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The Malacologist

The Bulletin of The Malacological Society of London

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Contents

Molluscan Forum 2017

Last November, an international group of young malacologists assembled at the Natural History Museum in London in order to take part in the annual Malacological Forum of the Malacological Society of London. The abstracts of their twenty six presentations start on page 8.

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

EDITORIAL

It is with great sadness that I report the passing of Dai Roberts, who served for many years on the Council of the Society. His obituary is presented on page 24.

As ever with the February issue, the major item is the list of abstracts from the *Malacological Forum* held in the previous November (2017) at the Natural History Museum (pages 8-19). There is the usual eclectic mix of papers from young malacologists, displaying both their enthusiasm and their erudition. All the papers and posters were of a high standard and the ambience of the Forum is friendly and welcoming. It would be good to know what happened to the lives of previous participants. **If you participated in a previous forum, please drop me a line to let me know what you are doing now, and especially if you are continuing to work with molluscs.** If any responses are forthcoming, I will collect them together and pass them on in a future issue of *The Malacologist*. As an academic I was always very keen to know what happened to the students who passed through my hands. What did they become? How did their experiences at university affect the direction of their lives, if at all? It is my experience that students rarely call back from where their life's trajectory takes them. Perhaps that's a healthy sign, but it still leaves one curious.

The last issue gave a resume of all the award winners of the Society and in continuation, this issue includes a list of Officers. (pages 23-24). Being a relatively old society, the Malacological Society of London has a long list of officers. The list includes famous malacological names such as Boycott, Dautzenberg, D'Arcy Thompson, Yonge and Cain. These and others first stirred my academic imagination as a PhD freshwater malacologist and it is an honour to be able to acknowledge their contribution to our Society.

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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.*].

News and notes

New perspectives on evolution in molluscs: from fossils to next generation sequencing

21st March 2018
Malacological Society of London
& Natural History Museum

and the 125th Annual General Meeting of the Malacological Society of London

Canadian Museum of Nature Visiting Scientist Awards -- Financial Grants for Travel Costs

The Beaty Centre for Species Discovery at the Museum awards annual travel grants for research in plant, animal, mineral and fossil systematics. The main objective of the Canadian Museum of Nature Visiting Scientist Awards is to assist collection-based systematics studies by facilitating and supporting access to the collections of the Canadian Museum of Nature providing external expertise enhancing the state of curation of the museum's collections.

Enhanced curation could include:
* designation of types
* updated taxonomy
* specimen-level data-basing
* specimen sorting and identification, particularly in taxa for which the museum lacks in-house expertise, etc.

See details at: https://nature.ca/en/research-collections/research-projects/centre-species-discovery-change/travel-grants
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Tracking aquatic snails

This message was posted on the Mollusca listserver forum (molluscalist@lists.berkeley.edu). Some interesting and useful replies are reproduced below.

From Dr. Nicholas Carey , Scottish Association of Marine Science, Scottish Marine Institute, Oban Argyll PA37 1QA UK

I am setting up a long term experiment (lab, not field) keeping marine snails permanently in water, and am looking for advice on tracking individuals. Does anyone have any advice or experience with different marking techniques? A lot of the information I have found is specific to terrestrial snails, and nail varnish is one suggestion that comes up often, but I am wondering how this holds up in seawater. Another option is small attachable, numbered, plastic tracking dots, as mentioned in the abstract here (If anyone could help me find a pdf of this that would also be very helpful!) –
https://www.researchgate.net/publication/20899919_Marking_snails_with_numbered_colored_discs_A_technique_for_identifying_individual_specimens
I have seen these small numbered discs in use,but am having trouble finding suppliers online. I have no idea what to Google to find them - anything I have tried so far has failed!

I used small simple printed paper labels glued on and coated and over with cyanoacrylate. These lasted at least a year in the field and 2 years in sea tables in Bamfield, BC on *Nucella lamellosa*.
Nicole Webster daelocin@gmail.com

Way back in the late 1970s I used an underwater epoxy (Sea Go'in Poxy Putty) to glue small tags on marine reef snails. The epoxy hardens underwater; I got it from a boat supply, I guess for people who want to repair their hulls without bringing the boat out of water. I made the tags from polyethylene (polythene) left over from food containers – plastic milk cartons or plastic lids. I forget how I shaped them – possibly just cut squares, or maybe used a hole punch. Then I inscribed (by melting) a number into each tag using a hot nail or hot pin.
Pearce, Timothy PearceT@CarnegieMNH.Org

One caution from the left coast in Oregon: We have very low buffering capacity in many of our salmon streams. Freshwater mussels are suffering rapid population decline from increasing anthropogenic acidification pressures challenging the low buffering capacity. This results in episodic dips in pH and available calcium in sensitive species, especially those that build shells from aragonite and calcium carbonate.
The umbo region of *Margaritifera falcata* has its usual characteristic bit of exposed calcium shell layers, but the dissolution of these sites on the shells picks up greater speed as the pH dips episodically. Aquatic snails also appear to be adversely affected. So, if the water hardness levels and resultant buffering capacity of alkalinity measurements indicate low buffering, it could be quite possible that any additional scraped periostracum points would also accelerate dissolution. Most waters in the nation would probably not be subject to the extreme acidification problems seen in our area, but just something to note especially in some Pacific northwest waters.
Ray Kinney kennyr@casco.net

CONTINUED

I think you are referring to either shellfish tags (which are made by Floy tag http://www.floytag.com/) or bee tags (which you can find via apiary suppliers, like http://www.beeworks.com/catalog/index.php?main_page=product_info&cPath=10&products_id=125) I have attached them with superglue, clear nail polish, or a marine adhesive (like spar splash zone compound). I have also printed tiny numbers on a laser printer and superglued or nail-polished them in place. Holds up fine in seawater, as long as you aren't working in a place with high wave action or a lot of sand in the water that abrades tags. You may find that some adhesives will dissolve the tags and/or ink on the tags (this is true for both tags you buy and tags you make yourself), but once the adhesive sets, its usually fine.
Sarah Gilman SGilman@kecksci.claremont.edu

I have used Hallprint tags and cyanoacrylate for freshwater mussels and have had good results. Here is the web site https://www.hallprint.com/
Kevin Roe kjroe@iastate.edu

I'd suggest using a Dremel tool to engrave unique patterns of dots and dashes somewhere on the upper whorls of the shell. As long as you only engrave the surface this should not affect the animal at all, and by using the upper whorls rather than the body whorl the fact that you are breaching the periostracum should not matter either.
Callomon,Paul prc44@drexel.edu

Nick, be careful to test your adhesive with a small subset of your snails, just in case there might be differences among species in tolerance for the chemicals involved. I did a quick Google search on nail polish and salt water and although the results were decidedly mixed, it seems likely nail polish will not hold up.
Vicky Meretsky (who had some issues with liquid cyanoacrylate and snails)
meretsky@indiana.edu

I have used nail polish to mark individuals of marine gastropods. You can print very small numbers on paper and cut the labels. You take the gastropods out of water (they will be fine for a short period of time) and dry their shell with kitchen paper. Scraping the shell a bit to remove any debris will also help. Then you place a generous blot of transparent nail polish on the shell and immerse the small label in it. Let it dry and you are ready. The longer you can let it dry, the better. This is an easy to apply method and it is relatively effective. After a period of time (2-3 months) the labels might be gone but it is easy to put them back (not the old ones, create new). I was measuring shell length of individuals so it was pretty easy to identify which one had lost its label. Also there is a special glue (not sure about the brand at the moment, e.g. Loctite Epoxy Instant Mix 5 Minute from Loctite Adhesives) which consists of 2 separate tubes. When you mix a certain amount from each tube the glue starts to harden. It dries pretty fast. You can also use this instead of nail polish to glue your labels.
According to my experience both methods do not affect the survival, growth or movement of the gastropods.
Eva Chatzinikolaou

84th Annual American Malacological Society (AMS) & 51st Annual Western Society of Malacologists (WSM)

June 19-23, 2018 malacologists, students, citizen-scientists, conservationists, and resource managers, and mollusc enthusiasts from across the United States and international locales will meet in Honolulu, Hawaii for the 84th Annual American Malacological Society (AMS) and the 51st Annual Western Society of Malacologists (WSM) meetings. The current presidents of these two historied malacological societies have joined forces to co-host the AMS-WSM meeting, which will take place against the backdrop of beautiful beaches, lush forests, and a rich natural history setting. Steeped in the deep cultural tradition of the Hawaiian people, we will gather on the island of Oahu to "talk story" about all things malacological, framed within the theme for this year's meeting "Building Capacity and Developing Solutions for the Future". The venue for this year's meeting will be the beautiful Hilton Waikiki Beach Hotel, bookended with the reception at the Waikiki Aquarium, and closing banquet at the Bishop Museum. On behalf of AMS president Norine Yeung, WSM president Rebecca Johnson, and the organizing committee I am excited to announce the website for this years meeting in Hawaii is up and running. Over the next month or so we'll be adding additional information and content. The site already contains information regarding the venue, dates, hotel accommodations, social events, travel support, and symposia and workshops.
Kenneth A. Hayes https://ams.wildapricot.org/Meeting

Kenneth Jay Boss Fellowships in Invertebrate Zoology—New

First call for proposals for this new fund stablished through a generous donation from the estate of Kenneth Boss (1935-2014) . The purpose is to provide financial support to allow graduate students to conduct collections-based research in the Department of Invertebrate Zoology at the NMNH. Both US and non-US citizens are eligible. As per the terms of the bequest, fellowships will be awarded preferentially to students investigating molluscs, although proposals focused on other invertebrate groups (exclusive of insects, arachnids, and myriapods) will also be considered. The deadline for the first call for proposals is March 1. There will be two review cycles per year, the second deadline will be September 1.
Ellen E Strong, StrongE@si.edu

The Western Society of Malacologists - McLean,Award

The Western Society of Malacologists is proud to offer a financial stipend for students to study fossil or recent malacological collections to further their research. This award honors James H. McLean, Curator of Malacology at the Natural History Museum of Los Angeles County from 1964-2001 and Emeritus Curator until 2013.

Eligibility: Graduate, undergraduate, and exceptional high school students may apply. Those within daily commuting distance are ineligible
Research Scope: collections-based and focus on extant or fossil western North American mollusks (freshwater, terrestrial, or marine).
Funding: The maximum award is $1000 (US dollars) and should be used to support collection visits. Museum(s): Visits to any University-based or Natural History Museum collection (domestic or international) are eligible.
Deadlines: Proposals and recommendations are due March 1st,
http://westernsocietymalacology.org/grants/james-h-mclean-student-grant-in-collections-based-research/

Revised classification, nomenclator and typification of gastropod and monoplacophoran families

On behalf of Philippe Bouchet, I'm pleased to forward the following announcement:

The "Classification and nomenclator of gastropod families" of Bouchet & Rocroi (2005) is dead.
Vive la "Revised classification, nomenclator and typification of gastropod and monoplacophoran families" by Bouchet, Rocroi, Hausdorf, Kaim, Kano, Nützel, Parkhaev, Schrödl & Strong, published 13 December 2017 in Malacologia, 61(1-2): 1-526. In terms of content and lay-out, the new work differs from the 2005 edition in a number of features:
(a) the nomenclator now includes the full typification of all family group names, i.e., type species of the type genus – and not just the name of the type genus;
(b) The 2005 classification avoided ranks above superfamily and instead used "clade" and "informal group". The development and success of online taxonomic authority lists (e.g., WoRMS /MolluscaBase, Catalogue of Life, Australian Faunal Directory), demonstrated that the use of additional ranks – suborder, order, subclass – is favored by many users; consequently, they have been adopted in the classification;
(c) The contents have been expanded to include the class Monoplacophora.

2,604 names (up from 2,400 in 2005) at the rank of subtribe, tribe, subfamily, family and superfamily have been proposed for Recent and fossil gastropods, and another 35 for monoplacophorans. All are listed in a nomenclator giving full bibliographical reference, date of publication, typification, and their nomenclatural availability and validity under the International Code of Zoological Nomenclature. Another 790 names (up from 730 in 2005), established for categories above the family group (infraorder to subclass) are listed separately. In all, the classification now recognizes as valid a total of 721 gastropod families (up from 611 in 2005), of which 245 are known exclusively as fossils and 476 occur in the Recent with or without a fossil record; and 20 monoplacophoran families, of which 1 only occurs as Recent. This is an average 132 valid species per family of Recent gastropods - to be compared with 1,000-2,000 for insects and 35-57 for vertebrates.

The work is accessible electronically on BioOne at http://www.bioone.org/toc/mala/current. Printed copies will also be distributed by ConchBooks.

Ellen E Strong, StrongE@si.edu

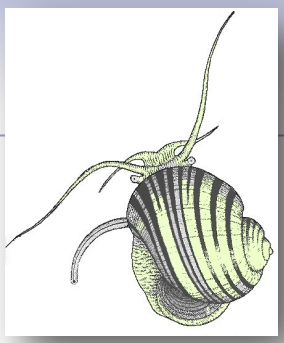
Snailish pets on the BBC

Ostensibly about cockroaches, almost all of this little piece is about snails.

Would you keep a cockroach as a pet?
http://www.bbc.co.uk/news/world-42763620

Molluscan Forum 2017

Natural History Museum, London
30 November 2018



Convened by

ANDREIA SALVADOR, Organiser Curator of Marine Mollusca, Natural History Museum (email: a.salvador@nhm.ac.uk)

Dr SUZANNE WILLIAMS, Organiser Researcher, Natural History Museum (email: s.williams@nhm.ac.uk)

ORAL PRESENTATIONS

Schedule

09.00 - 10.00 Registration, coffee & set up posters

10.00 - 10.55 Session I

10.00 SUZANNE WILLIAMS: Welcome and introduction to the day
10.10 EDWARD WORT: Population genetics of two intertidal *Gibbula* species in the Bay of Biscay and English Channel
10.25 FIDDY S. PRASETIYA: Greening by the blue diatom *Haslea ostrearia*: consequences on bivalve feeding behaviour, physiological and biochemical state
10.40 JAN STEGER: Lessepsian molluscs reshape soft substrate-assemblages of the Israeli Mediterranean Shelf
10.55 SAMUEL ABALDE: Transcriptome analysis of the venom gland of the Atlantic piscivorous *Chelyconus ermineus* (Caenogastropoda: Conidae)

11.10 - 11.40 Coffee & poster viewing

11.40 - 13.00 Session II

11.40 VIOLETA LÓPEZ-MÁRQUEZ: Historical dynamics of two top shell in the Mediterranean and Black seas
11.55 AYU SAVITRI NURINSIYAH: Non-native terrestrial gastropods in Java and the potential distribution of *Lissachatina fulica* and *Bradybaena similaris*
12.10 MOHD ZACAERY KHALIK: Phylogeny and systematics of Bornean *Georissa* (Gastropoda: Hydrocenidae)
12.40 LUKE HELMER: The efficacy of suspended broodstock cages as a restoration strategy for the European flat oyster *Ostrea edulis* Linnaeus, 1758: A case study in the Solent, UK
12.55 SUZANNE WILLIAMS: Announcements, Arrangements and Awards etc.

13.00 - 14.00 Lunch break

14.00 - 15.15 Session III

14.00 HEATHER E. GRANT: Shell colour in Bivalvia: a systematic approach
14.15 R.M.L. KENT: Preliminary observations on spatial patterns of foraging in the Celtic sea slug, *Onchidella celtica* (Cuvier, 1817)
14.30 HANANE RASSAM: The variability of *Pisidium* species in some Moroccan basins: morpho-geometric approach
14.45 MARIA LORETO MARDONES: The effects of temperature on larvae and early juvenile development of European sting winkle, *Ocenebra erinaceus* (Neogastropoda, Muricidae, Linnaeus, 1758)
15.00 ANA KARLA ARAUJO: What about Runcinacea (Gastropoda: Heterobranchia)? A preliminary molecular approach to their phylogenetic relationships and its raised problems

15.15 - 15.45 Tea break & poster viewing

15.45 - 17.15 Session IV

15.45 HASSAN BENAISSA: Host fish of Moroccan freshwater mussels
16.00 AHMED SAADI: Phylogenetic relationships of aquatic snails in the Clade Hygrophila
16.15 TOM PENNANCE: Landscape genomics of the *Bulinus africanus* group across Central East Africa and their associated *Schistosoma* species
16.30 JENNY LARSSON: Inferring growth parameter for the shell shape of *Littorina saxatilis*
16.45 DANIEL A. HORTON: Epigenetic investigation into gene movement within *Biomphalaria glabrata* and implications on infection by *Schistosoma mansoni*
17.00 SUZANNE WILLIAMS: Closing remarks.

17.15 - 18.30 Wine social & final poster viewing

POSTER PRESENTATIONS

FRANZISKA S. BERGMEIER: From shallow sands to deep-sea trenches: exploring Japanese solenogaster fauna

ZOË HOLBROOK: Elevated beds: a solution for European native oyster restoration?

HILDUR MAGNÚSDÓTTIR: Fine-scaled spatial patterns in the shell morphology and colour of the subtidal whelk *Buccinum undatum*

M.R. MARTÍN-HERVÁS: First approach to the systematics of the genus *Elysia* (Heterobranchia, Sacoglossa) in Europe

RUTHELA P. PAYAWAL: Molecular identification of cone snails (Family Conidae, Gastropoda) from Verde Island, Batangas City, Batangas, Philippines using CO1 and 16S gene markers

MARYORY SARRIA-DULCEY: The effect of acidification on *Dentalium majorinum*: (Mollusca: Scaphopoda) in the Southern Ocean

DINARTE TEIXEIRA: Death and rebirth on the Desertas Islands (Madeira: Portugal): land snails as a case study

HARRIET WOOD: Great British Mollusca Types Project: a union database for the UK

ABSTRACTS

Transcriptome analysis of the venom gland of the Atlantic piscivorous *Chelyconus ermineus* (Caenogastropoda: Conidae)

Samuel Abalde & Rafael Zardoya
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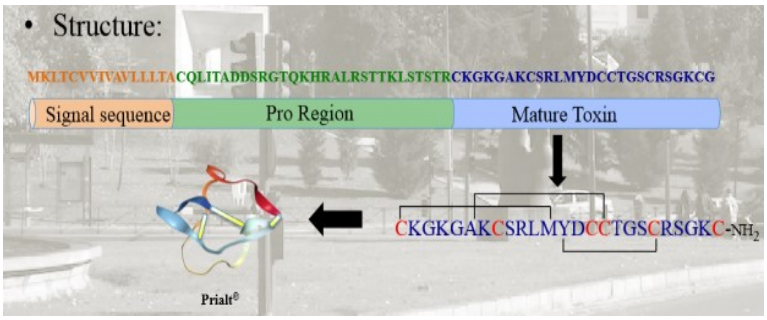
Cone snails (Caenogastropoda: Conidae) form one of the most diverse groups of gastropods, with more than 800 described species. They are active marine predators, feeding on worms, other mollusks and fishes. Cone snail species are predominantly vermivorous and the other feeding strategies evolved later in time (based on the phylogeny of the family): the switch to a molluscivorous diet occurred once, while the piscivorous diet probably appeared in two independent events within their evolutionary history. Cone snails use a complex venom system to hunt their prey. This venom is a species-specific cocktail formed by different peptides named conotoxins. Despite being known for the last 60 years, new transcriptomic techniques have boosted its study and provided an incomparable opportunity to gain insights on the venom composition, diversity, and evolution. Here, we have sequenced the transcriptome of the venom gland from three specimens of *Chelyconus ermineus*, the only piscivorous species of the Cabo Verde archipelago, and a representative of the only fish-eater cone genus of the Atlantic Ocean, the second origin of the piscivorous diet. We report more than 100 different conopeptides in each specimen. The venom composition is highly variable, since many of the conopeptides are specific for single individuals. Nevertheless, the overall superfamily composition seems constant among specimens; the M, O and T superfamilies are the most abundant, as reported for other species. These results could be further compared with piscivorous species from the Indo-Pacific Ocean, helping us to understand whether the venom composition depends on diet, on phylogenetic relatedeness, or has some common features across all cones.



What about Runcinacea (Gastropoda: Heterobranchia)? A preliminary molecular approach to their phylogenetic relationships and the related problems

Ana Karla Araujo[1], Marta Pola[2] & Juan Lucas Cervera[3]
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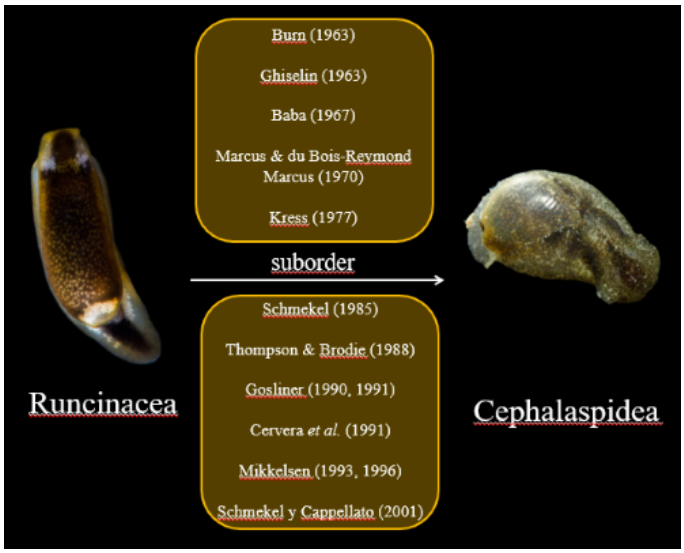

Runcinacea has been considered as a lineage of Cephalaspidea for almost a decade. A study of the molecular phylogeny of Cephalaspidea however, allocates Runcinacea as a separate lineage from Cephalaspidea. Their species are generally characterized by their small sizes and a very reduced internal shell for those shelled species. At present, 10 genera are recognized within Runcinacea, including *Runcina* the most important genus regarding the number of species (39) with the majority of its described species distributed in Europe (25) (Mediterranean/eastern Atlantic Ocean). The aim of our study is to increase the knowledge of the systematics of this group in European waters and how it diversified. At the moment, we have analyzed more than 60 specimens belonging to at least 29 species, some of these identified as "sp.", using two mitochondrial (COI and 16S) and one nuclear (H3) genes. Preliminary analyses using Bayesian inference and Maximun Likelihood as well as delimitation species

From shallow sands to deep-sea trenches: exploring Japanese solenogaster fauna

Franziska Bergmeier[1], Katharina Jörger [1,2], Yasunori Kano[3] and Hiroshi Saito[4]
[1]Systematic Zoology, Ludwig-Maximilians-Universität München, Germany
[2]SNSB-Bavarian State Collection of Zoology, Munich, Germany
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[4]National Museum of Nature and Science, Tsukuba, Japan
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Solenogastres, one of the eight subphyla of Mollusca, is a solely marine clade of worm-shaped molluscs. They lack a shell, but are encased by aragonitic sclerites ranging in form from solid scales to hollow, needle-like structures. Close to 300 species are currently known, with most of the taxonomic work conducted in the North Atlantic, the Mediterranean and (sub-) Antarctic waters: three quarters of known species are described from these regions. Despite largely similar geographic conditions, only nine solenogaster species – including the giant-sized *Neomenia yamamotoi* and the colorful, soft-coral mimic *Anamenia amabilis* – are described from waters around Japan, and the overall solenogaster diversity is poorly explored. Material collected during several Japanese expeditions, ranging from shallow sands to the abyssal depths of the Japanese trench, revealed to us at least three times more species than previously known. We use external investigations via light and scanning electron microscopy in combination with molecular barcoding to characterize the regional solenogaster diversity. Our study highlights the gap in knowledge on the true species-richness of the clade, both on a regional and global scale.

The efficacy of suspended broodstock cages as a restoration strategy for the European flat oyster *Ostrea edulis* Linnaeus, 1758: A case study in the Solent, UK

Luke Helmer, Ian Hendy, Paul Farrell & Joanne Preston
Institute of Marine Sciences, University of Portsmouth, Portsmouth, UK
Email: luke.helmer@port.ac.uk

Award Winner Best oral presentation

Due to its extreme abundance and therefore low cost, the European flat oyster, *Ostrea edulis*, was once regarded as a food of the poor. The Solent, being home to one of the largest populations within Europe, supporting over 700 workers on 450 vessels, was a key source of this supply. Today the species is under severe pressure to survive within the majority of its natural habitat. A combination of overfishing, poor fisheries management, invasive species, habitat loss, disease, pollution and other detrimental impacts has decimated most natural populations, prompting the establishment of restoration projects. The initial stage of this study, as part of the larger *Solent Oyster Restoration Project,* concerns the determination of current population densities in relation to the invasive slipper limpet, *Crepidula fornicata*. Initial surveys have recorded mean limpet densities of up to 927 m^2 within Langstone Harbour. By contrast, only 2 individual oysters were observed within all sample locations (n = 31, with 3 replicates per location) in the harbour. The main section of the study aims to determine the efficacy of using broodstock populations suspended from marina pontoons as a viable source of larvae to aid natural recruitment. With study sites distributed across the central and eastern areas of the Solent, survival, spawning period, reproductive potential and sex ratios will be determined as well as any differences in these factors between geographical location. This will allow for the future deployment of spat collectors and suitable substrata to be coordinated appropriately. Initial results show that successful reproduction and spawning can occur in this off-bottom environment and that survivorship can remain high. An unexpected result, obtained from observing the biodiversity associated with the cage systems, was the presence of the critically endangered European eel (*Anguilla anguilla*), a juvenile long-snouted seahorse (*Hippocampus guttulatus*) and juvenile sea bass (*Dicentrarchus labrax*). These findings indicate that the cage systems are acting as artificial reefs, increasing fish abundance and species diversity, further highlighting the importance of restoring native oysters for the benefit of the wider ecosystem and the human community that is dependent on it.

Elevated beds: a solution for European native oyster restoration?

Zoë Holbrook[1], Antony Jensen[1], Malcolm Hudson[2], Morven Robertson[3], Simon Harding3 and Chris Hauton[1]
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[3]Solent Oyster Restoration Project, Blue Marine Foundation, London, UK
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In contrast to *Crassostrea* or *Magallana* species that build three-dimensional structures, through fishery practice European flat oyster *Ostrea edulis* tend to lie flat on the seabed as singletons. As a consequence, it has been argued that this renders native oysters prone to siltation in depositional environments and subject to competition for habitat with other benthic epifauna, including invasive species such as the slipper limpet, *Crepidula fornicata*. The elevation of native oysters has been shown previously to result in more efficient particle clearance than those left on the seabed. Data have shown that an elevated habitat provides an environment with lower bacterial counts and reduced sediment loads, and potentially places oysters in faster flow regime with greater oxygen concentrations. However, the means to raise oysters above the seabed requires more effort and intervention, and does not benefit fishing activity. Further work is required to constrain the optimum height from the seabed, sediment load and water flow at which physiological performance is most productive for the native oyster. This summary will introduce a project to quantify (a) the physiological performance of *O. edulis* at different elevations from the seabed, (b) clearance rates of *O. edulis* post exposure to sediment load, and (c) effects of water flow on *O. edulis* respiration rates. It will be argued that the use of small scale experiments to constrain optimal environmental conditions represents a cost-effective approach to support native oyster restoration prior to the large-scale deployment of oyster reefs in the environment.

Epigenetic investigation into gene movement within *Biomphalaria glabrata* and implications on infection by *Schistosoma mansoni*

Daniel Horton[1], Gabriel Rinaldi[4], Patrick Driguez[4], Halime Arican-Goktas[1], Matty Knight [2,3] & Joanna Bridger[1]
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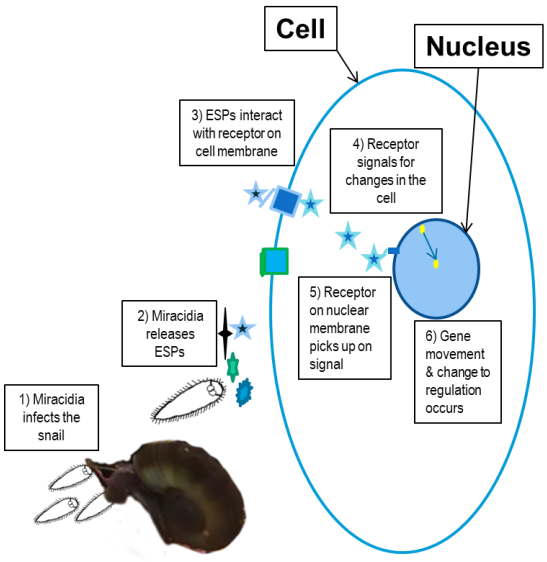
Biomphalaria glabrata is the intermediate host of the blood fluke *Schistosoma mansoni* which causes the neglected tropical disease schistosomiasis that affects 250 million people globally. Investigating host:pathogen interaction between these two species using susceptible and resistant strains of *B. glabrata* revealed that the parasite elicits gene movement and associated upregulation of gene expression in susceptible hosts. Therefore we hypothesise this to be a key event for infection establishment. One of the genes affected is heat shock protein 70 (*hsp70*), which can be induced to move by mild heat shock at 32°C. Using this heat-shock model the epigenetic alterations associated with *hsp70* gene movement can be identified and drugs that may prevent gene movement investigated. Initial assessments of the epigenetic alterations have focused on histone modifications, specifically looking at markers associated with gene activation or repression that show a global change after incubating snails at 32°C. Concurrent to this, we examined whether using chemical inhibitors of key events such as gene movement and gene expression conferred resistance onto susceptible snails. Preliminary studies showed that 2,3 butanedione monoxime (BDM), a global myosin inhibitor, is capable of preventing gene movement in the heat shock model. A pilot study was conducted into the effects of BDM on the outcome of treating susceptible snails prior to *S. mansoni* miracidia. Two metrics were used to determine the effect of BDM on snail susceptibility to the parasite; resistance to infection and cercariae shedding. Although a strong trend of increased resistance was observed in BDM-treated, infected, susceptible snails, neither metric revealed statistically relevant change. Optimisation of the BDM drug treatment regimen is currently underway in preparation for testing larger cohort of snails to identify more subtle changes to resistance as indicated by the pilot study.



Preliminary observations on spatial patterns of foraging in the Celtic sea slug, *Onchidella celtica* (Cuvier, 1817)

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Onchidella celtica is a pulmonate found on exposed rocky shores in parts of Cornwall and north Devon. It spends most of its life taking refuge in crevices, emerging onto open rock only during ebb tides to forage for food and to find a mate. Time-lapse photography was used to record the foraging behaviour of a group of at least 15 sea slugs that shared a single crevice at Polzeath, north Cornwall and emerged during four periods of consecutive ebb tides between May and September 2015. Image analysis software was used to track the movements of the sea slugs and to estimate the speed, distance, duration and direction of foraging. Individuals exhibited a range of crawling speeds. Both duration of foraging and maximum foraging distance were very variable. More than 95% of 193 tracks recorded began and ended at the home crevice, but the paths followed by individual sea slugs varied greatly from simple loops to highly complex meanderings. Discrete Maximum Likelihood Estimation (MLE) indicates that some individuals follow a Levy walk search pattern during parts of their period of emergence. The significance of the results obtained so far is to be discussed along with suggestions for further research.

Phylogeny and systematics of Bornean *Georissa* (Gastropoda: Hydrocenidae)

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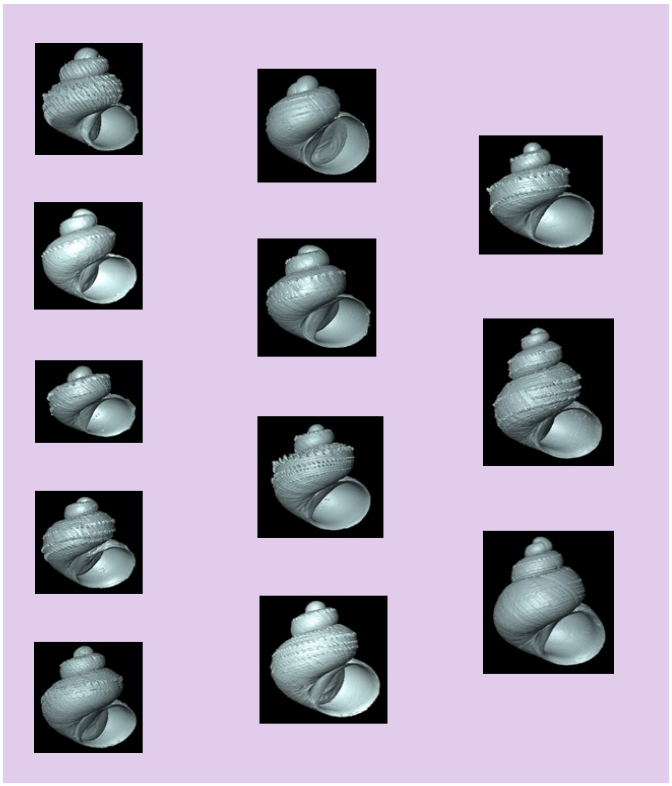
In the present study, we analysed character data of our model organism, minute land snails belonging to the genus *Georissa* (Gastropoda: Hydrocenidae). Animal tissue and shell samples were obtained from recent fieldwork in Malaysian Borneo, voucher specimens from Naturalis Biodiversity Center, Borneensis Collection (UMS), and Zoology Museum (UNIMAS). The genomic DNA of *Georissa* was extracted and phylogenetics analyses were carried out using concatenated sequences of 16S and CO1 mitochondrial genes from 173 individuals, including outgroup. Morphological examination of *Georissa* shells were evaluated based on the stacking microscope and scanning electron microscope images. The analyses of RAxML and MrBayes show that *Georissa* sp. from Malaysian Borneo form five major clades. Within these clades, *Georissa scalinella* consists of two subclades, separating the populations from Sabah and Sarawak. This provides evidence of a long history of dispersal of *G. scalinella* throughout Borneo. Furthermore, our findings from molecular and morphological analyses show that hydrocenids from Malaysian Borneo are complex and diverse in shell shape. Further analysis of shell character evolution, combined with niche circumscription in the field may reveal the driving forces behind the morphological diversification.



Inferring growth parameter for the shell shape of *Littorina saxatilis*

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The highly polymorphic *Littorina saxatilis* is a very common marine intertidal snail in the northern Atlantic, and has been the subject of extensive research in the areas of speciation and parallel evolution. The reason *L. saxatilis* is of such interest is because of strong natural selection for two different ecotypes in distinct microhabitats just a few meters apart. The main selective pressures in the two different habitats are crab predation or wave action respectively. This has selected for bigger, thicker shells with smaller relative aperture in the crab rich habitat, and smaller, thinner shells with bigger relative aperture in the wave swept habitat. Previous morphological research has shown that the two ecotypes can be distinguished not only by size, but also by shape. Because of this variation, this species is a good candidate for examining the possibilities of using a growth parameter investigation based on Raup's model. Building on the basis of logarithmic spirals we can make 3D models of a wide variety of shell shapes using only a few parameters, and since these parameters determines the shell construction process, they may relate closely to the underlying genetics of the snail. Using the landmarked images from previous geometric morphometrics research, the intention is to develop a method for inferring and analysing the growth parameters, giving us the ability to acquire 3D models from 2D images. This method should be able to explain the variation between the ecotypes in a biologically descriptive way, and in addition give us realistic computer models of the shells.

Historical dynamics of two top shell species in the Mediterranean and Black Seas

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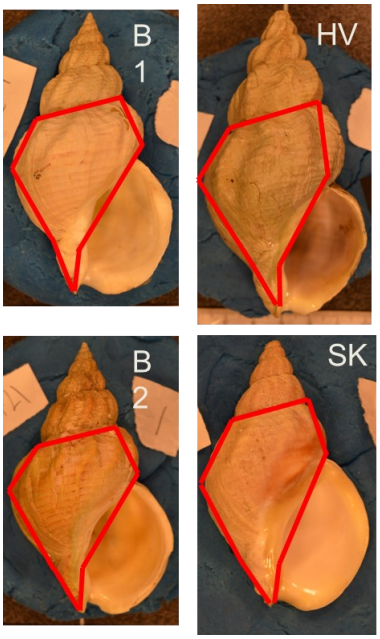
Gibbula Risso, 1826 is one of the most diverse genus within Trochidae, with 24 species recognized only along the European coastlines. Differences in shell morphology and colour patterns, among others, are generally considered enough to recognize and differentiate species within the genus. However, two of these species, *G. divaricata* and *G. rarilineata*, overlap their morphological characteristics that often make them indistinguishable. Furthermore, both species share the same habitat and distribution area. Therefore, the use of molecular tools has been of paramount importance for identifying these two species. We here have analysed the patterns of COI genetic variability in more than 700 specimens of *G. divaricata* and *G. rarilineata* throughout the Mediterranean and Black Sea, in order to study the historical processes responsible for their differentiation and current distribution areas, highlighting the phylogenetic affinities of the different genetic variants found, the population structure and patterns of gene flow and isolation-by-distance within each species.
Two groups of differentiated mitochondrial lineages are observed in *G. divaricata*, corresponding to the eastern and western basins of the Mediterranean, with a probable origin within the latter. In *G. rarilineata*, however, two lineages are also identified for the same basins and the Black Sea, but a possible origin in the eastern Mediterranean and/or Black Sea seems to be more likely. The two species, thus, seem to have colonized the Mediterranean basin in opposite directions, reaching their current sympatric distribution. We will discuss the historical dynamics of the two species, their demographic trends, and the establishment of a potential hybrid zone between them.

Analyses performed for *G. rarilineata* include specimens from these localities of the Mediterranean and Black sea

Fine-scaled spatial patterns in the shell morphology and colour of the subtidal whelk *Buccinum undatum*



Hildur Magnúsdóttir [1,2] Snæbjörn Pálsson[1], Kristen Marie Westfall [1,3,4], Zophonías Jónsson[1] & Erla Björk Örnólfsdóttir[2]
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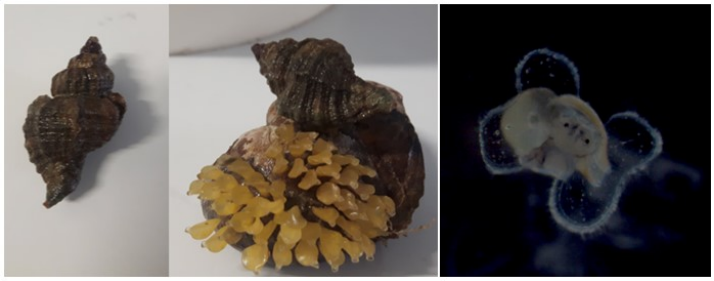
Geographical patterns in morphology can arise from direct environmental control of physiological processes and body shape, differential adaptation to changing biological surroundings or random changes in distinct populations. Spatial patterns and connectivity within subtidal gastropod species was studied using the ubiquitous common whelk (*Buccinum undatum*), which exhibits remarkable spatial variation in life-history traits and morphology throughout its bicontinental N-Atlantic distribution. Phenotypic variation in shell morphology and colour was assessed quantitatively in whelks from Breiðafjörður. Whelks in Breiðafjörður displayed a fine-scaled pattern of spatial variation in shape, thickness, lightness of shell colour and colour diversity. Increased differentiation with increased distance between populations suggests that population connectivity of the common whelk is limited. Both shape and colour varied from the inner part of Breiðafjörður in the east to the outer part in the west. In the inner part of the bay, whelk shells were thick with a round body whorl and less diverse in colour while outwards in the bay, the shells gradually became thinner with a more elongate body whorls and more colour diversity. The high site-specific differences in shell traits of the common whelk and inshore-offshore pattern in correlation with environmental variables indicate local ecotypes and limited demographic connectivity.

The effects of temperature on larvae and early juvenile development of the European sting winkle, *Ocenebra erinaceus* (Neogastropoda, Muricidae, Linnaeus 1785)



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Temperature has been recognized as a critical factor regulating the reproductive success, recruitment, mortality and geographical distribution in marine benthic species. In general, larvae and juveniles are more sensitive to thermal stress than adults and, as a consequence, represent a key life stage in determining the geographic range of a species. In marine gastropods with encapsulated development, temperature is considered as a constraint because the oxygen availability inside the egg mass is directly correlated with temperature; changes in environmental temperature affecting oxygen diffusion through the egg mass. *Ocenebra erinaceus* is a predator species that caused significant damage to shellfisheries. To understand the potential impact, it is important to know how temperature can affect the development. *O. erinaceus* is native to UK and France, females spawn one clutch of capsules between April and May, when the temperature reaches 14-15°C. Previously, *O. erinaceus* has been reported to exhibit 8 ontogenetic stages and dispersal polymorphism at hatching time. Some larvae hatch as swimming larvae and others as crawling juveniles. In this study newly laid egg capsules were exposed to five different temperatures within the adult thermal distribution (9–22°C). We compared development time, embryo size, capsular mortality, metabolic response, oxygen intracapsular conditions and dispersal polymorphism in relation to temperatre. Intracapsular development was faster at higher temperatures. Capsular mortality was high at extremes of the temperature range. Metabolic rates were not affected by warmer temperatures, although hypoxic conditions (> 2mg O_2 L^{-1}) were observed in capsules with advanced embryos exposed to warmer temperatures. Larvae exposed to higher temperatures took more time to settle than larvae exposed to 14°C,. No significant differences were observed however, in the carbon and nitrogen composition of recently settled juvenile. Importantly, we note that dispersal polymorphism was not observed at hatching time. Our results suggest that temperature may produce deleterious effects on intracapsular development of *O. erinaceus* because during early stages of the development, the thermal tolerance window was narrower compared with the adult thermal distribution. Moreover, delayed metamorphosis at warmer temperatures may affect adult population recruitment.

First approach to the systematics of the genus *Elysia* (Heterobranchia, Sacoglossa) in Europe

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There is not much literature reviewing the phylogeny of small groups within Sacoglossa and there is even less literature on the European fauna. Therefore, in this contribution we attempt to clarify the European diversity of genus *Elysia* Risso, 1818 and test its monophyly with an integrative taxonomic approach. In the present study, seven recognized European Sacoglossan species were sampled. Bayesian inference (BI) and Maximum Likelihood analyses (ML) based on three partial genes (mitochondrial 16S rDNA, cytochrome oxidase subunit 1 and nuclear histone H3) were used to infer the phylogenetic hypothesis. In addition, network analyses were conducted in order to obtain a better picture of the systematics and evolution of the European species of the genus. Morphological traits were also studied. *Elysia* species forms a polyphyletic group in the Atlantic and Mediterranean; by contrast, its sister genus *Bosellia* appears to form a rather well-defined monophyletic group. Regarding morphological characters, the radula was a key character to re-identifying some species. Based on our results, we present a revised systematics of the Plakobranchoidea superfamily representatives in the European context.

Non-native terrestrial gastropods in Java and the potential distribution of *Lissachatina fulica* and *Bradybaena similaris*

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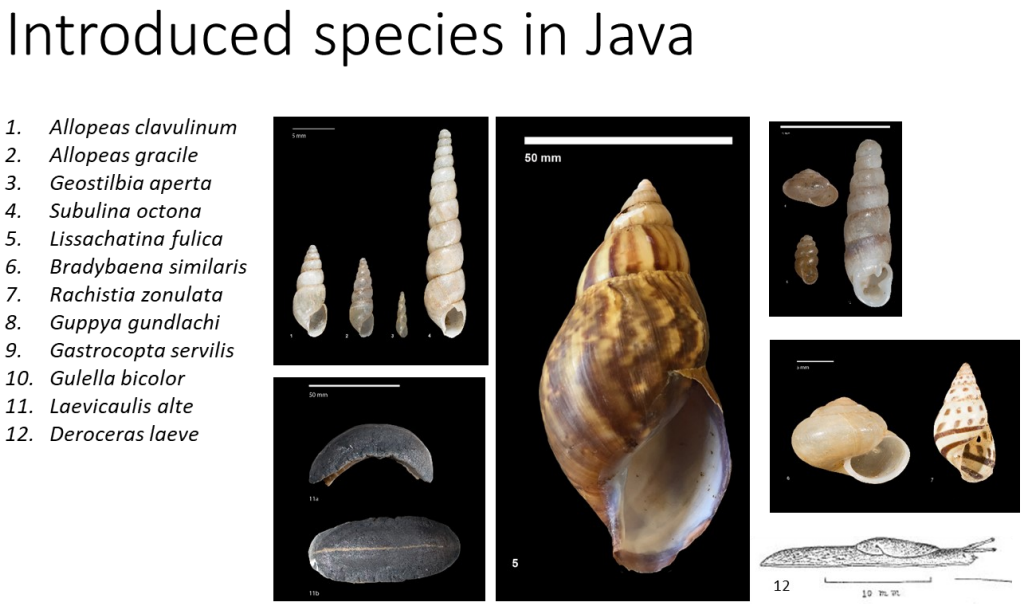
We compiled records of non-native land snail species from Java from recent collections, museum and literature records as well as data from citizen science. Twelve species, *Laevicaulis alte* (family Veronicellidae); *Allopeas clavulinum*, *Allopeas gracilis*, *Geostilbia aperta*, *Lissachatina fulica*, *Subulina octona* (family Achatinidae); *Gulella bicolor* (family Streptaxidae); *Rachistia zonulata* (family Cerastidae); *Gastrocopta servilis* (family Gastrocoptidae); *Deroceras laeve* (family Agriolimacidae); *Guppya gundlachi* (family Euconulidae) and *Bradybaena similaris* (family Camaenidae), were listed as non-native species from Java. Based on the presence data records of *Lissachatina fulica* and *Bradybaena similaris*, the potential distribution of these two invasive species in Java was predicted using MaxEnt. *Lissachatina fulica* might colonize large parts of Java, especially lowland areas and the southern part of Java but should not be able to colonize mountain regions. In contrast, *Bradybaena similaris* might spread mainly in the mountain regions, but not in lowland areas. The prediction of the potential distribution ranges may help conservation area managers as well as policy makers to conduct precautionary actions against the two invasive species.



Molecular identification of cone snails (Family Conidae, Gastropoda) from Verde Island, Batangas City, Batangas, Philippines using CO1 and 16S gene markers

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Cone snails (Family Conidae, Gastropoda) are a hyperdiverse group of marine gastropods characterised by specialised organs known as venom apparatus that is used to subdue prey such as worms and other molluscs. They include at least 803 recent species recognized by the World Register of Marine Species (WoRMS, 2014). Cone snail samples were collected from the coastal areas and waters of Verde Island, Batangas City, Batangas, Philippines which has been dubbed the "centre of the centre" of world's marine biodiversity (Carpenter and Springer, 2005). Out of 44 isolates, BLAST analysis for mitochondrial gene marker CO1 revealed 11 species while 16S had 19. Pairwise analysis of the genetic distances within and in between species showed variation from expected results. Specifically, *Conus arenatus* and *Conus pulicarius* showed great variation in their morphology yet had only a small genetic distance in both CO1 and 16S gene markers. The purpose of this study is to (1) provide a data of the DNA barcodes and diversity of cone snails from Verde Island in the Philippines, (2) analyse genetic distances within and in between collected species thru pairwise distance analysis and construction of the phylogenetic trees & (3) compare and analyze results according to the accepted taxonomy of Family Conidae.

Landscape genomics of the *Bulinus africanus* group across Central East Africa and their associated *Schistosoma* species

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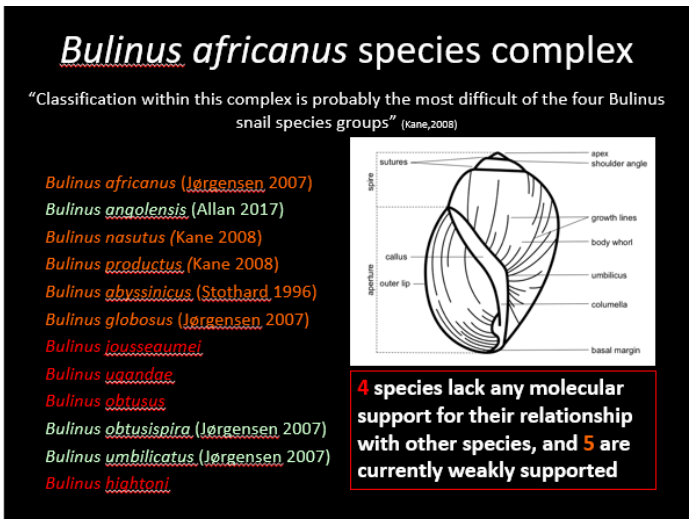
Bulinus africanus group species are widely distributed and of significant medical and veterinary importance in Central East Africa due to their role in transmitting *Schistosoma haematobium* causing the debilitating parasitic disease of schistosomiasis. Two species are of particular interest, *B. globosus* and *B. nasutus*, due to their overlapping distribution, similar morphology and differing roles in transmitting *S. haematobium* spp. dependent on their setting. Landscape genomics uses environmental and landscape factors to explore adaptive genetic variation by sampling individuals with a large number of markers. Affordable next generation sequencing, the improved availability of environmental data sets and the publication of techniques for handling datasets have significantly progressed this field. The combination of population genomics and landscape ecology has not been explored for any *Bulinus* group before, but its use is hypothesized here to help elucidate species boundaries and explore intra- and inter-species relationships across a broad geographic range. Whole mitochondrial genomes of multiple *B. africanus* spp. collected directly from the field, or already in the Schistosomiasis Collections at the Natural History Museum (SCAN), will be sequenced and scanned to identify loci displaying strong correlations with one or more environmental variables and/or phenotypic traits. For example, *B. nasutus* are considered as being more resilient to desiccation by aestivating in seasonal freshwater bodies than the closely related *B. globosus* on Zanzibar. However whether this is a definitive factor splitting the two species across Central East Africa is unknown. What determines the compatibility of schistosomes with their associated intermediate snail hosts is largely unknown; the current assumption is that schistosome infection success is based on local parasite-snail compatibility. However, this generalisation has proven to be insufficient, with the cattle schistosome *S. bovis* transmitted by *B. globosus* on mainland Central East Africa recently being introduced to Zanzibar, where it also utilises *B. globosus* (unpublished observations). By exploring the genetic diversity of such geographically isolated *B. africanus* spp. We hope to elucidate what determines infection success and potentially the region of the genome involved in intermediate host compatibility.



Greening by the blue diatom *Haslea ostrearia*: consequences on bivalve feeding behaviour, physiological and biochemical state

Fiddy S. Prasetiya [1,2,3], Jean-Luc Mouget [1], Priscilla Decottignies [4], Michèle Morançais [4], Luc Comeau [6], François Turcotte[5], Romain Gastineau [1], Iskandar [2], Toto Subroto [3], Réjean Tremblay [5] & Bruno Cognie [4]

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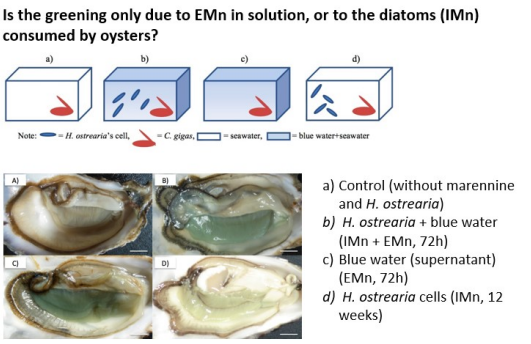

Haslea ostrearia is a marine diatom that synthesizes and releases a blue-green pigment, marennine, responsible for the greening of oyster gills, a phenomenon which affects the French oyster industry. However, the consequence of marennine fixation on gills and its ecological consequence are poorly documented. This work presents the first integrated study concerning the interaction of *H. ostrearia* and marennine in bivalves. We evaluated how the uptake of *H. ostrearia* cells and marennine changes the coloration of pallial organs in Pacific oysters *Crassostrea gigas*. And applied an histological approach to locate the pigment in pallial organs. In addition, we studied the effects of marennine concentration on the behaviour, physiology and biochemistry of two bivalve species, *Mytilus edulis* and *Crassostrea virginica*. Using video endoscopy and scanning electron microscopy, we followed the course of different cell sizes of *H. ostrearia* within pallial organs. We found that the greening of gills mainly results from the filtration of seawater containing marennine released by the microalga. Additionally, the histological approach revealed that marennine fixation probably occurs in the mucocytes of the gills. *C. gigas* seems sensitive to the fixation of marennine on its gills since we observed lower filtration rates. The pigment not only reduced valve opening, oxygen consumption, clearance rate and scope of growth of *M. edulis* and *C. virginica* but also affected the unsaturation index in membrane phospholipids of both bivalves. We also found that only small cells of *H. osteraria* and those larger cells orientated dorso-ventrally could enter the principal filaments and then enter the dorsal acceptance tract. In conclusion, our findings reveal that marennine impairs the biology and physiological rates of bivalves. These effects should be taken into consideration in applications other than greening.

Phylogenetic relationships of aquatic snails in the clade Hygrophila

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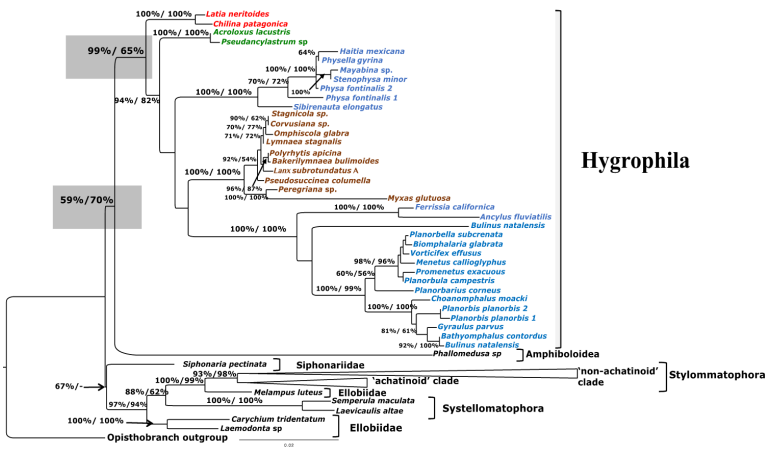
The Clade Hygrophila is the principal group of freshwater aquatic snails. It encompasses six families: the Chilinidae, Latiidae, Acroloxidae, Physidae, Lymnaeidae and Planorbidae. The clade includes the vectors of diseases of medical and veterinary importance, including *Biomphalaria* and *Bulinus* that transmit Schistosomiasis and *Lymnaea* that transmits *Fasciola*. At present, the position of the Hygrophila within the broader Pulmonate phylogeny is uncertain. Likewise, the interrelationships of the Acroloxidae, Physidae, Lymnaeidae and Planorbidae remain unclear.



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We have amplified and sequenced hygrophilan taxa and pulmonate outgroups for four genes: the LSU rRNA (28S), SSU rRNA (18S), Histone three (H3) and cytochrome oxidase I. To examine relationships, phylogenetic trees were constructed using Maximum likelihood (ML) and Neighbour-Joining (NJ) methods for both the concatenated sequence dataset (all 4 genes) as well as for each gene individually. The results of the combined genes analysis of LSU, SSU, H3 and CO1 strongly supported the monophyly of the Hygrophila clade and there is strong support for the monophyly of all the families within the clade (100% bootstrap support with both ML and NJ methods). The Acroloxidae and Physidae cluster together in the tree with 68% ML and 78% NJ supports. Likewise the Lymnaeidae and Planorbidae cluster with 81% ML and 74% NJ supports. The Chilinoidea is basal within the hygrophilan clade with 100% bootstrap support from both ML and NJ methods. The results of the individual gene trees are consistent. The current phylogenetic study provides the most comprehensive sampling of hygrophilan taxa to date. Further work will analyse additional genes to try to better resolve the interrelationships among the hygrohilan families and expand on the number of hygrophilan taxa sampled.

The effect of acidification on *Dentalium majorinum* (Mollusca: Scaphopoda) in the Southern Ocean

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Polar oceans are projected to be highly affected by warming and ocean acidification, thus making the Antarctic continent an ideal test laboratory. Regional differences in temperature and carbonate chemistry due to the different oceanography make the Weddell and Amundsen Sea an ideal test setting in which to assess biotic response to different environmental conditions. Here we focus on an understudied group, the Scaphopoda, specifically *Dentalium majorinum*. We found differences in morphometric parameters such as ventral and dorsal diameters, length and rib number, volume and densities. On average, the Amundsen sea specimens are smaller in length and volume than the Weddell sea specimens. Length, ventral and dorsal diameter are higher at depth below 1600m depth in the Weddell sea. Internal difference in shell morphology are been analysed by microtomography (microCT) and synchrotron based x-ray tomographic microscopy (SXRTM). No distinct growth rings, indicating difference with growth rates between winter and summer, are visible.

Lessepsian molluscs reshape soft substrate-assemblages of the Israeli Mediterranean shelf

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[2]The Steinhardt Museum of Natural History,
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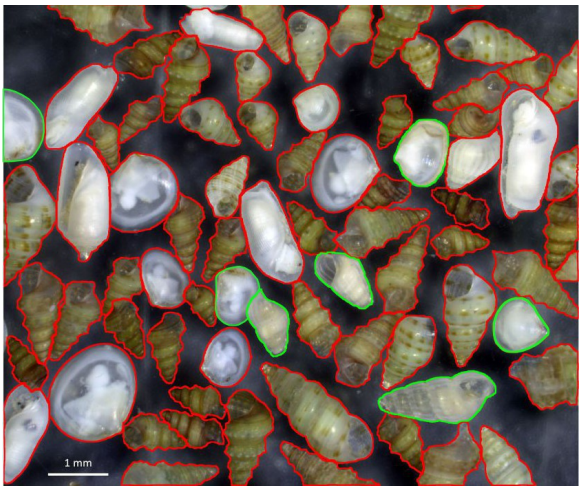

Shallow water molluscan assemblages of the Israeli Mediterranean shelf (here an example from 20 m water depth off Ashqelon) are characterized by a dominance of Lessepsian species (marked in red) over native taxa (in green).

The 'Lessepsian invasion' – the massive influx of Indo-Pacific biota into the Mediterranean Sea via the Suez Canal – is the largest marine biological invasion. To date, hundreds of non-indigenous species have been recorded from the eastern Mediterranean, with molluscs representing the most speciose non-native phylum. The lack of data on pre-Lessepsian benthic community composition, however, severely impairs our understanding to which degree the taxonomic and functional composition of shallow-water molluscan assemblages has been modified by non-indigenous species. Shelly death assemblages (DAs) encountered in surficial sediments represent a unique archive of past community states that enable overcoming this impediment. This is because they change more slowly (10-10,000 years) than the corresponding living assemblages (LAs; yearly scales of turnover). Strong and rapid directional changes such as those due to human activities are therefore not immediately captured by DAs, leading to a greater live-dead (LD) mismatch than under natural processes alone. We compared soft-substrate molluscan LAs and DAs collected in September 2016 along a depth transect from 10 to 40 m on the Mediterranean shelf of southern Israel. High dissimilarity in taxonomic composition (Jaccard-Chao index), rank-order agreement of species relative abundances (Spearman's rho), and differences in trophic

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guild composition between LAs and DAs suggest a major community shift in recent times. Our findings reveal that Lessepsian species not only numerically dominate assemblages at all sampling sites, but also altered the trophic properties of local molluscan communities. An analysis of a new set of LA-samples collected in spring will provide valuable insights into the degree of seasonal variability in community composition, while estimates of time-averaging by shell-dating will serve to better constrain the temporal scales of the observed community changes.

Death and rebirth on the Desertas Islands (Madeira: Portugal): land snails as a case study

Dinarte Teixeira [1,2,3], Beata Pokryszko [4], Robert Cameron [5] & Klaus Groh [6]
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[2] Laboratory for Integrative Biodiversity Research, Finnish Museum of Natural History, University of Helsinki, Finland
[3] Faculdade de Ciências da Vida, Universidade da Madeira, Portugal
[4] Museum of Natural History. University of Wrocław, Poland
[5] Department of Animal & Plant Sciences, University of Sheffield, UK
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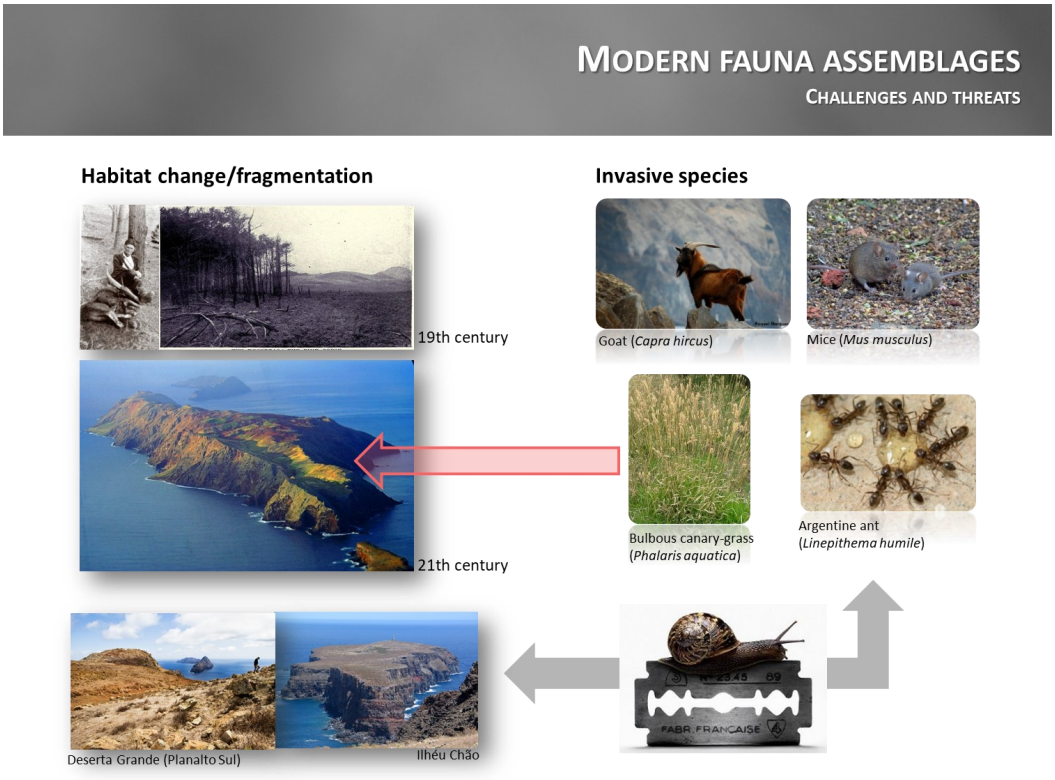
Email: 2311196@student.uma.pt

Desertas Islands (Madeira: Portugal), a small sub-archipelago (14,21 km2) of three islets (Ilhéu Chão, Deserta Grande and Bugio) located in the Macaronesian region of Portugal, encompasses a rich land snail fauna, the majority endemic to the Madeira archipelago and exclusive to the islands. Although geologically young (3.2–3.6 Ma), the extant faunal assemblages in the semi-arid and uninhabited islands of the Desertas are the result of the paleoenvironmental history and the effect of human impact, in the form of habitat disturbance/loss and invasive species introduction. Eleven late Pleistocene/Holocene colluvial fossil deposits were assessed for faunistic purposes, and their age (+60.000 yr – 8.200 yr BP) determined by shells dating through amino acid racemisation (AAR) calibrated with radiocarbon. As a result, seven new species and two subspecies have to be described for both islands, and eight new records can be added. These results are compared with 1999 surveys and discussed. Extensive surveys were implemented between 2008-2016, to assess the current fauna assemblages, focusing the effort on cliff areas which were unsurveyed before. As a result, eight endemic species were rediscovered on Deserta Grande, the majority unfound for more than one hundred and fifty years. The implications of the results for habitat and species conservation planning in the Desertas Islands are discussed, along with the contribution of habitat recovery and eradication of allochthonous species efforts implemented by the local authorities, to the current results.



Great British Mollusca Types Project: A union database for the UK

Ben Rowson[1], Harriet Wood[1], Jonathan Ablett[2], Jennifer Gallichan[1], Andreia Salvador[2], James Turner[1], Anna Holmes[1] & Graham Oliver[1]
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Nomenclatural "types" are the treasures of any natural history collection and are constantly sought out by researchers. Many curators lack the skills or resources to attend to their research and curation and such types risk being 'lost' to the international scientific community. Inter-museum collection databases are often discussed but rarely materialise. AC-NMW and NHMUK have received funding from the John Ellerman Foundation to develop a jointly held, universally accessible resource connecting the Mollusca collections of nationals and other large museums for the first time. Staff at seven partner museums in six UK cities, each lacking a malacological curator, are being trained to recognise, research and interpret the molluscan type specimens in their collections. This project will strengthen and develop curatorial skills in specialist areas at regional museums that are transferable to other historically important natural history collections. This poster describes the progress and provocations of the project so far.

Population genetics of two intertidal *Gibbula* species in the Bay of Biscay and English Channel

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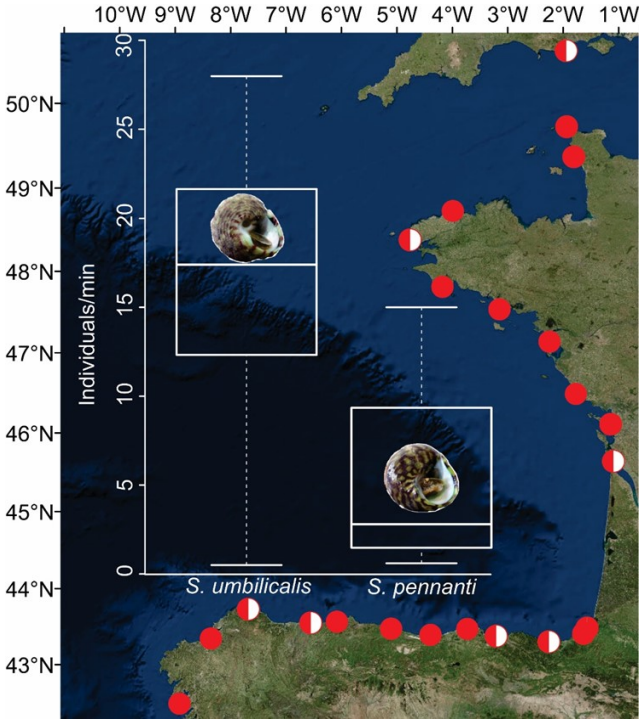
Email: ew6g09@soton.ac.uk



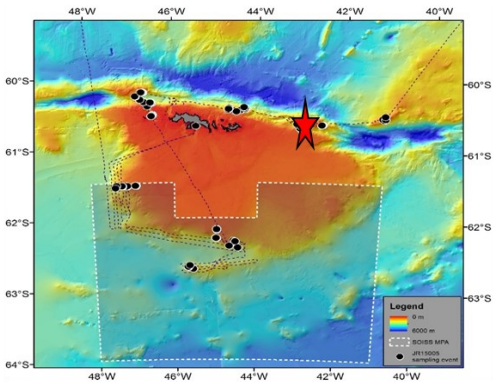
Gibbula umbilicalis and *Gibbula pennanti* are gastropods occupying similar ecological niches within north-east Atlantic rocky intertidal zones. Timed, quadrat-based and semi-quantitative estimates of abundance showed a patchier distribution of *G.pennanti* than *G.umbilicalis* at sites from northern France to the western coast of Spain. This difference may be related to *G.pennanti* being present most commonly on certain macroalgae species such as *Fucus serratus*, whereas *G.umbilicalis* is most common under boulders, in rockpools and crevices. We examined the possible links between these differences in distribution as well as habitat gaps and oceanography on the population genetics of the two congeners. Initial analyses on *G.umbilicalis* were based on a region of variable mitochondrial DNA, selected by comparing the mitochondrial genomes of two geographically distant individuals of *G.umbilicalis*. Pairwise Fst revealed no significant differences between *G.umbilicalis* from sites on Atlantic coasts of France and Spain. Subsequently, multiple microsatellite loci were selected for more detailed analysis of both species. This showed more significant genetic difference between sites with *G.pennanti* compared with the same sites with *G.umbilicalis*. There was a significant difference between microsatellite marker lengths of *G.umbilicalis* from Swanage on the UK south coast compared with sample groups from France and Spain, which did not correlate with an isolation by distance model. This suggests that the English Channel reduces connectivity between French and UK shores for *G.umbilicalis* and completely prevents expansion of *G.pennanti* onto the UK shores. Populations in the sites immediately north and south of the habitat gap were not significantly different for either species, implying that the sites are genetically connected. This implies that oceanographic conditions, not distance between areas of suitable habitat, are determining factors for connectivity in both species.

MALACOLOGICAL HELP NEEDED

At the 2017 Forum, Katrin Linse posted the following slide. If you have an idea what this animal is, please contact her

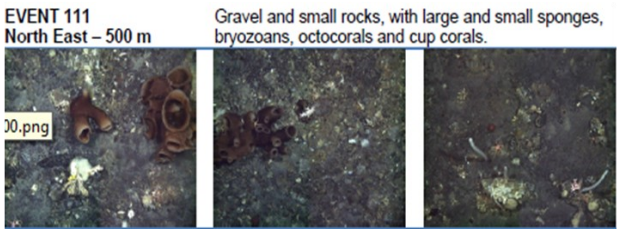
katrin.linse@BAS.ac.uk

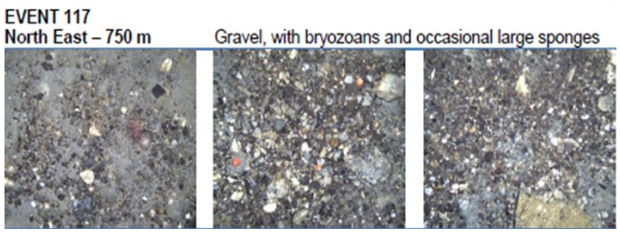
Unknown Southern Ocean gastropod – any ideas?



AGT 112 - 60.5°S 43.0°W - 548-598 m
AGT 119 - 60.7°S 42.5°W - 801-867 m

No operculum





Research Report

An account of work undertaken with financial support from the Malacological Society of London

Hunting bubbles

Trond R. Oskars

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The University Museum of Bergen has in recent years endeavoured to understand which processes have shaped today's patterns of species diversity and biogeography. One of the main branches of this research is Dr. Manuel Malaquias' studies on "opisthobranch" gastropods, with special focus on the Order Cephalaspidea or the bubble shells. My PhD thesis is a part of this project and has as its main aim to understand the diversity of the herbivorous cephalaspid family Haminoeidae. One of the goals of my thesis is to document the diversity, systematics and taxonomy of the Indo-West Pacific (IWP) genus *Haloa* and to try to use this knowledge to better understand speciation and biogeography of shallow-water gastropods.

Haloa are typically associated with shallow waters, and although they are found in temperate and sub-tropical climates, these gastropods are particularly abundant in tropical habitats such as reefs, seagrass-beds and mangroves. Due to this they are also well represented in the famous biodiversity hotspot "the Coral Triangle", which is most known for containing the highest diversity of marine species in the World. The Triangle is poised between the three landmasses of the Philippines, Indonesia, and Papua New Guinea, and large parts of the material in my study hails from this region or its periphery.

Through field trips and the study of museum collections I have already assembled a significant dataset of these snails from across the IWP. However, there is still one blank spot on the map, the China Sea. For cephalaspids from this region, specimens suitable for both morphological and DNA sequencing are rarely found in museum collections. The few specimens we do have are formalin fixed specimens from the continental coast of the South China Sea, whereas the East China Sea is only represented by two species from Okinawa, Japan. When looking for alternatives for filling in this blank, Dr. Malaquias and I also noticed that our own Museum's Collection was quite sparse in specimens from this region, and it was decided that we should conduct a field trip in this area. When deciding on a good sampling locality the answer was literally in the middle of the map, an island that bears the additional names "Heart of Asia" and Formosa (Portuguese; the Beautiful Island). Thus, as part of the University Museum of Bergen's research effort we carried out a 3-weeks field trip to Taiwan (Republic of China) during May 2017. My attendance on this trip was generously funded by the Malacology Society of London through a Research grant.

My main aim for this field trip was to sample specimens of *Haloa* for morphological and molecular work and to document range, habitat and ecology in a region where data on *Haloa* cephalaspids is sparse. An additional benefit for me was that the typical habitats associated with *Haloa* are all available in relatively short proximity, with tropical reefs to the south, mangroves and seagrass beds to the West and more mixed habitats to the North.

In terms of malacology, Taiwan is ideally located in the middle of the China Sea, and displays some unusual climatic features. While the northern parts of the island boarder the sub-tropical East China Sea, the southern parts of the island is affected by the warm waters of the Kuroshio Current. This current flows northward from the Philippines along the western limit of the Philippine Sea, before splitting into an eastern and western current hugging both sides of Taiwan. These unusual currents give Taiwan a more typical tropical climate in the south, with water temperatures as much as five degrees warmer than the sub-tropical north. The combination of different climates, oceanographic features and proximity to the Coral Triangle, results in a rich variety of habitats and available ecological niches, which in turn creates the basis for a diverse marine fauna, in other words perfect for supplementing our Museum Collections. To cover the most ground within our limited timeframe, we chose three habitat-rich regions for sampling, and we spent around 1 week in each. The sampling was done by tide-pooling, snorkeling and SCUBA from the intertidal zone down to around 30 meters depth.

Room with a view—Photo M.Malaquias

The first area we visited together with Professor Hwang Chung-Chi from the National University of Kaohsiung. The locality was the Hengchun Peninsula in the tropical southern part of Taiwan. A large part of the peninsula is covered by the Kenting National Park, and with the correct permits one can sample from the numerous coral reefs. This rural setting also entailed a few memorable occasions. While the proper PhD's rode up front, the student was placed in his right place with the diving gear, which apart from the occasional surprised driver went quite well. One of our sampling sites was at the local favourite water sports locality in the cooling water outflow from the nuclear power plant; luckily the healthy-looking locals were adamant that the water was completely safe. The different temperature of the water subtly alters the fauna in the outlet, meaning many species thrive here.

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The second week we worked together with Professor Chang Yen-Wei and his talented students from the National Penghu University of Science and Technology, visiting different sites around Penghu Island in the Taiwan Strait. The last week we sampled on the North Eastern coast together with Dr. Vincent Chen an expert on intertidal fauna and Dr. Jie Wei-Ban who is the author of the book "Taiwan Nudibranchs".

When we arrived in Taiwan our colleagues informed us that *Haloa* gastropods are rarely seen in the wild. Most *Haloa* species are small rarely exceeding 15 mm, and are notoriously difficult to find. Due to this most sampling campaigns turn up a few species and specimens, and the specimens in museum collections are the result of several campaigns spanning several years. Another factor is that the nudibranchs are by far the most popular gastropods among divers, and tiny or less photogenic species, like most species of *Haloa,* are easily overlooked. However, according to Professor Chang's doctoral work several species of *Haloa* have been photographed by Taiwanese divers.

Fig. 3. *Chelidonura inornata*

Fig. 4. *Chelidonura sandrana*

Fig. 2. *Chelidonura hirundinina*

Photos: M. Malaquias.

Some of the more apparent colourful species like *Haloa ovalis* (Pease, 1868) and *H. cymbalum* (Pease, 1868), have been seen in Kenting and Green Island, the latter a locality that was outside our current field trip. Additionally, some shell specimens have been found through the years. For example a shell of the species *H. vitrea* (A. Adams, 1850) was recently depicted in the book "Mini-shells and small shells of Hengchun Peninsula, Taiwan" by Wu Shi-Kuei. Additionally, the pioneer of Japanese Malacology, Tadashige Habe (1916-2001), described the obscure species *Haloa yamagutii* (Habe, 1952) from the same Peninsula. We investigated the habitats that usually support species of *Haloa*, and although we turned up several cephalaspids, like species of the predatory family Aglajidae, the haminoeids we were targeting eluded us.

Fig. 5. *Haloa* sp.

Fig. 6. *Phanerophthalmus luteus.*

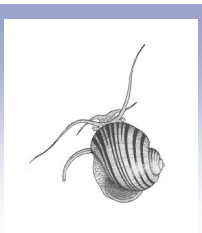
Photos: M. Malaquias.

Luckily, we managed to find a single dull coloured specimen of a haminoeid that seems to belong to *Haloa*. The specimen was found in the reefs around Kenting, with shell characteristics that seem to match *H. yamagutii*. We also visited two types of tidal sea-grass beds, the typical habitat of the duller *Haloa* species, but the snails were nowhere to be found. However, to our great luck, one of the beds was rich in *Haloa*'s close cousins, the elusive genus *Phanerophthalmus*. There have been mangroves in Taiwan in the past, but when we arrived, we were told that these are now heavily influenced by agriculture and urban development. We visited two restoration projects. Although these patches seem to be recovering, complete with the iconic fiddler crabs and several snails, there were no mangrove *Haloa* to be found.

When we returned to Bergen, we were pleased to hear that Dr. Jie had managed to find a live specimen of *H. cymbalum*, so we will have to regard two species of *Haloa* as a success. On the other hand, we have collected about 140 species of various "opisthobranchs". The samples are now being processed and will soon be deposited in the collections of the University Museum of Bergen, and will in time be ready for scientific study.

For the record ....

Officers and honorary members of the Malacological Society of London



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In Memoriam

Dai Roberts

13 October 1946 - 11 October 2017

Dai was born in North Wales and brought up in a village called Coedpoeth on the right side of Offa's Dyke. His family background included a traditional mix of miners, labourers and shopkeepers. He was brought up in the Welsh non-conformist tradition and received his early education in the village school, Penegelly and subsequently at Grove Park Grammar School in Wrexham. Whilst his audition for the school choir only lasted one line of "Onward Christian Soldiers" and his tenure in the front-row of the junior school rugby team lasted about 3 nose-bleeds, he did become a School prefect in the 6th form. Dai's childhood was marked by the strong influence of his paternal grandparents, with whom he spent many happy hours. Dai's father encouraged an interest in local fossils which Dai maintained throughout his life. His mother was a great source of strength to him and as well as teaching him how to bake, she introduced him to the delights of the popular music of the 1930's and 40's. Being Welsh was immensely important to Dai and there is a version of a Welsh poem that sums up his sentiments: "To be born Welsh is to be born privileged. Not with a silver spoon in your mouth, but music in your heart and poetry in your soul". After Grammar School, Dai was persuaded by his headmaster to follow a university education rather than seek a long-term commission in the Royal Navy and he studied Zoology at Liverpool University.

Jonathan and Christopher Roberts

Dai Roberts completed his BSc in the early 1970s. His PhD based at Port Erin Marine Station in the Isle of Man was on marine invertebrate ecotoxicology. He was appointed by Prof Gareth Owen to a lectureship in Queen's University of Belfast, Department of Zoology in 1972, rising to Senior Lecturer and then Reader by the time of his retirement in 2015. Dai was part of Zoology's 'taffia' but as a North Walian, he made his mark as something more than just another valley boy. During his long period of employment, Dai engaged across the full range of academic activities - teaching, research and administration - as well as involvement in the wider biological community through the institute of Biology, becoming a Fellow of the Royal Society of Biology. His many interests included malacology and conchology, and particularly the academic love of his life, the bivalves.

As a teacher, Dai was always passionate and well prepared, as well as fearless, happy to deal with not only his research interests but much else besides. His great forte was his ability to hold the attention of a class under our frequently cold, windy and wet field conditions. He was certainly the best field based teacher l ever worked alongside — knowledgeable, inventive and adaptable. While he was sometimes a fearsome master in the laboratory or field, Dai got the best out of the least motivated students by almost physically dragging them into the topic. The best students developed true respect and a genuine affection for Dai. Generations of Queen's students in marine and freshwater biology benefitted from his knowledge and developed interests they never knew they had. Dai knew he had to work hard if others were to follow and also, just as importantly, when to take a break and a drink or two to get to know our students as people and to win their trust. He was an excellent companion in the field, engaging in easy conversation when the time was right, but silent and focussed on with the job when the tide was coming in.

Dai's organisational skills were recognised early on and he became the Honour's year coordinator for Zoology and then Biological Sciences, responsible for the many tasks related to research projects, preparation and marking of examinations, assessment and reports. He and his wife Valerie organised and hosted excellent pre-examination meeting parties. Dai was an attentive host, highly sociable and considerate. In work, he frequently shouldered responsibility for difficult jobs: those involving student discipline and many ex-students are indebted to him for his precision and correctness in applying regulations as well as his kindness and support in addressing their problems and finding a way forward. Dai guided Zoology, Biological Sciences, Marine Biology and Biochemistry degrees through constant change from the 1980s onwards, overseeing the revision of the curriculum. His experience in modularisation, examination procedures, quality assurance, accreditation was invaluable prior to his retirement in 2015. Sometimes the research of academics who make such a maior contribution to education and administration is not given the regard it deserves, even by close colleagues. Dai's early work on marine pollution was very well regarded. As time went on, he developed wider interests and became expert on the molluscs and echinoderms of Southern Australia, as a result of a sabbatical spent there in the 19705 and in Indonesia with Operation Wallacea. Both places are far away from Queen's but undoubtedly both had a special place in the heart of Dai. His face would light up with any query related to the bivalves and holothurians of the reefs of these southern climes. He was also passionate about the people of these regions, particularly those living close to and dependent on the sea and supported a succession of Indonesian graduate students.

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But Dai's interests in research were wider again. He had a great interest in the ecology and conservation of freshwater pearl mussels which is endangered throughout its range not least in Ireland. Notably, he led research establishing the life cycle in captivity and restocking programmes. Dai had interests in the ecology and feeding habits of sea cucumbers including deep sea species and was one of the first to examine tentacle structure and particle size using electron microscopy. His interests in non-fin fish aquaculture based at the Queen's University Marine Laboratory at Portaferry bridged the divide between fundamental science and applied research and development as drivers of employment in isolated communities. This was the realm of C-Mar which Dai managed during the 1990s and 2000s. Visits to Portaferry to see the latest culture techniques for microalgae and a selection of tasty things like blue mussels, Dublin Bay prawns, lobster, abalone, 'dulse' and sea urchins, were always a pleasure. Over many years, Dai promoted the interests of sustainable marine aquaculture in Northern Ireland showing great patience and political astuteness in his dealings with Government and fishery interests. His involvement in Strangford Lough and its problems are well known. Whilst this work did not necessarily benefit Dai's publication list, it was ahead of its time with regards to 'impact' and 'outreach'.

In this era of specialists in research and teaching and the increase in university administration, Dai Roberts was of a generation which expected to be fully engaged in all areas of academia. He did this at Queen's for 42 years. I am personally greatly indebted to Dai for his friendship and support as a close colleague over an era of change in Queen's. He was the first colleague l could call on for sensible advice and opinion based on experience and common sense.

My abiding memory of Dai, however, will be on the shore, turning over rocks and digging up mudflats: the excitement of saddle oysters, sea spiders and urchins; burrowing anemones and burrowing sea cucumbers; the thrill of strawberry worms and the always naughty but nice sipunculids. Dai, regardless of weather, in his aged Gortex jacket (was it luminescent orange?), bobble hat and oversized, heavy duty pullover reaching down to his down-turned waders. Dai in his element. In The Slip, occasionally, with whiskey glass in hand, Dai would treat us to Sosban Fach (Saucepan Varch), sung with some style in a natural bass voice. He knew what we didn't know: the song refrain celebrates 'Little Dai the soldier, And his shirt tail is hanging out'. Enough said. Happy days.

Prof. Ian Montgomery

My strongest memory of Dai Roberts, who I knew as a colleague and friend for many years, relates to a meeting in Bilbao. We were trying to develop a Socrates programme for exchanging staff and students and had reached an irritable, nationalistic impasse. I could see that the whole thing would collapse, thus wasting a huge amount of time and money. As people started to pack up to return home, Dai stepped in and in a tour-de-force of diplomacy found a face-saving solution. The ensuing network became hugely successful in exchanging hundreds of students and staff across 14 European universities. Without Dai's input on that occasion, I am convinced this outcome would never have been achieved. I also remember Dai proudly showing me round his extensive collection of brass paraffin stoves, smiling sheepishly at his obsession.

We should also remember that Dai was a long-serving member of the Council of the Malacological Society, serving as Honorary Treasurer for many years.

G Dussart

Dai Roberts QUB Belfast | Jacques Daguzan Rennes | Maria Lazaridou Thessaloniki | Daniele Bedulli Parma | Angela Gallego Sala Canterbury Christ Church | Gustav Hellden Kristianstad | Ionan Marigomez Bilbao

Grants and Awards

Malacological Society of London Awards and Grants

The Research Awards Scheme was established to commemorate the Society's Centenary in 1993. Under this scheme, the Society gives awards 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 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 for student applicants, 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. Awardees are encouraged to publish their work in the *Journal of Molluscan Studies* (full papers) or *The Malacologist* (travel award reports, research award reports, news of ongoing research etc) as appropriate,

Early Career Research grants

Eligibility is restricted to those investigators at the outset of their independent scientific career. Applications must therefore be 1) postgraduate students, 2) within five years of being awarded their PhD (adjustable for career breaks), or 3) independent researchers not having a PhD. Early Career Research Grants will only be awarded to individuals twice, but not within 3 years of receiving a first award

Sir Charles Maurice Yonge Award

There is no application process for Sir Charles Maurice Yonge Awards. These awards are given for the best Travel Award application on bivalves, by a member of the Society to attend an international meeting (not including the Molluscan Forum). Authors of exceptional studies on bivalves in *the Journal of Molluscan Studies* may on occasion also be given this award. The Editor will nominate such papers as he/she sees fit. The award covers the costs requested in a Travel Award, or for open access publication of the paper. Members of the Society will also receive a personal cash prize of £300. Non-members will receive a personal cash prize of £250 plus one year's membership to the Society. If a paper is multi-authored, the award will be made to the corresponding author.

Senior Research Awards

are aimed at established researchers in professional positions, but without regard to nationality. Applicants for Senior Research Awards must be members of the Malacological Society of London. The Society currently awards up to five Senior Research Grants per year, each with a value of up to £1,500, to support research on molluscs that is likely to lead to publication. The maximum amount available should not be considered as a 'target'; rather requests should reflect the research that is proposed. The grants are reviewed by a Reviewers Panel including both Council and non-Council members invited for that purpose.

Travel Grants

Travel Awards are available as bursaries to support attendance at a conference or workshop relevant to malacology. Grants are preferentially conferred on students but researchers without professional positions may also apply. The maximum amount for one of these awards is £500 for Society members and £300 for non-members. Preference will be given to members of the Society. 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.

For further information, guidance notes and to access the application form see here - http://malacsoc.org.uk/awards-and-grants/travel-grants

Annual Award

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

Applications

Applications for Research Awards and Travel Grants should be sent to the Honorary Awards Secretary, Jonathan Ablett, Division of Invertebrates, Department of Life Sciences, Natural History Museum, London, SW7 5BD For further information, guidance notes and to access the grant application form see http://malacsoc.org.uk/awards-and-grants/research-grants Please note that all applications must be sent by email to MSL_awards@nhm.ac.uk.

Malacological Society of London—Membership notices

Objects

The objects of the Society are to advance education and research for the public benefit by the study of molluscs from both pure and applied aspects. We welcome as members all who are interested in the scientific study of molluscs. There are Ordinary Members, Student Members and Honorary Members. Members are entitled to receive a digital &/ or paper copies of the *Journal of Molluscan Studies* 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 into the *Journal of Molluscan Studies*. The *Journal* is published in annual volumes consisting of four parts which are available on -line by members and student members. A paper copy of the Journal is available for ordinary members who are willing to pay a hard-copy premium. Members also receive access to *The Malacologist*, which is the bulletin of the Society, issued twice a year, in February and August.

Meetings

In addition to traditional research on molluscan biology, physiological, chemical, molecular techniques are amongst the topics considered for discussion meetings and papers for publication in future volumes of the *Journal*.

Subscriptions

Membership fee structure

Ordinary Members: Journal on-line only £45
Ordinary Members: Journal on line and printed £70
Student Members: Journal on-line only £25

Methods of Payment

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

(2) Banker's standing order to: HSBC (Sort code 40-16-08 Account no. 54268210) 63-64 St Andrew's Street, Cambridge C32 3BZ

(3) Overseas members wishing to pay electronically should should use

IBAN GB54MIDL4016084268210

SWIFT/BIC MIDL GB22

(4) 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.

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

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APPLICATION FOR MEMBERSHIP OF THE MALCOLOGICAL SOCIETY OF LONDON

I wish to apply for (please mark your choice) :-

Ordinary Members: Journal on-line only £45

Ordinary Members: Journal on line and printed £70

Student Members: Journal on-line only £25

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 .....

Conference and Annual General Meeting




New perspectives on evolution in molluscs: from fossils to next generation sequencing

Wednesday 21 March 2018

125th AGM Malacological Society of London

Flett Theatre, Natural History Museum, London

In order to celebrate the 125th AGM of the Malacological Society of London, the Society together with the Natural History Museum are co-hosting a special day long symposium, *"New perspectives on evolution in molluscs: from fossils to next generation sequencing".* Talks from world renowned experts will cover aspects of life history and evolution in the phylum Mollusca ranging from pharmacology, palaeontology and chemo-symbiosysis to larval development and shell structure. Although focused on molluscs, these talks will be of interest to evolutionary biologists, biogeographers, marine biologists and palaeontologists.

Tentative Schedule

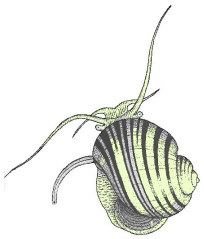
10.00-10.30h Registration and tea and coffee
10.30-10.40h Welcome
10.40-11.25h Prof. Geerat Vermeij: Shell function and the history of life: an arena and bedrock of evolution
11.25-12.10h Prof. Sarah Samadi: Feedback on the use of NGS in molecular systematics of molluscs in Paris
12.10-13.30h Lunch (provided by MSL) & AGM (held separately for members or interested parties)
13.30-14.15h Prof. Toto Olivera: Venomous fish-hunting *Conus* from behaviour and phylogeny to drug development
14.15-15.00h Prof. Yasunori Kano: Larval ecology matters: macroevolution and spatiotemporal distributions of neritimorph gastropods
15.00-15.30h Tea & coffee
15.30-16.15h Prof. Dan Distel: *Kuphus polythalamia:* uncovering the biology of a giant shipworm
16.15-17.00h Dr Carmel McDougall: The molecular basis of molluscan biomineralisation
17.00-17.10h Wrap up
17.10-18.45h Wine reception

The Malacological Society of London

Membership Notices

THE MALACOLOGICAL SOCIETY OF LONDON

Registered Charity No. 275980



Hon. Secretary
Dr Rowan J. Whittle

The 125th Annual General Meeting of The Malacological Society of London will take place at 12.10–13.30 on 21st March 2018 in the Flett Theatre, The Natural History Museum, London. The AGM will take place during The Natural History Museum and Malacological Society of London " *New perspectives on evolution in molluscs: from fossils to next generation sequencing"* symposium.

Agenda for AGM

Apologies for absence
Minutes of the last (124th) AGM
Matters arising
Financial report
Annual report of Council (delivered by the President)
Awards
Election of Council
Any other business

Year of existence	2017-2018	2018-2019
	124	125
President	Suzanne Williams (3)	John Grahame (1)
Vice Presidents	Richard Preece (2)	Richard Preece (3)
	John Grahame (3)	Robert Cameron (1)
Ex officio		Suzanne Williams
Councillors	Aidan Emery (1)	Aidan Emery (2)
	Phil Fenberg (2)	Phil Fenberg (3)
	Harriet Wood (1)	Harriet Wood (2)
	Debbie Wall Palmer (2)	Debbie Wall Palmer (3)
	Robert Cameron (3)	Andreia Salvador (1)
	Simon Cragg (3)	Fiona Allen (1)
Co-opted	Andreia Salvador	
Journal Editor	David Reid	David Reid/ Dinazarde Raheem
Bulletin Editor	Georges Dussart	Georges Dussart
Treasurer	Katrin Linse	Katrin Linse
Membership Secretary	Tom White	Tom White
Hon.Secretary	Rowan Whittle	Rowan Whittle
Web manager	Tom White/Chong Chen	Tom White/Chong Chen
Awards Officer	Jon Ablett	Jon Ablett

Numbers indicate years in post; posts are for 3 years.