Shells and Sequences: Adaptive Potential of Pteropods*

**11:00** **Peter Kohnert** (Bavarian State Collection of Zoology, Munich),  
**Christina Laibl and Michael Schrödl**  
*North vs. South: Who exactly is *Limacina helicina*? (Gastropoda, Euopisthobranchia, Pteropoda, Thecosomata)*

**11:20** **Alice Burridge** (Naturalis, Leiden), **Erica Goetze, Niels Raes, Jef Huisman and Katja Peijnenburg**  
*Global biogeography and evolution of Cuvierina pteropods*

**11:40** **María Moreno-Alcántara** (CICIMAR-IPN, México) and **Gerardo Aceves-Medina**  
*Ecological and taxonomic studies of holoplanktonic gastropods within the Mexican Pacific.*

**12:00** **Helen Scales**  
*Revealing hidden wonders: spreading the word about minute marine molluscs*

**12:20** LUNCH AND POSTERS

**13:00** Annual General Meeting of the Malacological Society of London (MSL members only)  
'Behind the scenes' tours for non-MSL members

## PALAEONTOLOGY

**13:40** **Malcolm Hart** (Plymouth University), **Christopher King and Christopher Smart**  
*Planktonic gastropods: survivors in a changing ocean*

**14:00** **Arie Janssen and Crispin Little** (University of Leeds)  
*Holoplanktonic gastropoda from the Miocene of Cyprus: systematics and biostratigraphy*



## RESEARCH OPPORTUNITIES

### Malacological Society of London Research Awards

The Malacological Society of London anticipates making at least five Research 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. Successful applicants will be notified within two weeks of the Society's Annual General Meeting (held the following year, usually in March or April).



Application forms should be sent by email sent to [MSL\\_awards@nhm.ac.uk](mailto:MSL_awards@nhm.ac.uk). Note that this is an automated email account, which will send an email to indicate successful receipt of your application. Do not send queries to this email. Instead send queries to the Dr Suzanne Williams, [s.williams@nhm.ac.uk](mailto:s.williams@nhm.ac.uk)

Further details and the application form are available at [http://www.malacsoc.org.uk/awards/award\\_research.htm](http://www.malacsoc.org.uk/awards/award_research.htm)

Contact—Dr Suzanne Williams, Natural History Museum, Cromwell Rd, London SW7 5BD, United Kingdom



### PhD opportunity in marine palaeo-ecology at the University of Vienna

The research group of Prof. Martin Zuschin, Department of Paleontology at the University of Vienna, Austria, has an open 4-year PhD position for candidates with a strong focus on palaeoecology of marine invertebrates. The topics investigated in the group include the molluscan palaeodiversity and faunal gradients in the marine fossil record of Europe, temporal and For further information please contact Martin Zuschin, Email: [martin.zuschin@univie.ac.at](mailto:martin.zuschin@univie.ac.at), Tel. +43-1-4277-53555

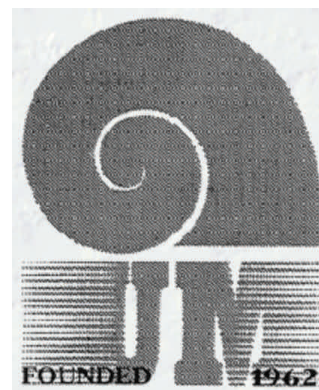


### Call for application for Unitas Malacologica Student Research Awards for 2015

#### Instructions for applying for awards

Two awards, each of up to €1 000, are offered every year to students engaged in research projects of a malacological nature. These will generally be projects undertaken in pursuit of higher academic degrees (e.g. M.Sc. and Ph.D.). Normal budget items include supplies, expendable equipment and research-related travel. The awards cannot be used to cover salaries, institutional overheads, permanent equipment or conferences. Only students who are members of UM in good standing are eligible to apply for these awards.

**The next deadline for submissions is 24 April 2014.** Applications must be completed on an application form which is available on the UM website <http://tinyurl.com/2pl4fc> and should be sent as an e-mail attachment to the UM secretary, Prof. Jesús Troncoso ([troncoso@uvigo.es](mailto:troncoso@uvigo.es)).



## 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](http://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](http://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](mailto:s.williams@nhm.ac.uk)



**SOCIETY NOTICES**

SOCIETY NOTICES

**Objects**

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

<http://www.Malacsoc.org.uk>

**Publications**

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

**Subscriptions**

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

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

**Methods of Payment**

- (1) Sterling cheque to "The Malacological Society of London".
- (2) Banker's standing order to: The Northern Bank (Sort code 95-01-49), 49-51 University Road, Belfast BT7 1ND, for the credit of "The Malacological Society of London" (a/c 70030422).
- (3) Credit card: Overseas members ONLY may pay by credit card: the Society can accept VISA and MasterCard payments only. Please provide the Membership Secretary with your card number and expiry date, card type (VISA or MasterCard.), the name on the card, and the cardholder's address (if this differs from your institutional address). Receipts will only be sent if specifically requested.
- (4) Overseas members wishing to pay electronically should contact the Membership Secretary Dr Rowan Whittle at [roit@bas.ac.uk](mailto:roit@bas.ac.uk).
- (5) 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 Rowan Whittle, British Antarctic Survey, High Cross, Madingley Road., Cambridge, CB3 0ET, United Kingdom  
[roit@bas.ac.uk](mailto:roit@bas.ac.uk)

