



ISSN 1759-1406

The Malacologist

The Bulletin of The Malacological Society of London

NUMBER 76

FEBRUARY 2021

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Molluscan Forum 2020



19th November 2020

Malacology during a pandemic



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



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

EDITORIAL

Sitting looking out at icicles and snow, it is difficult to believe that one year ago, the Editorial in the February 2020 issue of *The Malacologist* makes no mention of covid-19. Within a few weeks of that issue appearing, the Society had to, at the last minute, cancel the fully-planned conference on limpets organized by Prof. Alan Hodgson. This conference would have accompanied the AGM at Plymouth but the AGM had to be convened digitally without the conference. The only attendees were Council members, though it was open to the whole membership. At the time, the Council discussed the possibility that the November Malacological Forum might have to be held as a digital meeting—and so it was. A team led by Dr Phil Hollyman made a sterling effort and developed and ran a very successful Forum. As usual, the abstracts from the Forum comprise the core of this issue of *The Malacologist*. An innovation was to replace posters with quick-fire presentation, comprising short, illustrated talks of 5 minutes each.

The Council of the Society has discussed the possible ways we might support under-represented groups of (especially young) people, in our area of interest. The Council propose to add two new awards comprising firstly, an additional research award, given on top of the existing five awards. This will go to the top-ranked unfunded application that is submitted by *either* a UK/EU BAME applicant *or* an applicant from a developing or transition nation (whichever scores higher). We hope to roll this out in time for the June 2021 round; secondly a 'vacation studentship' to support a UK/EU BAME student gaining research experience in malacology. This will provide a weekly stipend and a small research budget for a 2-6 week project to start in 2022. To provide ample time to prepare applications to students and supervisors, we anticipate advertising this autumn. This award will be aimed at undergraduate students, but could accommodate A-level or Masters students if appropriate.

A CONTINUING PLEA The Council would like to digitise issues of the Newsletter, which predated both *The Malacologist* and the malacological *Bulletin*. If any members have copies of the Newsletter (particularly numbers 1-7), could they please contact me.

TAXONOMIC/NOMENCLATURE DISCLAIMER

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

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News and notes

Molluscs in Extreme Environments and the AGM of our Society

On behalf of The Malacological Society of London, we invite you to a symposium on ***Molluscs in Extreme Environments*** accompanying the Annual General Meeting of the Society (<http://malacsoc.org.uk/meetings/>). In a normal year and as planned for in 2019, this meeting would have taken place in the Natural History Museum in London, but the Covid-19 pandemic moves us to the virtual forum of Zoom.

When? – 24th March 2021, presentations between 1000 and 1615 with the Symposium closing at 1700 – all times are London time.

Where? – virtual meeting on Zoom. Joining details will be emailed to registered participants a few days before the meeting.

Registration – this is **free**, there is no charge. But please do register if you want to attend! E-mail Harriet Wood in Cardiff - harriet.wood@museumwales.ac.uk to register for the Symposium, **please include your full name and professional affiliation**. Registration will close on Friday 19th March.

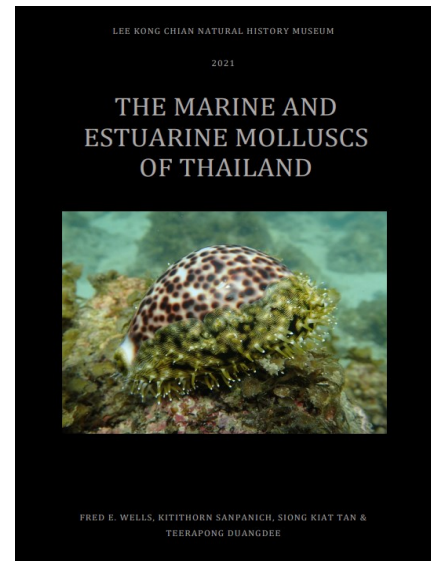
See pages 40 and 41 in this issue for details of this meeting and the Annual General Meeting.



The marine and estuarine molluscs of Thailand

Open access ebook published in January 2021 by the National University of Singapore.

Thailand is a large Southeast Asian country on the margin of the biodiverse coral triangle. It has a 3,299 km coastline on both the Gulf of Thailand in the Pacific Ocean and the Andaman Sea in the Indian Ocean. An extensive literature and internet search documented over 15,000 records of 3,359 species of Thai marine and estuarine molluscs. Records of 137 species are considered to be incorrect or dubious as their known ranges do not include Southeast Asia. The remaining 3,222 species include 1,963 gastropods, 1,116 bivalves, 129 cephalopods, seven polyplacophorans and seven scaphopods; no records were found of monoplacophorans or aplousobranchs. Most records cannot be verified through specimens lodged in museums. The taxonomy of all species has been updated to their current status. Previous names used, occurrence on the Gulf of Thailand and/or Andaman Sea coast, and literature records and notes (if any) are provided for each species. Two invasive species, the mussels *Mytilopsis sallei* (Récluz, 1849) and *Mytella strigata* (Hanley, 1843), are known to have been introduced to Thailand, but there may be more introduced species that have not yet been detected. Strategies to further document the marine and estuarine molluscs of Thailand are proposed.



2,400 Years of Malacology

This publication is now on the website of the American Malacological Society:

<https://ams.wildapricot.org/2400-Years-of-Malacology>

It is a comprehensive catalogue of biographical and bibliographical publications on numerous individuals with an interest in molluscs, from Aristotle to the present. It also has separate listings of publications on expeditions, museums, malacological societies, and malacological journals and newsletters. Three separate files provide collations for numerous malacological journals and multi-volume books. This compilation provides a comprehensive catalogue of about 30,000 malacologists, conchologists, paleontologists. For each person, the birth/death years and nationality are given (when known), followed by bibliographic citations to the literature about that person and his/her collections and publications. This on-line publication began in 2004 with 612 pages, and has more than tripled to 1,875 pages (in the main file) with another 250 pages for the three collations files. As before, we thank the numerous individuals who have provided us with information and corrections over the years. We also appreciate AMS for hosting this publication.

Gene Coan and Alan Kabat

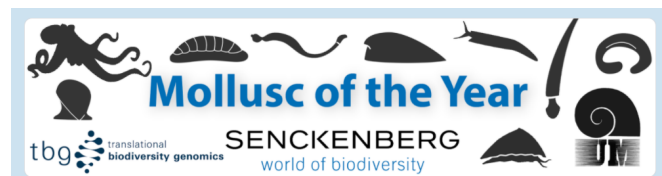


The American
Malacological Society



Mollusc of the year

This is a new joint venture between the Senckenberg Museum Frankfurt and Translational Biodiversity Genomics centre (TBG), and Unitas Malacologica: The 2021 Mollusc of the Year! Anyone can nominate their favourite mollusc species and provide a specimen. All mollusc species are eligible (marine, terrestrial, freshwater, from any country). There were over 120 nominations with more than 20,000 votes for the first ever international Mollusc of the Year. Keep sharing the mollusc love for the whole year! The TBG will sequence of the complete draft genome of the Mollusc of the Year. We particularly want this initiative to reach people and countries that do not have ready access to genome sequencing technology. You can read more about the competition here: <https://tbg.senckenberg.de/mollusc/>



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Drole de limace.....

The French continue to show a commendable general interest in molluscs. This small article (left) turned up in a local newspaper, remarking on the strange snail someone had found. The newspaper was soon contacted by local naturalists to say that, as a species of *Testacella*, it wasn't that rare. The article on the right celebrates the finding of an albino version of 'le petit gris' (*Cornu aspersum*) in a local park.

Would such news items occur in the UK or is it that we prefer to read about politics, murder and mayhem ?




Just Released!

Bivalve Seashells of Western South America

Marine Bivalve Mollusks from Punta Aguja, Perú
to Isla Chiloé, Chile

by
Paul Valentich-Scott, Eugene V. Coan and Diego G. Zelaya




BIVOLVE SEASHELLS OF WESTERN SOUTH AMERICA
Marine Bivalve Mollusks from Northern Perú to Southern Chile
Paul Valentich-Scott, Eugene V. Coan, and Diego Zelaya

Bivalve Seashells of Western South America is the most comprehensive book ever written on southeastern Pacific Ocean bivalves.

The culmination of an eight year study, it treats all bivalve mollusks living from northern Perú to southern Chile. A total of **256 species** are described and illustrated with **detailed color photographs** and drawings. **All habitats** in the region are included from the intertidal splash zone to the bathyal depths of the ocean basins.

The book has over **5,000 complete bibliographic references** to the bivalves including citations on the biology, physiology, ecology, and taxonomy of this commercially and biologically important group. **Character tables** and dichotomous keys assist the reader in identification. Also included in the **593 page** book is an **illustrated key** to the superfamilies of the region, and a **complete glossary**.



This is a **"must have publication"** for malacologists, paleontologists, archeologists, libraries, shellfishery and environmental scientists, and shell collectors.

In the USA order online at: <https://bit.ly/2HIPPj2>
Also available at Amazon: <https://www.amazon.com/dp/0936494476>
Outside the USA, order at ConchBooks: <https://www.conchbooks.de/?t=53&u=47637>
For other ordering options send email to: vdelnavaz@sbnature2.org

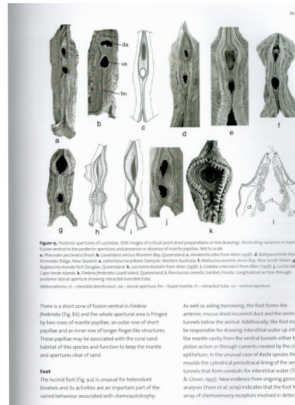
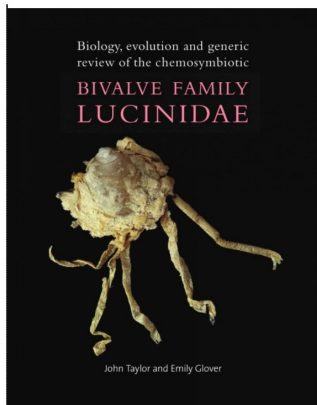
SANTA BARBARA MUSEUM OF NATURAL HISTORY MONOGRAPHS - 8
Studies in Biodiversity: Number 6
ISBN 978-0-936494-47-0



New publication on the biology, evolution and genetics of the Lucinidae

Chemosymbiosis – whereby dissolved hydrogen sulphide and methane are oxidised by symbiotic bacteria which provide nutrients to their invertebrate hosts – was first discovered in the communities surrounding abyssal hydrothermal vents of the eastern Pacific. Soon after, diverse chemosymbiotic populations, including abundant bivalves, were discovered associated with cold hydrocarbon seeps where the sulphides and methane were derived from the decay of organic matter in anoxic sediments. Following these earlier discoveries, it is now known that chemosymbiotic animals are present in all oceans from intertidal to hadal depths. With over 400 living species the bivalve family Lucinidae is one of the most diverse groups of chemosymbiotic invertebrates. They have a near global distribution and are found at all depths in a wide range of habitats including mangroves, seagrass and hydrocarbon seeps. Lucinids have featured extensively in studies of the biology of chemosymbiosis and stimulated by this interest many new species and genera have been described in the last 25 years. The last major generic review and classification of Lucinidae was published 50 years ago with minimal descriptions and unsatisfactory illustrations. *Biology, Evolution and Generic Review of the Chemosymbiotic Bivalve Family Lucinidae* is the culmination of 20 years of study involving fieldwork, molecular sampling and examination of collections held in major museums. Chapters cover shell characteristics, anatomy, symbionts, ecology, biogeography and phylogenetics. The main section is a critical review of the 96 known living genera. Each genus has a detailed description, images of all their individual species together with a summary of distribution and relationships. The fossil record of Lucinidae, dating from the early Palaeozoic, is briefly reviewed with a listing of all 80 fossil genera together with images of salient fossil species. A new classification of the Lucinidae is provided based on molecular phylogenies and detailed study of their morphology. Two new genera are proposed from the Indo-West Pacific. As a major review of this diverse group of heterodont bivalves this book will be of interest to malacologists, ecologists, biogeographers, microbiologists and marine biologists. It will also be of interest to palaeontologists researching the evolution of chemosynthetic communities such as hydrocarbon cold seeps but also marine faunas in general.

John Taylor and Emily Glover are both long term Scientific Associates in the Life Sciences Department at the Natural History Museum, London. They have published extensively on the systematics and evolution of Lucinidae and also on other chemosymbiotic bivalve families, Thyasiridae and Solemyidae. More broadly, they participated in a large international project to develop a new phylogeny and classification of all bivalve families. Other research interests include the relationships and classification of heterodont bivalves, systematics and biogeography of Laternulidae and mineralization of bivalve shells. They have surveyed subtidal molluscan diversity at several locations in Western Australia and participated in research workshops in Australia, Singapore, Thailand, Florida, Curaçao and Sweden. John Taylor is a past President of the Malacological Society of London.



Arion slugs as nest predators of small passerine species

Katarzyna Turzańska at the University of Wrocław in Poland & Justyna Chachulska at the University of Zielona Góra in Poland, were studying common whitethroat birds when they found an *Arion* slug in a nest with newly hatched chicks. The next day, the chicks were dead with severe injuries on their bodies. It looks as though the slug had killed the nestlings. Follow the reference for more:-

Katarzyna Turzańska & Justyna Chachulska (2017) Arion slugs as nest predators of small passerine species – a review. *Journal of Avian Biology* **48**: 455–458, 2017

Image from <https://www.sciencenewsforstudents.org/article/giant-slugs-snack-baby-birds>





SYNTHESYS+ Transnational Access – Call 3 opening 15th March 2021
Funding available for researchers to undertake short research visits at 21 partner institutions
Call 3 Deadline: 15th April, 2021 (17:00 UK time)

The SYNTHESYS+ Management Team is pleased to announce the third tranche of Transnational Access visits, funded via the SYNTHESYS+ project under the current European Commission's Horizon 2020-funded Integrating Activities programme. SYNTHESYS Access funding provides researchers with funding support to undertake short visits to use the infrastructure (collections, staff expertise and analytical facilities) at one or more of 21 partner institutions for the purposes of their research. Since 2004, the SYNTHESYS programme has supported over 52,000 days of research activity across 4,000 separate projects, generating over 5,000 publications. SYNTHESYS can cover research costs, travel & local accommodation and a per diem contribution towards living costs. Due to the COVID-19 pandemic, noting that both international travel and institutional access are restricted, if your application is successful the proposed visit dates may be delayed. We hope that delayed Call 1 and 2 visits will take place later this year and successful applicants who have not yet had their visit should please check the News page for updates.

Taxonomic Access Facilities (TAFs)

The 21 partner institutions are organised into 13 national TAFs. TAF users will be hosted by a TAF staff member (host). The 13 TAFs represent an unparalleled resource for taxonomic research offering collections amounting to over 490 million specimens and an internationally renowned taxonomic and systematic skill base. They also offer facilities including molecular, imaging and chemical analysis. Proposals for funding are welcomed from high-calibre researchers in any technical discipline seeking access for short-term research visits (average duration 15 days).

Eligibility:

SYNTHESYS+ TAFs are offering access to selected 'user-groups': teams of one or more researchers (users) led by a 'user group leader'. The user group leader and the majority of the users must work in a country other than the country(ies) where the TAF is located. Access for user groups with a majority of users not working in an EU or associated country is limited to 20% of the total access days provided under the grant.

See www.synthesys.info for more information or contact synthesys@nhm.ac.uk



Interesting BBC video on cuttlefish

[Can Cuttlefish camouflage in a living room? | Richard Hammond's Miracles of Nature - BBC - YouTube](#)



Severe climate-driven loss of native molluscs reported off Israel's coast

Native mollusc populations on the Israel coast have collapsed by about 90% in recent decades. The sharp decline in native cockle, whelk and other shallow subtidal invertebrates probably spread to waters off other countries in the region and may progress westward to Greece and beyond as global temperatures increase. The cause of the destruction is almost certainly human-driven climate disruption. The Israeli coast had a temperature increase of 3°C between 1980 - 2013. The average summer surface temperature is 32°C. This is thought to have triggered the eradication of native mollusc populations. Pollution and the arrival of tropical species through the Suez canal were less significant factors because pollution tends to be localised around ports such as Haifa, and the canal has existed for over 150 years. Also, studies of the coastline in the 1970s and 80s showed healthy waters.

Paolo G. Albano et al (2021) Native biodiversity collapse in the eastern Mediterranean. *Proceedings of the Royal Society B Biological Sciences*, **288**, Issue 1942, <https://doi.org/10.1098/rspb.2020.2469>



Abstracts of the Molluscan Forum 2020

Natural History Museum, London
19 November 2020

Convened by

DR PHIL HOLLYMAN

Council member of the Malacological Society of London Fisheries Ecologist, British Antarctic Survey
(email: phyman@bas.ac.uk)

DR JOHN GRAHAME

President of the Malacological Society of London
(email: J.W.Grahame@leeds.ac.uk)

MR JONATHAN ABLETT

Senior Curator in Charge, Mollusca Natural History Museum
(email: j.ablett@nhm.ac.uk)

Virtual meeting format

This year the forum will be held virtually over Zoom for the first time. Joining details will be sent to all delegates the day before the meeting.

Questions to presenters

We will endeavour to have time for a couple of short questions following each full talk (Sessions I, II & III). Should timings or technical issues make this difficult, please use the chat function within Zoom (or email) to ask any questions directly to the speakers.

For quick-fire talks (Quick-fire sessions I, II & III) we will not take questions directly after each talk. We would kindly ask all questions for these speakers to be made via the chat function.

We also have several scheduled breaks including a 45 minute lunch, during these times we hope to encourage discussion and questions for the presenters in the preceding sessions.

'Wine reception'

The forum would traditionally finish with a wine reception to socialize and discuss the day's events. In lieu of this we will finish the day off with a short mollusc-themed quiz for those who wish to join, during which you are encouraged to bring a drink of your choice (even if it's just a cup of tea). Following that we will announce prizes for talks and close the meeting.

Schedule

09.45 - 10.15 Meeting open and welcome

10.15- 11.30 Session I

- 10.15 FEDOR LISHCHENKO: On the application of geometric morphometrics to the identification and ecological studies on squids.
- 10.30 HAZEL RUTH S. JIMENEZ: A survey of the biodiversity of Cypraeidae (Gastropoda) in the intertidal zone of Isla Verde, Batangas City, Batangas, Philippines.
- 10.45 ROBERT FERNÁNDEZ-VILERT: Monitoring opisthobranchs (Gastropoda: Heterobranchia) through citizen science in the Western Mediterranean Sea.
- 11.00 ANNA BEREZKINA: DNA-barcoding of the three morphotypes of the gastropod mollusc *Nacella concinna* in the water area of Wilhelm Archipelago, West Antarctica.
- 11.15 ELISE M. J. LAETZ: Understanding how solar-powered sea slugs use sunlight to withstand starvation.

11.30 - 11.45 Break and discussion

11.45 - 12.15 Quick-fire session I

- 11.45 ALESSIA CARINI: Evolutionary development of oyster shells: a proteomics and microstructural view.
- 11.50 NIPU KUMAR DAS: Bibliometric analysis on Indian non-marine molluscan research.
- 11.55 MARIJN ROOSEN: Non-marine molluscs of mainland Ecuador: a preliminary analysis.
- 12.00 HASSAN BENAÏSSA: The ichthyo-hosts of the freshwater mussel *Unio foucauldianus* Pallary, 1936.
- 12.05 M. ROSARIO MARTÍN-HERVÁS: A green cryptic challenge: molecular systematics of the poorly studied genus *Bosellia Trinchese*, 1891 (Heterobranchia, Sacoglossa).

12.15 - 13.00 Session II

- 12.15 PETER M. SCHÄCHINGER: Arionidae in Munich: unravelling the sluggish mess.
- 12.30 ANA GÓMEZ DÍAZ: Mollusca in the Bonsor Collection. An interdisciplinary collaboration in archaeological studies.
- 12.45 KATE DEY: The Asian date mussel in the UK: a threat to Europe's benthic habitats and economies?

13.00 - 13.45 Lunch break and discussion

13.45 - 14.15 Quick fire session II

- 13.45 MARI-LEE ODENDAAL: Transcriptomic responses of juvenile versus adult shelled heteropod species *Atlanta ariejansseni* under past, present and future pH conditions.
- 12.45 KATE DEY: The Asian date mussel in the UK: a threat to Europe's benthic habitats and economies?
- 13.50 BORIS J. PRAST: Response to OA of *Heliconoides inflatus* pteropods collected along an Atlantic meridional transect.
- 13.55 HANANE RASSAM: Fingernail clams (Bivalvia: Sphaeriidae) inhabiting the High Atlas of Morocco.
- 14.00 GIADA SPAGLIARDI: Morphometric variation in the circumglobal shelled pteropod genus *Limacina*.
- 14.05 RITU SINGH: Mytilidae mussels support zonation of marine assemblages at a shallow-water hydrothermal vent chimney: Strýtan, Eyjafjörður, Iceland.

14.15 - 15.30 Session III

- 14.15 LAUREN EGGLETON: A sticky situation: investigating the contradictory nature of gastropod mucus.
- 14.30 ANA BEATRIZ TICIANELLI: Nudibranchs from the archipelago of Fernando de Noronha, Brazil.
- 14.45 MATTHEW BIRK: Temperature-sensitive RNA editing causes extensive protein recoding to compensate protein function.
- 15.00 REBECCA K. OSBORNE: Does size matter? Reproductive trade-offs in a freshwater pulmonate snail.

15.15 MEGHAN YAP -CHIONGCO AplacBase: a digital database for Mollusca's most neglected taxa

15.30 - 15.45 Break and discussion

15.45 - 16.15 Quick-fire session III

- 15.45 CHRISTIAN DRERUP: The burying behaviour of *Sepioloa* sp. (Sepiolidae: Cephalopoda) on different sediment types
- 15.50 MONICA FABRA: Investigations on factors affecting gametogenesis, larval survival and recruitment of the European flat oyster *Ostrea edulis* (Linnaeus, 1758) in hatchery production. Development of effective techniques to produce *O. edulis* as spat-on-shell for ecological restoration.
- 15.55 ELEA A. GIRAUD : Feeding rates and behaviour of *Cratena peregrina* (Nudibranchia: Aeolidioidea) around their prey and host *Eudendrium racemosum* (Hydrozoa: Eudendriidae)
- 16.00 SILVIA GONÇALVES MESQUITA: Molecular-based approaches for the detection of *Schistosoma mansoni* infection in snail hosts in a persistent endemic area in Brazil.
- 16.05 HANNAH BEEBIE Preliminary investigation into the efficacy of Niclosamide in controlling the aquatic invasive snail, *Viviparus georgianus* in northern New York

16.15 - 17.00 Meeting close, mollusc quiz and prize giving

Abstracts

Alphabetical by presenter

Preliminary investigation into the efficacy of niclosamide in controlling the aquatic invasive snail, *Viviparus georgianus* in Northern New York

Hannah Beebie, Andrew David

Department of Biology, Clarkson University, Potsdam, US

Email: beebiehm@clarkson.edu

This research study focused on aquatic invasive species management of the banded mystery snail, *Viviparus georgianus*. *Viviparus georgianus* is native to the southern United States and has become invasive in numerous rivers and lakes in the north-eastern US including the Adirondack forest – the largest protected forested reserve in the contiguous US. In this study, we exposed *V. georgianus* to various concentrations of the widely used molluscicide Niclosamide (ethanolamine salt). Three LD₅₀ experiments were performed containing 'full' concentration, 'half' concentration and 'diluted' concentration of Niclosamide. Five snails collected from the Raquette River in Potsdam, New York were placed into six tanks with decreasing sub-concentrations for each of the aforementioned concentrations and survivorship was determined after a 24 and 48 period. After using the uncrystallized powder Niclosamide, we began to see mortality in the snails during each experiment. In the full concentration experiment we saw 100% mortality in all tanks with 0% mortality in the control. In the half-concentration experiment we saw 100% mortality in all tanks with 0% in control and 0% in tank four. In the diluted concentration experiment we saw 100% mortality in all tanks with 0% in control and 20% mortality in tank three. These percentages are based after a 48-hour period. Based on these results, the next step of this study will be a four-week long experiment focusing on shell regeneration rates of *V. georgianus*, after a simulated predation event at a lowered Niclosamide concentration.



The ichthyo-hosts of freshwater mussel *Unio foucauldianus* Pallary, 1936

Hassan Benaissa¹, Mohamed Ghamizi¹, Amílcar Teixeira², Ronaldo Sousa³, Hanane Rassam¹, Simone Varandas⁴ & Manuel Lopes-Lima^{5,6}

¹Department of Biology, Natural History Museum of Marrakech, University of Cadi Ayyad, Marrakech, Morocco.

²CIMO-ESA- IPB - Mountain Research Centre, School of Agriculture, Polytechnic Institute of Bragança, Portugal.

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⁴CITAB-UTAD - Centre for Research and Technology of Agro-Environment and Biological Sciences, University of Trás-os-Montes and Alto Douro, Vila Real, Portugal.

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⁶CIIMAR/CIMAR - Interdisciplinary Centre of Marine and Environmental Research, University of Porto, Matosinhos, Portugal.

Email: benaissahassan2@gmail.com

Studies on the life cycle of Moroccan mussels pay little attention to future conservation measures. This is especially important when it comes to species that the IUCN considers to be critically endangered, as is the case for *Unio foucauldianus*. The life cycle of most freshwater mussel species of the family Unionidae has a temporary but obligatory parasitic stage, in which the larvae (glochidia) attach to the external surface of a suitable host fish and then later metamorphose into free-living juveniles. For the *Unio* genus, different studies have shown the diversity of fish species that have been found to be hosts for its glochidia. In this study, mussels and fish samples were collected in April 2017 in the Nfiss river using, respectively, diving and electrofishing. Fish were kept in laboratory aquaria under specific conditions and the water was checked monthly until the appearance of the first glochidia. After infestation experiments, three endemic species of fish proved to be host fishes for the mussel species *U. foucauldianus*. These hosts were *Carasobarbus fristschii*, *Luciobarbus magniatlantis* and *Luciobarbus ksibi*. These results are nationally significant for the development of conservation strategies such as the inception of a management plan for the ichthyo-hosts that inhabit the river basins where this bivalve lives.

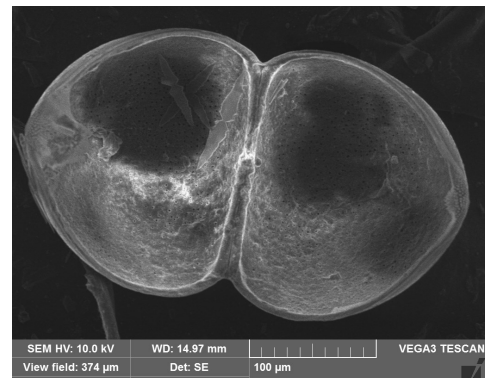


Image showing two valves of glochidium



DNA-barcoding of the three morphotypes of the gastropod mollusc *Nacella concinna* in the sea off Wilhelm Archipelago, West Antarctica

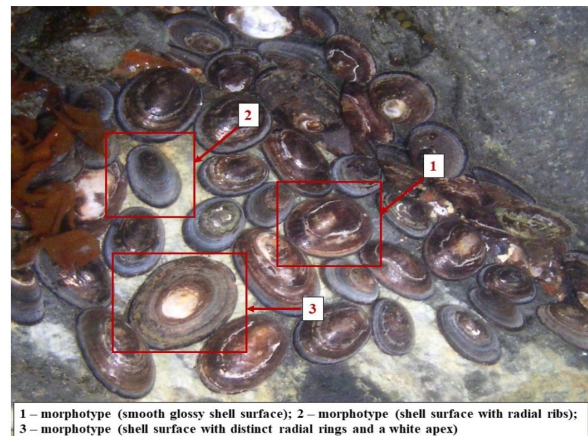
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Two morphotypes of the gastropod mollusc *Nacella concinna* are known from the Southern Ocean. One morphotype is littoral with a heavy high shell, and the other is sublittoral with a light flat shell. Three morphotypes of *N. concinna* with different shell sculptures were found in the sea off the Ukrainian Antarctic Station “Akademik Vernadsky” (Argentine Islands, Wilhelm Archipelago) during an underwater survey. The first morphotype has a smooth glossy shell surface, whereas the second morphotype has a classic shell with radial ribs, and the third has a shell surface with distinct radial rings and a white apex. A non-destructive survey of benthic assemblages on 7 transects at depths of 1, 5, 10 and 15 m was done. The morphometric analysis of the mollusc’s shell (length, width), and underwater imaging, were carried out using the VISION-ZEISS software package. The weight of the molluscs was calculated with appropriate equations. Statistical analysis showed no division of molluscs into littoral and sublittoral morphotypes. Different models of mollusc distribution according to the depth, weight and size are deduced for landscapes of the sea bottom at different depths. DNA-barcoding and phylogenetic analysis of the three morphotypes using three mitochondrial genes was done. A maximum-likelihood phylogenetic tree of the family Nacellidae based on 12S, 16S, and COI sequences and the GTR evolutionary model indicate that it belongs to the species *Nacella concinna*. Different phylogenetic reconstructions demonstrated monophyletic or paraphyletic groupings of *Nacella concinna* and its close relationships with patellids of tropical and temperate waters of the South Hemisphere. The variety of shell sculpture in the Antarctic *Nacella* species may be explained by ecological plasticity, which requires further study of the genes that are directly responsible for shell formation.



1 – morphotype (smooth glossy shell surface); 2 – morphotype (shell surface with radial ribs); 3 – morphotype (shell surface with distinct radial rings and a white apex)



Temperature-sensitive RNA editing causes extensive protein recoding to compensate protein function

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Molluscs are poikilothermic and thus encounter wide changes in body temperature. Their nervous systems are particularly complex with many temperature-sensitive processes that all must align to function at a new temperature. A-to-I RNA editing is a potential acclimation pathway wherein adenosines in mRNAs are deaminated and subsequently interpreted as guanosine by ribosomes. This pathway has the potential to change the codon and resulting amino acid in the protein product. Although protein recoding is rare in most animals, coleoid cephalopods recode up to 67% of their neural transcripts. Therefore, we investigated the potential for temperature acclimation of neural function through temperature-sensitive RNA editing. We kept cohorts of *Octopus bimaculoides* at 12 or 22°C for 8 hours up to 6 weeks and collected mRNA from stellate ganglia. We found that (1) ~25% of the 77,000 known editing sites are cold-induced, exhibiting higher proportions of edited mRNA transcripts at 12 than 22°C, (2) temperature-sensitive sites are not randomly distributed but rather are enriched amongst certain amino acid recodings and in proteins associated with the cell membrane and calcium, (3) these changes start to occur within hours and reach a new steady state within four days, and that (4) important neuronal proteins such as synaptotagmin and kinesin have cold-induced editing sites that alter protein function. Such rapid and abundant temperature-sensitive RNA editing events are likely to allow coleoid cephalopods to tweak neuronal function in response to temperature at an environmentally-relevant timescale.



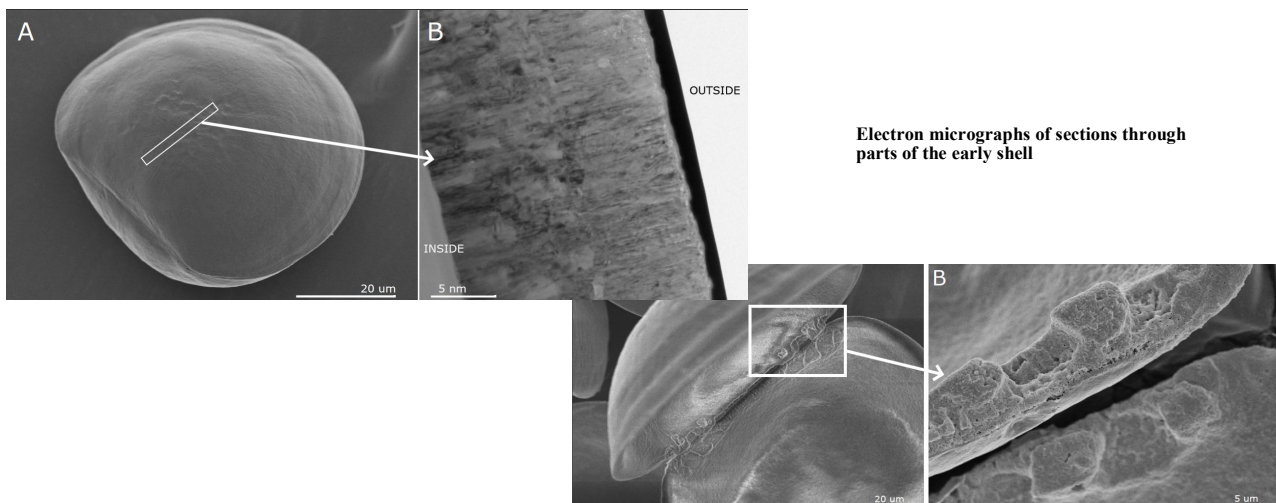
Evolutionary development of oyster shells: a proteomics and microstructural view

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Oysters are among the most economically and ecologically important groups within the Pteriomorpha, the marine bivalves. The evolutionary success of the Pteriomorpha is believed to have been facilitated by the secretion of the bivalve shell. Shell biomineralisation is a complex mechanism that involves the deposition of calcium carbonate (CaCO₃) together with an organic phase composed mainly of chitin and extracellular shell matrix proteins (SMPs). SMPs are secreted by oyster cells, incorporated within the mineral phase and are key for controlling biomineralisation. SMPs have established roles in crystal nucleation, CaCO₃ phase determination and the initiation and inhibition of calcification. In addition, they are now hypothesised to have immunology and antibacterial roles, making shells not only a physical protection but also a chemical barrier aiding bivalve survival. Phylogenetic analyses show that adult shell proteomes are highly divergent between bivalves, with only a handful of functional protein domains conserved even in closely related species. Therefore, adult shell proteomes seem to be rapidly evolving, possibly as a result of exposure to highly dynamic environments. However, it is unknown if the differences in SMP assembly are most influenced by evolutionary relationships, environmental conditions or inherit biological variability. While SMP research has mostly focussed on adult shells, planktonic, early developmental stages are observed to be most sensitive to abiotic stressors and constitute a bottleneck in the oyster life cycle. Differently from adults, bivalve larval shells from different species are similar in shape and structure with variability accumulating further along in the developmental process. Similarly to other organisms, it is hypothesised that the larval shell could constitute an ancestral stage that is retained in modern bivalves and could be intrinsically less susceptible to adaptive plasticity and rather an example of development canalisation. However, structural and proteomic data for larval shells are scarce. Therefore, experiments were conducted to investigate SMPs and microstructures from the first larval stage to adult shells using oysters as a study system. By exposing animals to future ocean acidification scenarios and interrogating the existing environmental and species variability along the Chinese coast, we aim to describe the mechanisms behind oysters biomineralisation and elucidate the evolutionary development of oyster shells.



Bibliometric analysis on Indian non-marine molluscan research

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Bibliometry, a quantitative statistical method is used to analyse scientific articles in order to visualize and interpret different trends, relationships or networks within bibliographic data. There do not appear to be any bibliographic studies of research on Indian non-marine molluscs to date. Here, we aim to understand various trends in publications, species discovery rates, collaborative researches, regional and subject-wise biases from the beginning of Indian non-marine malacology studies to the present. Articles were extracted from Google and Google Scholar with search-strings such as ‘molluscs+India’, ‘land snails+India’ etc. Back-referencing was also performed for articles to get the maximum representation. An Excel database was created with details such as author(s), year, title, journal, subject (biochemistry, biogeography, conservation biology, ecology, genetics, taxonomy, etc.), group (terrestrial or land snail or both), species, and state. Bibliometric analysis was done using VOSviewer and MS-Excel platforms. We found a total of 2909 research articles covering non-marine molluscs (freshwater 1903, terrestrial 806, and both 200) (Fig 1). The data analysis showed an increase in published articles during post-1970, involving a variety of research fields, compared with pre-1970 which covered mostly taxonomic works. (Fig.2). Land mollusc research is almost totally limited to taxonomy only, while in the case of freshwater molluscs, research in toxicology tops the list followed by physiology, ecology and taxonomy. The lack of our knowledge in fields like non-marine molluscan biogeography, genetics, ecology and taxonomy are also highlighted from our analysis. ‘Cooperation between authors’ shows nine clusters of 31 items (Fig.3). The regional biases study is yet to be completed; it might show some trend towards biodiversity hotspots. We identify gaps in different fields, which will help researchers to focus on research in those areas.

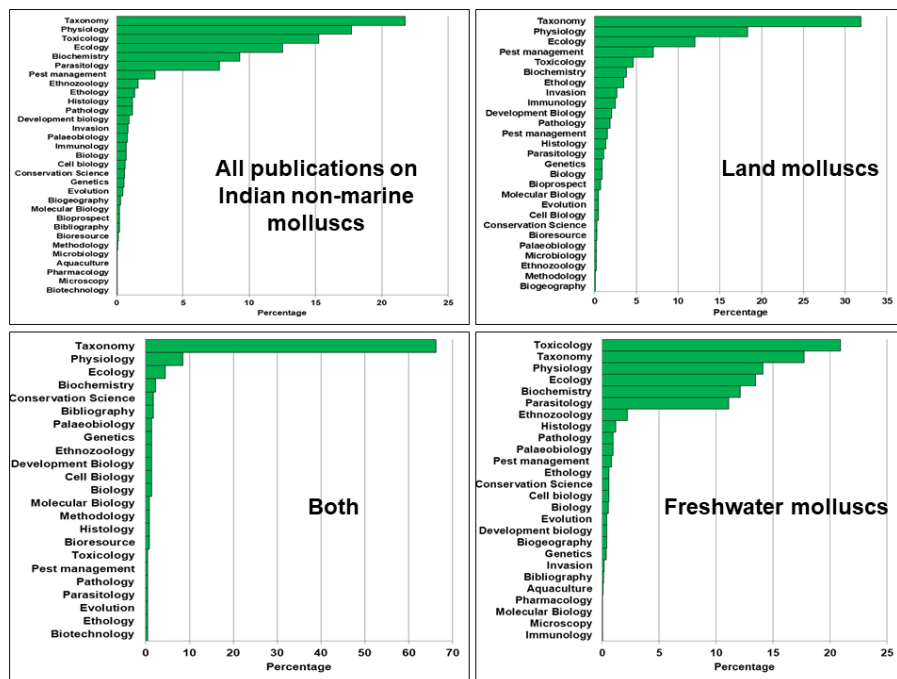


Fig. 1

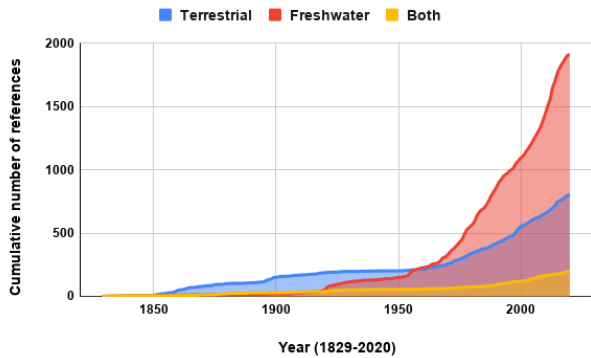


Fig. 2

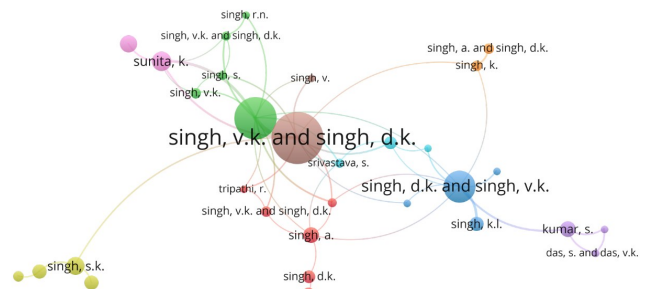


Fig. 3



The Asian date mussel in the UK: a threat to Europe’s benthic habitats and economies?

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The Asian date mussel (*Arcaatula senhousia*) is one of the most successful non-native marine species, having become established in four continents outside of its native range. In much of its introduced range, it is considered to be invasive, since it can form aggregations of 10,000s m⁻² and compete for space and food with surface-dwelling suspension feeders. In 2011, *A. senhousia* was first detected in the UK, although its arrival was not officially reported in the scientific literature until 2017. Here we present baseline data on its spatial extent in diverse habitats and its reproductive cycle from the Solent region of southern England. Individuals were recorded from functionally critical soft sediments, seagrass meadows, and attached to European oysters and manufactured structures within marinas. The presence of sexually mature (14-20 mm in length) individuals from estuarine subtidal soft sediment, combined with increasing mean gonado-somatic index values into the summer, confirm gametogenesis. In conclusion, *A. senhousia* has successfully established within the Solent and we, therefore, document the first self-sustained population within the Greater North Sea eco-region. However, the maximum density of 290 m⁻² was relatively low, possibly reflecting an early stage of invasion. Subtidal and intertidal sampling within the Solent will determine its distribution, population structure, reproductive cycle, environmental preferences and associations with other macrofauna. Manipulative mesocosm experiments will then be used to determine potential impacts on commercially and ecologically important species as well as investigating its functional roles. Finally, species distribution modelling will be used to assess the potential future distribution of *A. senhousia*. We conclude that *A. senhousia* poses a potential threat to the ecosystem goods and services of Europe. However, in order to create balanced national and European risk assessments, research to fill key knowledge gaps is an urgent priority.



The burying behaviour of *Sepiola* sp. (Sepiolidae: Cephalopoda) on different sediment types

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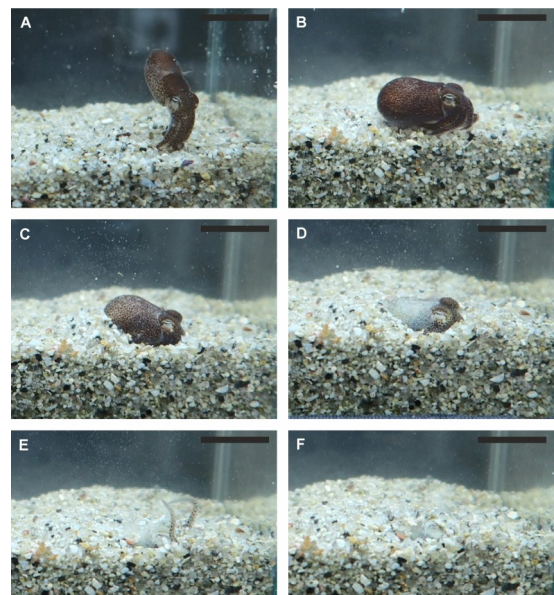
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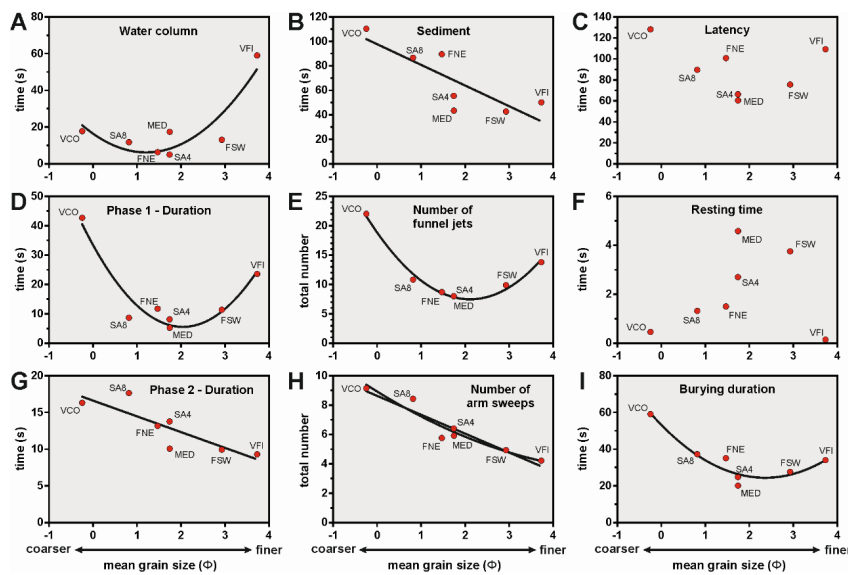
Burying in soft sediment is a widespread behaviour of animals inhabiting the marine environment, including cephalopods. Some octopus, cuttlefish and especially bobtail squid species bury; the latter usually spend the day in the sediment and emerge at night to hunt and mate. In recent years, bobtail squids have become popular organisms for scientific studies. However, little is known about bobtail squids even though understanding their biology and ecology would ensure their welfare in captivity. This study tested the effect of seven sediment samples, differing in mean grain size, grain



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>DRERUP ET AL. CONTINUED

size distribution and origin (natural/artificial) on the burying behaviour of *Sepiola* sp. (Sepiolidae, Cephalopoda). All individuals performed the same two-phased burying behaviour. Phase 1 included alternating forward- and backward-directed funnel jets to disperse sediment into the water column, obscuring the majority of the sepiolid's body. Subsequently, phase 2 consisted of sweeping arm movements to further cover exposed body parts with sediment. Although the body size (= mantle length) of *Sepiola* sp. was not correlated with its burying behaviour, the duration and number of body movements (funnel jets/arm sweeps) per burying phase significantly differed with the mean grain size of the sediment samples. The burying latency, phase 1 duration, number of funnel jets and total burying duration were the shortest/lowest on medium-grained sediment and extended on finer and coarser sediment. By contrast, the duration of, and the number of, arm sweeps within phase 2 was the shortest/lowest on finer sediment samples and increased with gradually coarser sediment. Following the observations of this study, sediment with a mean grain size between 125 to 250 μm ($2 - 3 \Phi$) facilitates the burying procedure of *Sepiola* sp. and should therefore be used to house captive individuals. This would minimize their burying duration and corresponding energetic costs and could therefore benefit their welfare when held in captivity.



A sticky situation: investigating the contradictory nature of gastropod mucus

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Gastropod mucus has two contradictory properties, adhesion and locomotion, which gastropods are able to seamlessly move between whenever the functional need arises. The mechanisms behind this transition have not been identified as the two types of mucus are typically studied separately. Both types of gastropod mucus have unique visco-elastic, non-linear rheological properties and due to their interesting crystallisation behaviour have begun to be classified as liquid crystal elastomers. However, the mucus is often studied in isolation from the animal and biological function is extrapolated from research undertaken in a purely engineering context. Through the creation of a gastropod locomotion translation device, our study enabled simultaneous visualisation of gastropod movement and sample collection. This has provided a more holistic view of mucus structure and function within the context of gastropod behaviour. Our study utilised a combination of spectroscopy, SDS-PAGE, video analysis, and microscopy to identify the mechanisms used by gastropods to manipulate their mucus' structural composition to meet a specific functional demand. In response to orientation changes, a range of biocrystallisation effects were observed when gastropods required an immediate increase in adhesion. This biocrystallisation indicates a fast adhesion mechanism that uses non-organic compounds, proposed to be calcium, to rapidly alter the viscoelastic properties of mucus between locomotion and adhesion. This effect was observed across a range of gastropod species, including: *Cornu aspersum*, *Arion hortensis* and *Veronicella sloanei*, suggesting that this is potentially a class-wide mechanism. We propose that such crystallisation, within a biological context, may help explain the apparent contradictory effects of the adhesive and locomotive properties of this material and may indicate the presence of a previously unidentified, crystallizable, intermediate, mucus stage lying between locomotive and adhesive mucus. Further research comparing the various rheological properties and composition of the observable crystal structures may shed light on how gastropods control their mucus to meet a range of seemingly contradictory needs.



Investigations of factors affecting gametogenesis, larval survival and recruitment of the European flat oyster *Ostrea edulis* (Linnaeus, 1758) in hatchery production. Development of effective techniques to produce *O. edulis* as spat-on-shell for ecological restoration.

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Reflecting the global decline of oyster reefs, with 85% of the world's oyster populations having been lost, the current distribution of the European flat oyster, *Ostrea edulis* (Linnaeus, 1758), across the UK and Europe represents only a small fraction of the historic distribution. The multiple socio-economic benefits and ecosystem services provided by natural oyster beds make *O. edulis* a desirable species to conserve and restore. In past decades, numerous feasibility studies and restoration projects have been, and are currently being, conducted within the UK and Europe. However, seed oyster supply is currently a key limiting factor for native oyster restoration projects in Europe, alongside the lack of suitable settlement substrata. Several hatcheries are currently being established across Europe, to assist in restoring *O. edulis* populations, providing oyster seed. Despite its biological and technical feasibility, *O. edulis* hatchery production is still prone to failure, in terms of larval production, survival and recruitment. The scarce capacity to produce large quantities of larvae is mainly due to the knowledge gaps surrounding *O. edulis* gametogenesis and sex differentiation. Larval survival in *O. edulis* hatcheries is currently low because of the ineffective rearing techniques and the lack of standardized methods. The high number of factors affecting settlement and metamorphosis, and the knowledge gaps related to them, make it difficult to fully predict and control habitat colonization by larvae in controlled environments. This project will investigate the effects of temperature and fatty acid composition of diet on *O. edulis* gametogenesis and sex ratio, the effects of different diets (cell size and fatty acid content) on larval growth and survival, and the effects of shell topography, biofilm and chemical cues on larval settlement and metamorphosis. This will enable development of effective rearing techniques for *O. edulis* in hatchery production, establishing a reliable source of oyster seed for restoration projects, such as the Solent Oyster Restoration Project. The genetic implications surrounding the employment of locally adapted broodstock from disease-affected areas in the Solent will be also investigated, assessing any loss of genetic diversity through the production process and the possible inheriting of disease-resistance by the following generations in the hatchery.



Monitoring opisthobranchs (Gastropoda: Heterobranchia) through citizen science in the Western Mediterranean Sea

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Marine heterobranchs, commonly known as opisthobranchs, generate a lot of interest among scuba divers. This interest was conveyed through citizen science for a project that involved monitoring many species along the NE Spanish coast. The project was facilitated by the NGO Catalan Opisthobranch Research Group (GROC). Up to date, in our on-line database (<https://opisthobrànquis.org/en/>), a total of 194 collaborators have entered 23,660 observations, corresponding to 74,781 specimens belonging to 233 species, for a total of 2,963 diving spots. This amount of data would have been difficult to collect for our scientific community alone during the same period. All the observations have increased the records of the diversity of sea slug species from the Spanish and southern French coast, including some species with scarce records worldwide (e.g. *Lomanotus barlettai*) and alien species (i.e. *Aplysia dactylomela* and *Lamprohaminoea ovalis*). We have also extended the records for the range of distribution of several species that were recorded as rare, but which are now found in several places (e.g. *Doto pygmaea*, *Berghia verrucicornis*). Moreover, taxonomic and systematic studies done by the association revealed cryptic speciation in diverse taxa (i.e. *Tylodina*, *Trinchesia* and *Doto* genera). The current project of the association focusses on Doridina, a somehow common but unknown taxon for which several undescribed morphotypes and new records for the Spanish coast were found. Thus, our main objective is to clarify the identities of species present on the Mediterranean coast by providing molecular and morpho-anatomical evidence, updating and redescribing several elusive species.



Feeding rates and behaviour of *Cratena peregrina* (Nudibranchia: Aeolidiodea) around their prey and host *Eudendrium racemosum* (Hydrozoa: Eudendriidae)

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Kleptopredation is a feeding mechanism which combines predation with kleptoparasitism, where a predator consumes both a prey and its fresh caught meal. It was first discovered in 2017, between the nudibranch *Cratena peregrina* and its prey and host *Eudendrium racemosum*, a hydroid of the Mediterranean basin. The current work builds on this discovery by looking at further aspects of this relationship. Nudibranchs are highly specialized feeders which are seasonally abundant. They exhibit voracious feeding tendencies on their seasonal and ephemeral prey which often consist of just a single or few prey taxa. During this specialized prey-predator interaction, the hydroid concurrently plays a role as both the prey and the host of the nudibranch. In the current model, *C. peregrina* selectively feeds on *E. racemosum* hydranths which have recently fed, resulting in half of the nudibranchs' food intake being derived from the planktonic prey consumed by the hydroid. This study investigates the bioenergetics of these trophic exchanges by employing a mixture of methods including behavioural analyses, biological rate measurements and feeding experiments to answer fundamental questions about the underlying mechanisms, benefits and tradeoffs of this evolutionary strategy. Preliminary results are presented here which have so far shown that *Cratena peregrina* feeds on *Eudendrium racemosum* at a rate which varies diurnally, although with marked fluctuations.

Behavioural experiments have suggested that nudibranchs sense their immediate environment by touching surroundings with their oral tentacles, enabling them to identify their prey and host while crawling on the substratum. The models that will be derived from these studies will contribute towards addressing the consequences of extreme specialization in the marine environment, an evolutionary trait which will become increasingly challenged by global climatic and environmental changes.



C. peregrina feeding on hydroid in the lab



C. peregrina on hydroid colony - in the field photo



Mollusca in the Bonsor Collection. An interdisciplinary collaboration in archaeological studies.

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The scientific collaboration between George Bonsor Saint Martin, archaeologist, and Robert Ashington Bullen an authority on molluscs and member of the Malacological Society of London from 1897, has been one of the earliest interdisciplinary studies of its kind in Spain. Within the framework of the archaeological study of the Alcores' Region in Andalusia achieved by George Bonsor, Robert Ashington Bullen advises him about the importance of studying the Mollusca. In the early twentieth century, they began to work together at the Roman Necropolis of Carmona where Ashington Bullen studied *in situ* the recent land shells and Holocene shells from the Roman tombs. Later Bonsor continued collecting all Mollusca occurring in any of his excavations in order to preserve them for examination and identification. The results of these sampling efforts is a collection of more than 60 specimens of shells, coming from 10 archaeological sites dated from the Neolithic to Roman age. Most of those studied by Ashington Bullen are still exhibited to the public at the museum and are classified and identified in sixteen boxes. The conclusions of this study were published in the *Proceedings of the Malacological Society of London* vol. VI in 1904-1905 where Ashington Bullen made some reflections about the origin, use and date of each one of the shells studied in the Alcores Region. Now we still preserve in the archives of the castle of Mairena their correspondence and the specimens under study that still arouse interest in researchers.



Signature: SI/PC/56/3. *Margaritana sinuata*, Lam. Archaeological site: Campo Real, Carmona, Sevilla Catalogue Bonsor: n°: 26 y 30 Study made by: Robert Ashington Bullen and Jorge Bonsor. Casa Bonsor. Castillo de Mairena. Mairena del Alcor, City Council.



A Survey of the biodiversity of Cypraeidae (Gastropoda) in the intertidal zone of Isla Verde, Batangas City, Batangas, Philippines

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The family Cypraeidae Rafinesque is a group of marine snails commonly called as "cowries" in the Order Littorinimorpha Golikov & Starobogatov, and Class Gastropoda Cuvier. Along with other grazing gastropods, Cypraeidae species play an important role in controlling epiphytic and macroalgal blooms in a marine environment. This study aimed to assess the biodiversity of the species of family Cypraeidae in the intertidal zone of Isla Verde. Sampling was done using 100 m belt transect lines and a quadrat method using 10 1x1 m² quadrats during wet



(August & September 2018) and dry seasons (November & December 2018). Collected shell specimens were morphologically observed

and identified to the lowest possible taxa. Nine Cypraeidae species belonging to five genera were collected, namely: *Erronea*, *Erosaria*, *Lyncina*, *Monetaria* and *Mauritia*. Diversity indices showed a high diversity of Cypraeidae species in the intertidal zone of Isla Verde. Based on the Shannon-Wiener index values, species of Cypraeidae are diverse and evenly distributed in the area. However, Simpson's diversity index and Pielou's evenness index showed that there is a high diversity and low distribution of the abundance within species during wet and dry seasons.



Understanding how solar-powered sea slugs use sunlight to withstand starvation

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¹Groningen Institute for Evolutionary Life Sciences, University of Groningen, Groningen, NL

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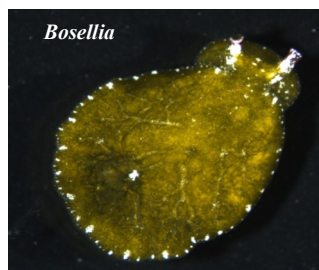
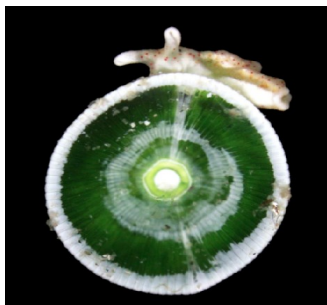
³Centre for Molecular Biodiversity Research, Zoological Research Museum Koenig, Bonn, DE

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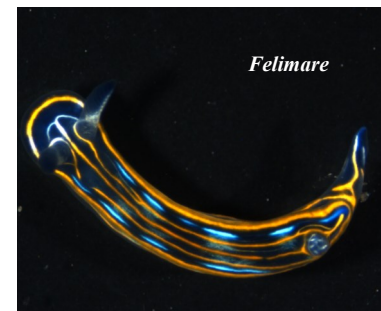
Solar-powered sea slugs (Sacoglossa: Gastropoda) are an evolutionary enigma. Six species have acquired the ability to photosynthesize by stealing functional chloroplasts from algae and retaining them within specialized cells – a process termed functional kleptoplasty. This ability has captivated the public and fascinated researchers, earning these sea slugs nicknames like “solar-powered sea slugs” and “leaves that crawl”. As is often the case in nature though, functional kleptoplasty is far from straightforward. Kleptoplasty research has predominantly focused on the energetic benefits kleptoplastic slugs receive from their sequestered chloroplasts. These investigations reveal that kleptoplastic slugs do energetically profit from their chloroplasts; however the degree to which they benefit can differ by species. For example, when the long-term kleptoplastic species *Elysia timida* enters starvation, photosynthetically derived sugars are bundled into starch molecules and stored in the chloroplasts for over a month. During this time, the slug sharply reduces its digestive capacity, potentially allowing for chloroplast retention. It is only after approximately a month that the slug increases digestion and consumes the chloroplasts and their starch. This pattern has not been observed in multiple species with limited chloroplast retention times. Instead, these species increase digestion and break down their chloroplasts, which lack starch accumulation. These observations suggest that the key to understanding kleptoplastic differences between species may lie in the regulation of digestion and other metabolic processes. Little is known about solar-powered slug metabolism. To address this, we investigated the resting metabolic rate in three sacoglossan species with varying degrees of kleptoplastic ability, and a nudibranch species completely lacking in any photosynthetic capacity. We also examined how starvation, temperature, irradiance, and chemically inhibiting photosynthesis affect the metabolic rate for each species. Increased temperature and extended starvation led to significantly increased metabolic rate and decreased longevity. Irradiance and metabolic rate were positively correlated for every solar-powered species at every starvation point. Furthermore, high-light conditions induced significantly higher metabolic rates in each of the kleptoplastic species, which may indicate stress due to photo-damage. Overall, these observations form a foundation for subsequent investigations into how specific metabolic processes facilitate or affect kleptoplasty in solar-powered sea slugs.



Thuridilla



Bosellia



Felimare

A green cryptic challenge: molecular systematics of the poorly studied genus *Bosellia* Trinchese, 1891 (Heterobranchia, Sacoglossa)

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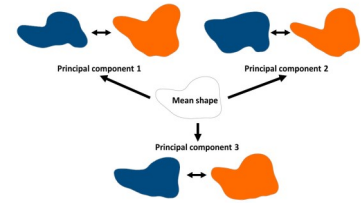
The genus *Bosellia* Trinchese, 1891 (Heterobranchia, Sacoglossa) is one of the most ecologically specialized marine gastropod groups. Members of this genus are flattened sea slugs that live and feed solely on algae in the genus *Halimeda* J.V.Lamouroux, 1812, in which slugs are highly cryptic and therefore poorly studied. Thus, the inference of interspecific relationships in *Bosellia* has been limited by the available taxon sampling and morphological similarity among specimens globally. In order to clarify the phylogenetic relationships and diversity in *Bosellia*, we sampled 59 specimens and added additional sequence data from six specimens from GenBank. Bayesian and Maximum likelihood phylogenetic analyses were performed on two mitochondrial markers (COI, 16S rRNA) and one nuclear gene (H3). The molecular data, external anatomy, as well as penial and radular morphology, confirmed the taxonomical validity of the genus *Bosellia* and the existence of five candidate species distinct from *B. mimetica* (type species from Mediterranean), although all shared an overall similar green, flattened morphology. Three of these taxa are distributed through the Indo-Pacific, one across the Caribbean, and the last has an ampho-atlantic distribution. This study further confirms that integrated approaches can reveal the prevalence of cryptic species in traditionally ‘low diversity’ sea slug lineages.



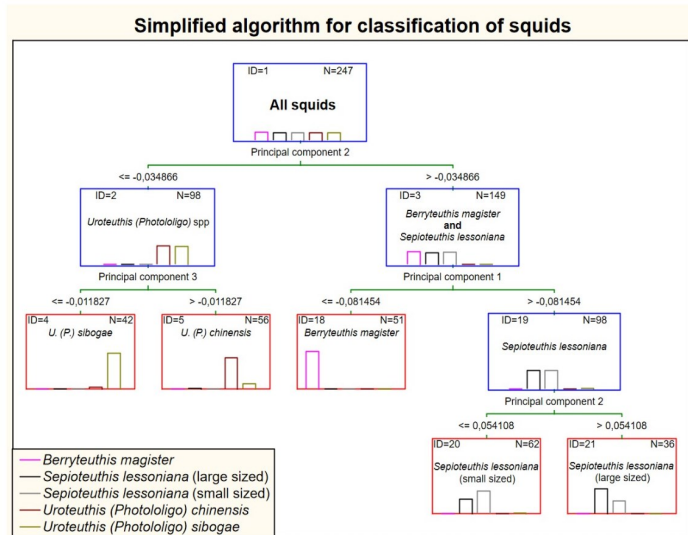
On the application of geometric morphometrics to the identification and ecological studies on squids.

Fedor Lishchenko

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Development of reliable identification methods for squid at different taxonomic levels remains an issue of great interest for ecological studies and fisheries management. At present two approaches are applied - identification by keys based on external morphology and molecular methods. However, both methods have pronounced limitations. On the one hand, the accuracy of morphology-based identification can be rather low, especially if applied in a framework of market sampling. On the another hand, molecular-based identification is an expensive, laborious and time-consuming process. To address these limitations an alternative method was applied to classify animals belonging to taxonomic levels ranging from order to intraspecific groupings (namely *Beryteuthis magister*, *Uroteuthis (Photololigo) chinensis*, *Uroteuthis (Photololigo) sibogae* and two different-sized groups of *Sepioteuthis lessoniana*). Shapes of squid statoliths were expressed using elliptic Fourier transformation, then the results were studied via principal component (PC) analysis coupled with classification and regression trees analysis. This allowed me to develop a simple but accurate algorithm for identification based exclusively on the outline of this recording structure. Application of this algorithm allowed classification at the family level with 100% accuracy, at the genus level with 99,5% accuracy, at the species level with 92,9% accuracy and at the intraspecific level with 76,5% accuracy. In order to provide a tool allowing fast identification in the framework of a large scale sampling, a simplified classification tree was developed. In this case, the accuracy of identification decreased, especially at the lower taxonomic levels (100%, 99%, 88,8%, 62,2% of correct classifications, respectively) however the decision-making process was greatly simplified. Moreover, investigation of the visualized PC used in this algorithm revealed the statolith morphological traits which could be used for identification. Additionally, this study allowed me to address the question of whether the statolith's shape is genetically determined or whether it reflects the environmental conditions experienced by the animal. As all squid selected for this study had a similar lifestyle (all except *B. magister* are tropical demersal shallow-water species), the observed clear differences in their statoliths' shape point to the genetic nature of the statolith shape



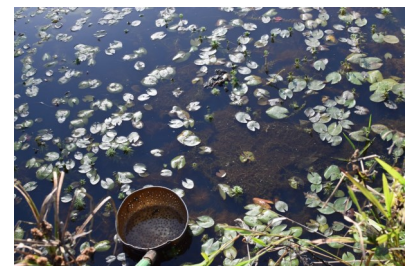
Molecular-based approaches for the detection of Schistosoma mansoni infection in snail hosts in a persistent endemic area of Brazil.

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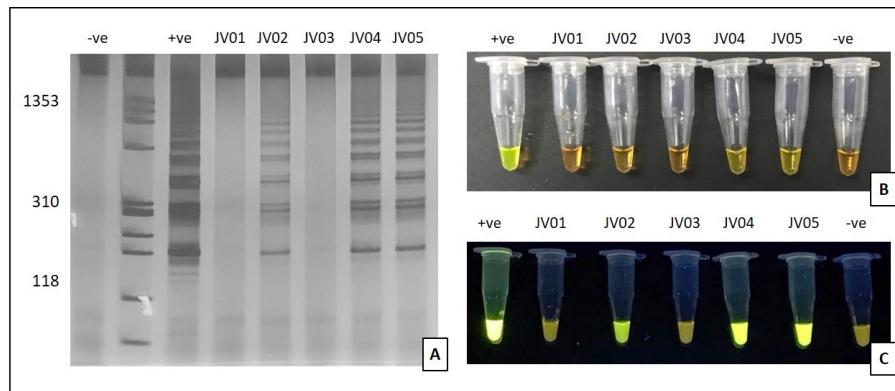


Schistosomiasis is a snail borne parasitic disease associated with poverty and low sanitation condition. It is estimated that 7.1 million people are infected with *Schistosoma mansoni* in Latin America, 95% of whom live in Brazil, where *Biomphalaria* snails are essential in the parasite life cycle. Three species act as intermediate hosts. Minas Gerais state is a prevalent region in Brazil where all of the three host species have been reported as naturally infected with *S. mansoni*. The Jequitinhonha Valley is located at the North of Minas Gerais, comprises 55 municipalities and is considered as one of the poorest regions of the country. This region is a high endemic area for *S. mansoni* with a persistent transmission pattern over time. Among all the strategies to control and eliminate schistosomiasis, the surveillance of transmission focus and snail control are highly recommended. This study aimed at the evaluation of the performance of different molecular approaches for the monitoring of endemic areas by the diagnosis of the infection in the intermediate hosts. A total of 602 snails were collected in five waterbodies (JV01-JV05) from the municipalities of Jequitinhonha, Joáima and Ponto dos Volantes. The snails were pooled according to the collection site and squeezed between glass plates to detect the presence of the larval forms of *S. mansoni* and other trematodes. By this method, *S. mansoni* cercariae and a Spirorchiidae cercariae in

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>GONÇALVES MESQUITA ET AL. CONTINUED

Jequitinhonha (JV04 and JV03, respectively) were detected. DNA was extracted from the prepared pool. PCR-RFLP were used for the species specific identification and *Biomphalaria glabrata* was found to be present at all the collection sites. LS-PCR, Multiplex PCR, conventional PCR and LAMP assay were used to detect the presence of infection. By all methods, *S. mansoni* DNA were detected in all municipalities (JV02, JV04 and JV05) suggesting that molecular methods are more sensitive than parasitological ones and that auxiliary tools are needed for a more accurate mapping of active transmission areas. We highlight the potential of the LAMP assay due to its specificity, sensitivity, and applicability directly in the field, as it does not require expensive laboratory infrastructure.



A: Silver-stained 6% polyacrylamide gel showing LAMP products. B: naked eye visual inspection of reaction tubes using SYBR Green I 1:10- positive (green) and negative (orange). C: UV inspection of reaction tubes using SYBR Green I 1:10- positive (fluorescent) and negative (nonfluorescent).
-ve: Negative control, no DNA added; +ve: Positive control, 1 ng *S. mansoni* DNA added; JV01: Collection site 01, Ponto dos Volantes/MG; JV02: Collection site 02, Ponto dos Volantes/MG; JV03: Collection site 03, Monte Formoso/MG; JV04: Collection site 04, Monte Formoso/MG; JV05: Collection site 05, Joaíma/MG

**AplacBase: a digital database for Mollusca's most neglected taxa**

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Aplacophorans (Solenogastres + Caudofoveata) are weird and wonderful marine molluscs. Small, shell-less, and worm-shaped, these animals have challenged malacologists since their discovery of the animals 150 years ago. In competing phylogenetic hypotheses, they are either regarded as the first two offshoots of the molluscan tree and interpreted to represent the ancestral condition of molluscs, or they are placed together with chitons (Polyplacophora) in a clade called Aculifera as the sister taxon to all other molluscs. Despite their key role in understanding molluscan evolution, they are one of the lesser known groups among Mollusca due to neglect by researchers. Although common in the global benthic malacofauna, aplacophorans often go unnoticed, are left unidentified, or are simply discarded for research as their identification usually requires a combination of complex and time-consuming methods and is challenging for the untrained. As a consequence, fewer than 500 species have been described so far, even though the true number is estimated to be ten times higher. Most aplacophorans from remote locations constitute new taxa, but new species are still being routinely discovered even from well-studied areas. Here, we present **AplacBase**: a freely accessible on-line database about Aplacophora. Our aims are to provide (1) an up-to-date species list of Solenogastres and Caudofoveata including their known distribution ranges; (2) a compilation of 150 years' worth of aplacophoran literature; and (3) a photo database and keys to help facilitate identification to at least higher taxonomic levels. All the information will be available in an interactive way, making it easier to access and thus facilitating progress in understanding this interesting group. AplacBase is aimed at both experts and non-experts and will include additional information about the animals and their ecology. We hope AplacBase will not just support and facilitate future aplacophoran biodiversity research, but will also contribute to making scientific progress (especially taxonomy and biodiversity research) more accessible to the general public, as a resource to raise awareness and public participation in biodiversity and nature conservation.



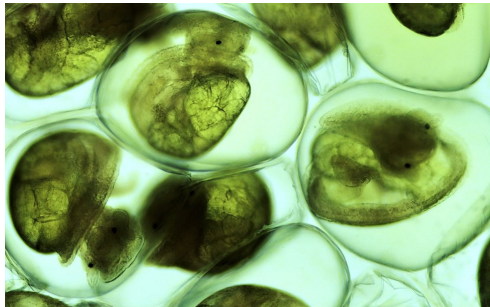
Does size matter? Reproductive trade-offs in a freshwater pulmonate snail

Rebecca K. Osborne & Ryan S. Prosser

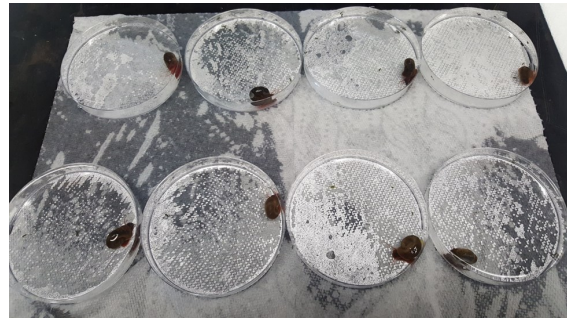
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Despite their impressive diversity, freshwater gastropods are considered one of the most imperiled taxonomic groups with 74% of North American species listed as extinct, possibly extinct, imperiled, or vulnerable. Although often inconspicuous, freshwater snails are a significant component of the ecosystems they inhabit, playing an important role in food webs, nutrient cycling, and control of macrophyte populations. Therefore, the maintenance and conservation of freshwater snail populations is critical to ensuring the continued health and productivity of our freshwater ecosystems. Unfortunately, freshwater snails tend to be under-represented in literature and life history has only been thoroughly characterized in a handful of common laboratory species. The present study uses as a model the pulmonate planorbid *Planorbella pilsbryi* which can be found in lakes, streams, and slow-moving rivers across Canada and northern USA and is closely related to other planorbid species that are common throughout the rest of the world. In a series of three reproductive studies, we assessed factors that may influence the variability observed in reproductive output and juvenile fitness which provide important information on the conditions which most strongly affect population dynamics and may be relevant to conservation or pest management. First, a group of isolated snails were observed for 8 weeks to track reproductive output from single individuals and evaluate preferential investment in growth versus reproduction. Second, one egg mass from each isolated parent was separated and monitored to assess the influence of parental factors on juvenile size and fitness. Finally, using time-lapsed photography, embryo development and growth were described at different incubation temperatures. Altogether, this work serves as an important description of reproduction and life history in a freshwater snail. Additionally, by evaluating the relative influence of explanatory variables on the variability in snail growth and reproduction, we can better use these endpoints in both ecotoxicology and population management.



Developing embryos of *Planorbella pilsbryi* used in time-lapsed photography to assess developmental milestones and embryo growth.



Isolated individuals of *Planorbella pilsbryi* used in reproductive studies to assess preferential investment in growth versus reproduction.



Nudibranchs from the archipelago of Fernando de Noronha, Brazil

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Nudibranchs are small marine gastropods without a shell in their adult life stage. They feed on other invertebrates such as sponges, tunicates and hydroids. The archipelago of Fernando de Noronha is formed by 21 islands and islets of volcanic origin located 541 kilometers far from the Brazilian northeastern coast. The region is known for its pristine waters and abundant marine life. In this project we discuss the occurrence of nudibranch molluscs in Fernando de Noronha, through the compilation of literature records and new observations. Until 2019, only six species were recorded for Fernando de Noronha. From May, 2019 to March 2020, scuba dives from 6 to 53 meters deep resulted in the record of a total of 12 nudibranch species. The material was preliminarily identified based on the external morphology and colour pattern compared with specialized literature. Of the 12 species observed, two had been previously recorded: *Felimida* sp. and *Phidiana riosi*. Ten species are recorded for the first time in Fernando de Noronha: *Berghia creutzbergi*, *Bulbaeolidia oasis*, *Cuthona iris*, *Doto* cf. *wildei*, *Felimare* cf. *fregona*, *Felimare kempfi*, *Nanuca sebastiani*, *Phidiana lynceus*, *Caloria* sp. and *Thordisa* sp.. Some of these species were previously recorded from the Caribbean Sea and southeastern Brazilian coast but their occurrence in Fernando de Noronha fills a gap in their distribution records. *Thordisa* sp. and *Caloria* sp. might represent undescribed species. Considering the number of species recorded in a short time period, we conclude that the nudibranch fauna from Fernando de Noronha is far from being well known. The next stage of the project will include the collection of specimens for study using an integrated taxonomic approach.



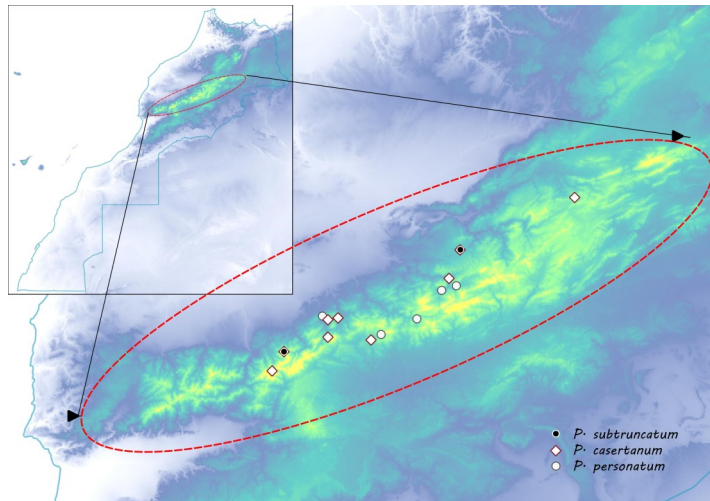
Fingernail clams (*Bivalvia*: *Sphaeriidae*) inhabiting the High Atlas of Morocco

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The Sphaeriidae family, commonly referred to as fingernail clams, are the smallest freshwater bivalves inhabiting practically all types of freshwater ranging from ephemeral ponds to large lakes and river systems. In Morocco, studies on this family are considerably lacking. The present work took place in the High Atlas of Morocco which is the highest mountain chain in north Africa, where sampling was conducted between 2016 and 2019 in different type of freshwater ecosystems, specifically, in habitats susceptible to Sphaeriidae. In total, 3 species belonging to *Pisidium* were recorded in 14 localities: *P. casertanum*, which is the most abundant species of the genus, distributed worldwide, *P. personatum*, the spring-dwelling species is the second abundant in the studied area, whereas, *P. subtruncatum* remains the less frequent species, occurring in only two localities. All the species occurrences are first records in the basins of the Moroccan High Atlas; therefore, further investigation is required to enlarge the knowledge of this neglected group in Morocco



Non-marine molluscs of mainland Ecuador: a preliminary analysis

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Ecuador has some of the highest recorded biodiversity in the world. This is probably also true for the mainland molluscs, but these are poorly studied. The known records are largely based on old literature, small species are mostly ignored and there is no up-to-date checklist available. The objective of this study is to provide such a checklist as a basis for further research. Locality records are based on literature, GBIF, and iNaturalist observations. Type material is illustrated or original figures reproduced. Our current listing has 323 non-marine species (24 *Bivalvia*, 299 *Gastropoda*), with several new species to be described in subsequent papers. The most species-rich families are Bulimulidae, Neocyclotidae, Achatinidae and Orthalicidae. 165 species are endemic to the country, of which 117 (71%) are only known from one locality or from an imprecise locality. For the total fauna, this percentage is 55%. Many species are only known from historical records. Twenty one species are (putatively) non-native, of which some are a serious pest (e.g. *Achatina fulica*). Habitat destruction during past decades and continued mining activities in protected areas are serious conservation issues. Our conclusion is that the mainland malacofauna is poorly known, under several threats, and needs concerted action by malacologists.



Arionidae in Munich: unravelling the sluggish mess

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Arion vulgaris Moquin-Tandon, 1855 is a frequently discussed pest species – known to the public as the Spanish slug. Originating in western and central Europe, it is currently increasing its range into both northern and eastern Europe. Its origin as well as its status as either invasive or native species for different regions is a focus of recent research. *Arion vulgaris* is highly abundant especially in urban areas. Adults can be anatomically distinguished from congeners and

juveniles were supposed to show a typical colour pattern. However, on the woody grounds of the Bavarian State Collection of Zoology, in early spring we observed an abundance of juvenile brownish arionids showing high phenotypic diversity that matches with identification keys of other native slug species, making accurate morphological identification impossible. In this study, we collected 93 juvenile arionid slugs and grew and observed them over a period of five months. Then we took mitochondrial CO1 barcode sequences of a subsample of the 20 most different looking specimens. Both phylogenetic trees as well as species delimitation tests were performed to evaluate species identities, species diversity, and the morphological identification made beforehand by means of current literature. Our results demonstrate an urgent need to correlate coloration of juvenile and adult slugs and to test morphology-based identifications with molecular methods.

EDITOR'S NOTE - ARION SP. CAN EAT BABY BIRDS! SEE PAGE 5 OF THIS ISSUE



Mytilidae mussels support zonation of marine assemblages at a shallow-water hydrothermal vent chimney: Strýtan, Eyjafjörður, Iceland

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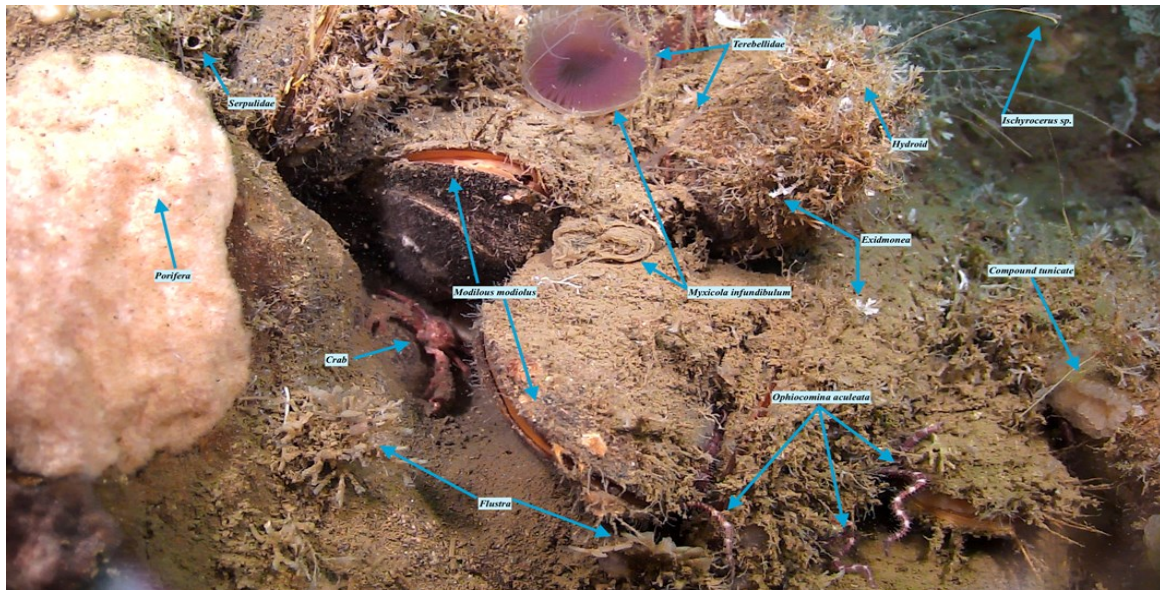
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Deep-sea hydrothermal vents exhibit zonation of specialist fauna, including *Bathymodiolus* mussels, characterized by proximity to reduced chemical and mineral-rich fluid emission zones. While rarer, hydrothermal vents also exist within shallow-marine environments though there are relatively few studies of these chimneys. Strýtan, located in Eyjafjörður, northern Iceland, is a 45m, shallow-water hydrothermal vent comprised of saponite, with a depth range of 15-60m. The chimney shows demarcated seepage zones of white saponite interspersed by dense mats of sub-tidal marine fauna such as hydroids, bryozoans, and mussels, whose interactions with hydrothermal fluids and zonation along the chimney are largely unknown. Assessing their distributions provides insights into the relative tolerances of Arctic shallow-water, marine invertebrates to changing temperatures, geochemical regimes, and adaptation to hydrothermal environments. As a study in progress, we characterized the zonation of Strýtan, hypothesising that zonation correlates with depth and distance from fluid emission. During June 2019, we conducted SCUBA and ROV surveys of the Strýtan chimney. Screengrabs of footage taken during ROV set-down periods were used to assess zonation patterns of dominant taxa. The vent field location and environmental effects support a relatively species-rich community of marine invertebrates, endemic to the wider region, with no vent-obligate species. Saponite deposits in the top 5m, and active zones throughout the chimney's height appeared largely un-colonized, with deposits controlling colonization. Species richness and diversity within assemblages was predicated on distance from emissions, indicating toxic fluids had a negative-effect on variation, and significantly promoted species that were vent-tolerant. *Modiolus modiolus*, *Mytilus trossulus*, and *Mytilus edulis* are early colonisers whose distribution, proximal to emissions, made a significant difference to assemblage composition and zonation. Mytilidae, after algae, act as a secondary substratum or buffer between assemblages and saponite, supporting further layers of opportunistic taxa over time, with characterization and mineral seepage of Strýtan determining a 3-dimensional zonation system, correlating with depth, vertical and horizontal distance from fluid emissions. Further study using DNA barcoding and transcriptomic analysis of the three mussel species collected is proposed and will provide further insights into the adaptations and tolerance of these species to the fluctuating environmental stresses at marine shallow-water vents.

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Still image from ROV zonation survey HD footage showing 5 mussels (*Modiolus modiolus*) acting as a substratum for various marine invertebrates typical of Arctic sub tidal regions including: 2 species of Bryozoa (*Exidmonea* sp., and *Flustra* sp.), and a hydrozoan. Also visible (image left), is a sponge (species unknown) and the open tube of a Serpulid worm (top left). Teribellidae worm tentacles surround the open violet radiolar crown (top center) of a *Myxicola infundibulum* worm, and right of the gaping black mussel shell is the collapsed web that surrounds the radiolar of a second *M. infundibulum* worm. On the thin



Molluscan jokes - told while waiting for the Forum to start

From Vicky Sleight to everyone:

Does anyone have a mollusc joke to pass the time... ?

From Lauren Sumner-Rooney -

I had a bivalve joke, but it was boring...

From Roya Haghighat-Khah -

Why don't McDonald's sell snails? ...Because they're not fast food!

From Tim Pearce

How does a gastropod keep its shell so shiny? It uses snail varnish!

From Peter M. Schächinger

The CSI is investigating a seafood company in Hawaii which dealt in molluscs

They suspect it of being a shell company being in fishy business

From Christian Drerup

How many tickles does it take to make a cephalopod laugh?

Ten-tickles

From Ruthela Payawal

How does a mollusc hide from predators?

CLAMouflage!

From Tim Pearce

For holiday, the gastropod family decided to go to Dis-SNAIL-land.

From Tim Pearce

I asked my friend, who got a new pet snail, what she would name the snail. She suggested, "Shelly Noelle." I said, "Very pretty, but wait, how do you spell Shelly with no 'L'?"

From Ruthela Payawal

LOL! Shelly with no L will no longer have a shell, hence will no longer be a snail!

From Peter M. Schächinger

Slug pets are better anyway *looks at my two limax*

..... boom, boom, crash on the symbols and the Forum starts



RESEARCH GRANT REPORT

Intertidal molluscs on the ecologically dynamic Saurashtra Peninsula (Gujarat, India)

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Molluscs are often defining features of species assemblages on rocky intertidal coasts. Such coasts sometimes have striking ecological patterns and dynamics. When these are researched, they may allow important ecological discoveries. Classic examples include research on patterns of intertidal mussels in NW America (Paine 1966) or the contribution of predatory whelks to patterns of barnacles in Scotland (Connell 1961). With the view of scoping the potential for new ecological discoveries in a dynamic coastal region little known to marine biologists of western countries, I used an MSL Senior Research Grant to travel to Gujarat for two months at the beginning of 2020 and make observations on the fascinating patterns of molluscs on rocky shores of Saurashtra Peninsula. The grant allowed a collaboration finally with the well-known Indian marine biologist Prof. Rahul Kundu, with whom I had been planning teamwork since 2015, and with the staff and students at his lab, including a talented expert on local cerithiid gastropods, Soniya Jethva.



Chiton found occurring in cavities within layers of sheet-forming coral



Using a chain and quadrat to measure habitat topography around cerithiid gastropod aggregations

More so than for other coastlines with which I am familiar, around every corner there seemed to be some conspicuous new ecological pattern, indicating high levels of medium-large scale species distribution variability. As expected, the patterns often involved molluscs, particularly the cerithiid gastropods being studied by Soniya. We sampled their distributions at two sites and found extreme patterns of aggregation at the scale of metres, to the extent that sometimes gastropods were piled several individuals deep. What could cause such aggregation? We tested habitat topographic complexity as a reason, as cerithiids may aggregate more in places with crevices and other beneficial microhabitats. We correlated topographic complexity with cerithiid abundance but found only non-significant results, so some other factor must be the cause. Measurements of cerithiid sizes showed that individuals within the centre of aggregations on average were about half the size of those around the edges. This evidence suggests aggregation may be a form of protection, with smaller intra-aggregation individuals protected possibly from predators or high temperatures. Many ecologists worldwide are interested in the reasons for animal aggregation like this and Soniya will continue her research on this highly distinct pattern

Another aim of the research trip was to gain data to contribute to a global project on ecology of intertidal rockpools, organised by Dr Louise Firth, University of Plymouth. Thirty-nine teams across the world are sampling fauna, flora and environmental conditions of rockpools during periods of high temperature stress in summer and again during more favourable winter conditions. The results will inform the field of coastal eco-engineering because in many regions artificial rockpools are being added to structures such as seawalls and breakwaters for coastal biodiversity conservation – we can sample natural rockpools to determine what benefits taxa such as intertidal molluscs can expect from eco-engineering. With the MSL Senior Research Grant I was able to successfully obtain unique data from the Indian subcontinent for this project, on the rocky coastline of Veraval which is characterised by abundant gastropods, chitons, limpets, nudibranchs and other intertidal molluscs that were responding to the rockpools. The students of Prof. Kundu's lab assisted with this project and the experience encouraged several to now start intertidal rockpool projects of their own.

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Dr Vakani sampling limpets in rockpools

We are indebted to the MSL for providing the funding to allow the outcomes achieved so far. Included in these outcomes is my participation as guest lecturer at the International Conference on Panorama of Life Sciences, University of Bhavnagar, January 2020, where I communicated to an audience of Indian biologists the concepts behind this global rock-pool project, and a manuscript in preparation with Soniya Jethva about cerithiid gastropod aggregation. As expected, numerous promising ecological discoveries were made during my research stay in India. Relating to molluscs, we found chiton specimens occurring within a unique cryptic habitat of cavities formed by layered growth of encrusting intertidal corals. Species identification and further research of this discovery is being done by a Saurashtra University PhD student, Swati Chauhan. Also, cerithiids were not the only mollusc found in aggregations – Dr Bhavik Vakani from Saurashtra University and I started experiments investigating aggregation of the limpet *Cellana karachiensis*, and potential correlation of this aggregation with algal food. Although the situation for international travel is currently uncertain, when circumstances permit I plan to return and continue these experiments and collaborations, helping the molluscan species and research possibilities from this unique coastline be more broadly visible across the scientific community.

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Meetings with staff of Saurashtra University



INTERIM RESEARCH GRANT REPORT

Disentangling multi-partner effects on collaborative hunting between octopus and fishes

Eduardo Sampaio

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 Department of Collective Behaviour, Max Planck Institute of Animal Behavior, University of Konstanz
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First of all, we would like to thank the MSL for funding our research project: "Disentangling multi-partner effects on collaborative hunting between octopus and fishes". We are excited to relay that the first output of the project was just accepted and will be published soon in the scientific journal *Ecology* (*The Scientific Naturalist*).

In short, we report several events of different octopuses (*Octopus cyanea*) displacing fish using a swift motion with one arm, a behaviour we refer to as a "punch". This behaviour is novel, not having been described in scientific papers addressing collaborative hunts between octopus and fish (either in pairwise interaction, or with multiple fish partners). Interspecific collaborative hunting is underpinned on partner-specific morphologies and hunting strategies, and the videos show that the reported behaviour is a partner-control mechanism, and thus may serve as a means to diminish costs for the octopus (stemming from, for example, competition, scrounging, aggression) in these interactions. That is to say, this behaviour can potentially be used either to prevent partners from overfeeding on prey, or expel partners who do not contribute with increasing prey opportunities (i.e. ambush predators). We then discuss the aspects of social evolution and game theory that are present during these interspecific cooperative hunts.

Thank you again for funding this research, and we look forward to publishing more material on it.



Example of a multispecific hunting group composed by a day octopus *Octopus cyanea*, a yellow-saddle goatfish *Parupeneus cyclostomus*, a smooth cornetfish *Fistularia commersonii*, and a blacktip grouper *Epinephelus fasciatus*



Image sequence depicting the behavioural action of *Octopus cyanea* punching (white arrows) a yellow-saddle goatfish (*Parupeneus cyclostomus*) partner during interspecific multicollaborative hunting

A full article and videos are accessible at <https://esajournals.on-linelibrary.wiley.com/doi/10.1002/ecy.3266>



INVITED ESSAY

Tales from the Palaeolithic

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I joined the Malacological Society in 1968. The first two papers of mine appeared in what was then *Proceedings of the Malacological Society of London* the following year. Subsequently, a further fourteen have appeared in the *Journal of Molluscan Studies (JMS)*, the last in 2019. Many others have appeared elsewhere. I have no idea in which year I was first asked to referee a submitted paper, but it would be well before 2004, when I became an Associate Editor at the invitation of David Reid.

Over that fifty-two years period (where did those whole decades go?) there have been changes; changes mostly for the better. The *JMS* has now abandoned hard copy, and I guess that many subscribers/members have, like me, received their copy in digital form only for several years. Soon, I suspect, the submission of papers to the journal will not merely be digital but will require the use of an elaborate electronic pro-forma. It might be amusing to those much younger than me to read just what submitting a paper (to most journals, not just *JMS*) entailed.

Two hard copies would be sent to the editor. Most of us were not proficient typists, let alone having our own typewriter so clerical help was needed. Photocopying existed, but was expensive and controlled. Carbon copies were the norm and serious mistakes meant retyping. There are limits to the usefulness of Tippex. My handwritten drafts had a lot of literal cutting and pasting, sometimes giving rise to pages of radically different sizes. Figures were hand drawn, with copious use of stencils or Letraset.

Appropriately enough, all business was conducted by snail mail. Editors must have had a great consumption of paper, envelopes and stamps. I do not recall being particularly bothered by the delay that postal exchanges must have imposed. Short of outright rejection, the fear was that "major revision" was required, almost certainly requiring a complete retyping of the paper. Not that there were standard categories of that kind; referees' (now reviewers') comments were not constrained by any pro-forma categories.

If accepted, galley proofs would be sent and you were liable to pay for any major glitches. Fifty reprints were available free, but more had to be paid for. There was the thrill of being asked for a reprint. Someone, even someone abroad, was interested in your work! I had, once upon a time, box files full of the post card requests. Sometimes, I ran out; sometimes, at my Department's expense, I grossly overestimated the demand for my earth-shattering discoveries. Even with some clear-outs, there are still boxes of unloved reprints. Testaments to vanity, I fear.

Changes came piecemeal, and I cannot date them with any accuracy. I started typing my own papers only on retirement in 1998. But long before that photocopying had become standard. Increasingly, clerical staff, then academics themselves, acquired word processing facilities. Figures could be constructed and manipulated digitally. Reviewing and editing became far simpler. I place on record the particular advantage that it was far easier as an editor and reviewer to improve the work of first-time authors and of those whose first language was not English. Above all, there was the beauty of email, attachments, and the pdf you could send to those who asked. Sadly, that great facilitator is being replaced by an increasing insistence on the use of highly prescriptive and often clunky websites, which brings me to a finale. Not all change is for the better. While things are vastly better than when I started, I think that there are downsides. So, apologies if I ruffle some feathers.

The digital world makes it practical to require more information and more conformity to increasingly precise protocols. Authors have always been the lowest form of pond life in the great academic publishing ecosystem. More and more of the tasks handled later in the process are passed down to them. Reviewers, praised repeatedly as the lynch-pin of peer review, reviewers who give time for free, are forced to conform to mechanistic forms of report. On one occasion, I was involved in about six attempts to get a password that gave me access to the sterile, prescriptive way in which my report was to be entered. Often, the paper to be reviewed is available only as a pdf. Word is much easier to edit. I ask, and I am given. Fine, but it is just one more delay, one more unpaid step, in an increasingly robotic process. I do understand the economies that come with these changes, both for hard worked editors and even more for publishers. Demand to be published exceeds supply. Costs rise. There are, though, other forces at work, forces that are not entirely benign. I could sum it up in one word: accountability.

What was once a rather cosy mode of operation, relying on trust, has become, at least in part, an exercise in tick-box conformity. Returns must be made, analyses of conformity conducted. Authors doubt the impartiality of reviewers. Publishers and Societies run in fear of accusations of bias. The digital era makes bureaucratic solutions practical. I am in no position to say that these are not needed, but something has been lost along the way. To my relief *JMS* is behind the curve in this respect. The moment when it catches up may be the time I should retire properly. At eighty, coming up soon, I do not think I can be accused of shirking.



POSITION PAPER

Diversity, Equality and Inclusion in the Malacological Society of London



Lauren Sumner-Rooney, Jon Ablett, Dinarzarde Raheem, Georges Dussart

Council Members of the Society

Following the murder of George Floyd on the 25th May 2020, which prompted widespread and overdue reflection on Society’s treatment of Black and other BIPOC, a note was submitted to the Council of the Malacological Society of London 4th June meeting to suggest a review of Society practices in the light of racism and diversity. Following that meeting, we have examined the current position of the Society, explored the practices of other learned societies in STEM, and tried to identify areas in which we can take immediate and meaningful action.

Membership and engagement

We note that the Society currently has no record of ethnicity of its members, or of participants in events such as the Molluscan Forum. In the first instance, we propose a survey of the existing membership, and of participants at such events, to gauge the current demographic reach of the Society. This need not be restricted to ethnicity and could include other valuable information including institutional setting, career stage, and other protected characteristics. The Palaeontological Association conducted a similar survey of their membership in 2018, available at <https://www.palass.org/association/diversity-study>. In future, membership application and renewal forms could include an optional section to continue to capture these data.

Awards and grants

The awards and grants schemes represent one of the most powerful ways the Society can enact change. As with membership data, the Society does not record ethnicity data for applicants to our various grant and award schemes. This means we cannot currently capture success rates for Black and other BIPOC applicants from Europe, North America and other developed economy countries, despite the known barriers for BIPOC researchers in those countries.

As a separate exercise, we also reviewed the rate of award of travel and research grants to applicants from developing and transition economy countries (as defined by the UN*), and find that it is substantially lower than the rate of award to others:

| All awards | | | | | |
|-------------------|--------------|--------------|----------|----------|-----------|
| | # Applicants | % Applicants | # Awards | % Awards | Success % |
| <i>Developing</i> | 29 | 19.2 | 9 | 10 | 31 |
| <i>Transition</i> | 5 | 3.3 | 2 | 2.2 | 40 |
| <i>Other</i> | 117 | 77.5 | 79 | 87.8 | 67.5 |
| Total | 151 | - | 90 | - | 59.6 |
| ECR awards | | | | | |
| | # Applicants | % Applicants | # Awards | % Awards | Success % |
| <i>Developing</i> | 22 | 21.4 | 3 | 6.5 | 13.2 |
| <i>Transition</i> | 3 | 2.9 | 0 | 0 | 0 |
| <i>Other</i> | 78 | 75.7 | 43 | 93.5 | 55.1 |
| Total | 103 | - | 46 | - | 44.7 |

*https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/WESP2019_BOOK-ANNEX-en.pdf

We propose that the Society establish two new awards within the remit of the existing travel and research awards, provisionally;

Diversity and Inclusivity – for BIPOC researchers/students working at UK/EU institutions.

International Development – for researchers/students working in developing/transition economies.

We reviewed 16 similar schemes from other funding bodies offering similar sized awards for travel and research (see appendix). We found that most were standalone awards, not part of a wider scheme. For awards offered by societies, 5/9 required applicants to be members. Thirteen listed specific eligibility criteria (e.g. a list of countries or underrepresented

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backgrounds). We suggest that candidates for research and travel awards can simply tick a box on the existing application forms stating that they would also like to be considered for one of these awards. If applications are made, the Society commits to funding e.g. at least one of each per round. If no applications are made, the funds are made available to the wider pool. This approach will not increase the total cost of grants and awards to the Society and will not segregate applicants from the wider award schemes. With Council's approval we hope to introduce these new awards from June 2021.

Representation in Society channels, publications and events

The Society has several platforms through which it could amplify the work of Black and other BIPOC malacologists, including via social media, the website, organised events, and publications. The Science Council's Diversity Framework highlights showcasing the successes of underrepresented groups as an important contributor to improving diversity (<https://sciencecouncil.org/professional-bodies/diversity-equality-and-inclusion/diversity-framework/>). We note that award recipients are already asked to provide a report on their travel and/or research for the *Malacologist*, and suggest that we could start including a couple of these, with images if possible, as examples on the Society website and Facebook page to amplify the work of recipients and encourage applications from a wider pool.



History of the Malacological Society of London

From print to on-line, a historical review of the Journal of the Malacological Society of London

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Council Members of the Society

ABSTRACT

From 2021 the *Journal of Molluscan Studies* will no longer appear in print, becoming an on-line publication only. We review the 127 year history of the journal from its inception in 1893 as the *Proceedings of the Malacological Society of London*, its renaming and relaunch as the *Journal of Molluscan Studies* in 1976, to the present date. In addition to highlighting how the journal has changed and overcome various challenges over the years, the contributions of the various editors are recognized.

After 127 years of publication, the last printed issue of the Malacological Society of London's journal rolled off the press in November 2020. From 2021 onwards, the journal has become an 'on-line publication only'. There are a number of reasons for this decision. Journal usage is now mainly on-line and most libraries purchase the journal as part of an on-line bundle. Only a handful of subscribers take the printed journal. The move to on-line only also means that publication is more environmentally friendly because the need for paper and shipping materials are eliminated, as is the need for transportation. This move to on-line publication only is an important historical moment, and therefore it is not only worth reflecting on the long and illustrious history of the Society's journal in print, but also to acknowledge those members of the Society who ensured that the papers published were to the highest scientific standard, often during difficult times.

The Inaugural meeting of the Malacological Society of London was held on the 27th February 1893 at 67 Chancery Lane, London. (Note: subsequent AGMs were held in February of subsequent years and this February/March timing for AGMs continues to this day.) The meeting was chaired by the renowned geologist Wilfrid H. Hudleston, and attended by a number of conchologists. At the meeting, the name of the new Society was decided, its aims established (this included not only facilitating the study of Mollusca, recent and fossil, but also Brachiopoda*), and membership fees set (10s.6d per annum). However, membership was not just a matter of paying fees, since those wishing to become members had to be elected! An important decision of the new Society was to produce a publication that would include full length scientific papers and be sent to all members as part of their membership fee.

* In 1896 in his presidential address, Professor G.B. Howes proposed that because of the strength of Malacology, the Brachiopoda should no longer be a taxon included within the Society's sphere of interest. The study of brachiopods was discontinued as an objective of the Society in 1904 although not removed from the Society's rule until much later e.g. still mentioned under rules (rule 2) published in Vol. 15 pt. 6 of 1923.

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The publication would also include, however, records of monthly meetings (held on the second Friday each month, sometimes in the house of the President) and Annual General meetings, financial statements, the names and addresses of members and those elected to membership, notes on scientific presentations, exhibits shown at the meetings, as well as some advertisements (mainly sellers of shells and specimens). The *Proceedings* also published the text of the annual address of the President to the Society. This documentation of the activities of the Society presumably explains why the journal was named the *Proceedings of the Malacological Society of London*. Dulau & Co. (London) was appointed the first publisher.

The first volume of the *Proceedings* was published between 1893 (one issue; Fig. 1) and 1895 (a further 6 issues: three each in 1894 and 1895). Thereafter each volume of six parts (three per year) was published over two years. The first editor appointed was Bernard Barham Woodward (Fig. 2A, Table 1) who was a founding member of the Society. Woodward, who held Fellowships of the Geological Society, Linnean Society and Microscopical Society, was employed by the British Museum (Natural History) (now the Natural History Museum, London). He was not only the museum's librarian, but also someone who undertook studies and published on fossil and terrestrial molluscs. He also published three books of note, one on British species of *Pisidium*, a second on British freshwater Mollusca, and a third entitled "*The Life of the Mollusca*". The *Proceedings* immediately attracted papers from UK authors and a few from further afield. Early volumes were dominated by systematic and conchological papers, but also included many studies of molluscan anatomy and several palaeontological investigations. The papers reflected the current state of natural science, which was then in a time of faunistic exploration, collection and description of new species, all with little quantification. Many of the papers included drawings of the specimens (often just the shell), although some included anatomical drawings. However, in 1898, Volume 3 carried the first photographic plate, two images of the fossil cephalopod *Acanthoteuthis ferussacii*. Photographic images remained a rarity in the early years of the journal, as were coloured plates, that were produced as lithographs. Typical of the format of papers at this time, none had abstracts, some did not give the affiliation of the author, and only a few had a formal reference list or bibliography. References, when given, were usually presented as a footnote on the same page. The footnotes often included comments by the author.

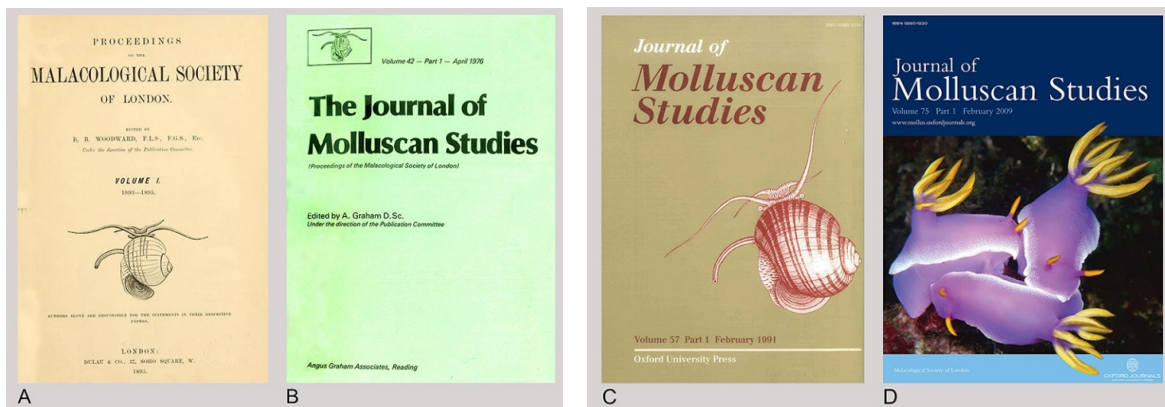


Figure 1. The changing face of the journal. A, first *Proceedings* issue 1893; B, first issue as *Journal of Molluscan*

In 1904 the editorship of the journal was taken over by Edgar Albert Smith (Fig. 2B, Table 1), another founding member of the Malacological Society and staff member of the British Museum. Smith was to edit the journal until his death in 1916 at the age of 69. Smith was a conchologist who had published regularly in the *Proceedings*. During his career Smith published some 300 papers on the Mollusca. This work included studies on the bivalve molluscs collected by numerous expeditions including those of the *Challenger* expedition. He had also made extensive studies of the molluscan fauna of the African Great Lakes. For his meritorious services to science he was awarded the Imperial Service Order in 1903, an award introduced by Edward VII for civil servants (the award was discontinued in 1993).

Despite the outbreak of World War I, publication of the journal continued during the war years. By 1914 photographic images of shells and specimens were becoming a little more common in papers. The first paper involving quantitative data and statistical analysis was published in 1920 and written by A.E. Boycott ('On the size variation of *Clausilia bidentata* and *Ena obscura* with a locality'; Volume 14: 34–42). In this paper Boycott examined size variation of two species of snail within a Wiltshire beech-wood. Data in tables included means, standard deviations and coefficient of variation as well as estimation of significance by examining the standard error of the difference. Boycott regarded any difference between means that were three times the standard error as significant (this was explained in detail in a paper he published in 1919 in the *Journal of Conchology*). His statistical analysis was taken from the 1911 text "*An introduction to the theory of statistics*" written by G. Udny Yule. Boycott's paper also included the first graph to be published by the *Proceedings*. However, during the next 50 years few papers in the journal included statistical analyses.

With the death of Smith in 1916, Woodward once again took on editorship of the *Proceedings*. Although he retired from the British Museum in 1920, he continued to edit the journal until 1926 when the editorship passed to Guy Coburn Robson (Fig. 2C, Table 1). Robson, a specialist on cephalopods, was also an employee of the Natural History section of the British Museum, where he rose to the position of Deputy Keeper. His tenure as editor of the journal lasted for only two years, stepping down from this role at the end of 1927 we suspect owing to health reasons. Ronald Winckworth (Fig. 2D, Table 1), a member of the administrative staff of the Royal Society, replaced Robson.

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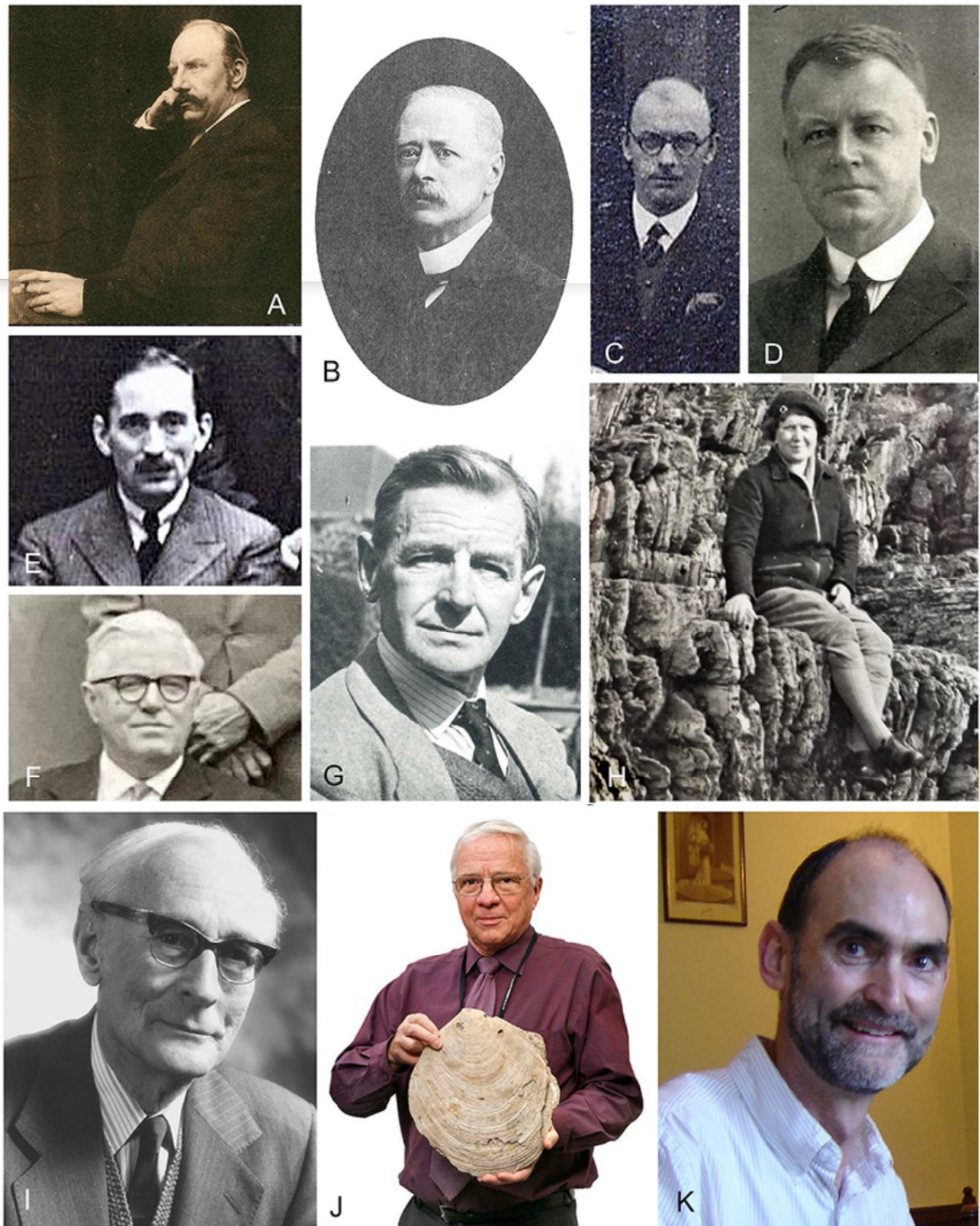


Figure 2. Editors of the journal. A. Bernard Barham Woodward; B, Edgar Albert Smith; C, Guy Coburn Robson; D, Ronald Winckworth; E, Arthur Tindell Hopwood; F, William James Rees; G, Hamilton Ernest Quick; H, Nellie Barbara Eales; I, Alistair Graham; J, John D Taylor; K, David Gordon Reid.

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Winckworth had an interesting journey into malacology. After obtaining a degree in mathematics from Oxford, he taught the subject in two private colleges and Brighton Technical College until the outbreak of WWI. During the war years he enlisted as a seaman in the Navy, where at one point he was accused of being a spy because he had a number of 'foreign grammars' in his kit bag. Once his innocence was established and educational background known, the Navy immediately forced him to take a commission as Paymaster Lieutenant. Upon his return to the UK he accepted a post as an assistant at the Marine Biological Association in Plymouth. After resigning this position in 1921 he spent two years (1922–1924) teaching navigation at the Pangbourne Nautical College before moving to India and Ceylon for six months to study the natural history of the Indian Ocean. He joined the staff of the Royal Society in October 1925, and pursued malacology in his leisure time, being particularly interested in British and Indian Ocean molluscs. Many of the shells he studied were sent to him by his brother Harold who was an officer in the Indian Army collecting specimens at each of his various postings. These collections are housed in the Natural History Museum in London. As editor, Winckworth was known for his thorough proof reading as well as the encouragement and help he gave first time authors. During Winckworth's editorship, another publishing company, David Nutt (London), took over production of the journal in 1936. This company would publish the journal for the next 24 years.

**Table 1. Editors of *Proceedings of the Malacological Society of London* and *Journal of Molluscan Studies* in chronological order. Names and dates obtained from the information given in journal issues.
* given as acting editor**

| Editor | Affiliation whilst editor | Dates |
|--|---|---------------------------|
| Proceedings of the Malacological Society of London | | |
| Bernard Barham Woodward | British Museum (Natural History) | 1893 to 1903 |
| Edgar Albert Smith | British Museum (Natural History) | 1904 to 1916 |
| Bernard Barham Woodward | British Museum (Natural History) | 1916 to 1926 |
| Guy Coburn Robson | British Museum (Natural History) | 1926 to 1927 |
| Ronald Winckworth | The Royal Society | 1928 to 1947 |
| Arthur Tindell Hopwood | British Museum (Natural History) | 1948 |
| William James Rees* | British Museum (Natural History) | 1949 - 1950 |
| William James Rees and Hamilton Ernest Quick | | 1950, volume 28 parts 4&5 |
| Hamilton Ernest Quick | Swansea General & Eye Hospital | 1951 to 1955 |
| Nellie Barbara Eales | University of Reading | 1956 to 1969 |
| Alistair Graham | University of Reading | 1970 to 1975 |
| Journal of Molluscan Studies | | |
| Alistair Graham | University of Reading | 1976 to 1985 |
| John D Taylor ¹ and Peter F Newell ² | ¹ Natural History Museum, London | 1986 to 1988 |
| John D Taylor | ² Queen Mary College, London | 1989 to 2002 |
| David Gordon Reid | Natural History Museum, London | 2002 to 2018 |
| Dinarzarde Raheem | Natural History Museum, London | 2019 to present |

With Britain declaring war against Germany on 17 September 1939, the Council met in October to discuss the impact that this would have on the Society's activities. A notice to members was then published that year in Volume 23 (6) stating: "It is intended to continue the publication of the *Proceedings* as material becomes available rather than at regular dates". Whilst three issues of Volume 24 were produced in 1940, only issue 4 appeared in 1941. This was when the bombing of London was most fierce, and it is remarkable that any issues were produced. However, in 1942 not only were issues 5 and 6 completed, but also the first three issues of Volume 25. It was during this time that records of ordinary meetings were no longer published in the journal. However, despite the war, the Society was able to celebrate its Jubilee year in 1943 with a meeting, the minutes of which were published in Volume 25 (part 4) of the *Proceedings*. As part of the meeting the President (Arthur Tindell Hopwood) noted that the journal had in its first fifty years "published descriptions of nearly 500 species", which rather emphasises the taxonomic bias to papers during this period. However, Winckworth also addressed the meeting, summarizing some of the other scientific highlights of the journal. At this meeting presentations were given by C.M. Yonge, A. Blok, and L.R. Cox, their addresses being published in Volume 25 (part 4).

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Further disruption of publication occurred in 1945 with only two issues of Volume 26, but once again by the end of the following year, not only had this volume been completed, but also issues 1–3 of Volume 27. However, as might be expected, there had been a decline in the number of papers carried by the journal during the war years. Some of the papers included information that would today be considered unsuitable for a scientific journal. For example, between 1941 and 1949 the journal carried a series of six papers entitled “Shell Sales” by J.R. le B. Tomlin in which he documented the name and date when collections were sold, what specimens were sold, and prices reached.

After steering the journal through the war years, Winckworth retired as editor at the end of 1947, probably due to ill health (he died 3 years later). In the following 8 years there followed a succession of three editors. The first was past President Arthur Tindell Hopwood (Fig. 2E), a vertebrate palaeontologist working at the British Museum (Natural History). This appointment, at first, may seem strange, but he was also a malacologist and a recognized authority on *Conus*. Hopwood, however, only served as editor for one year. He was replaced by William James Rees (1949 to 1950; Fig. 2F), and then Hamilton Ernest Quick (1950 to 1955; Fig 2G) (Table 1). Rees, a hydroid specialist, was also in charge of the Mollusca section at the British Museum (Natural History) for a time. Quick (a practicing ophthalmic surgeon) was an authority on the Succinea-idae and slugs, and an active member of the Society. Rees took charge of the *Proceedings* when the publication of issues were in serious arrears. Whilst three issues of Volume 27 had been published in 1946, only one issue per year had appeared in 1947 and 1948. Rees, however, was able to complete Volume 27 in 1949 and also ensure that the first issue of Volume 28 reached members and libraries. In the next five years, Quick was able to steady the publication ship. Several issues per year were produced and the post-war arrears were made good.

In 1956 the editorship of the *Proceedings* was taken over by Nellie Barbara Eales (affectionately known as “Nellie B”) (Fig. 2H, Table 1) who was to fulfil this role for the next thirteen years. After obtaining her degree in Zoology at Reading University, she was appointed a Curator in Zoology at the university and later lecturer and finally senior lecturer. She had broad zoological interests, investigating both elephant and narwhal foetal development, as well as the biology and taxonomy of opisthobranch molluscs. In addition to being the first female editor of the journal, she was also the first female president of the Society (1948–1951). In 1959 (Volume 33, part 5) the *Proceedings* for the first time published four papers from a themed symposium. These papers by L.R. Cox, C.M. Yonge, G. Owen and R.D. Purchon focussed on the status of the Protobranchia within the bivalve Mollusca. Publication of papers from symposium meetings would follow in later years.

In 1960, after 24 years with David Nutt, printing of the journal was taken over by Stephen Austin & Sons (Hertford). This arrangement, however, was short lived and mid-way through the publication of Volume 34 in 1961 printing was moved to another company, Bennett Brothers Ltd. (Salisbury). This also did not last long (1961 to 1963) and in mid-1963 publishing of the *Proceedings* (from Volume 35 part 4) was taken over by Blackwell Scientific Publications, Oxford (printing was done by Willmer Bros & Haram Ltd., Birkenhead). Reasons for the frequent changes in publishers/printers are unknown, as the minutes of annual reports of Council do not provide this information. With the move to Blackwells, authors now began to receive fifty free offprints. It is not known whether authors received such copy prior to this, as the only information given in earlier issues of the journal was that authors could secure the printing blocks used to print their papers. Presumably with these blocks, authors could produce their own reprints. Having to deal with three different publishers in less than four years cannot have been easy for Eales and this undoubtedly affected the continuity of publication. For example, only one issue (Volume 35 part 1) appeared in 1962.

With journal production moving to Blackwell publishers, detailed instructions to authors were included in issues of the *Proceedings* for the first time as a “*Notice to Contributors*” (1963; Volume 35, part 4). Also for the first time, authors were required to provide an abstract that appeared as a ‘summary’ at the end of papers. In 1966 (Volume 37, part 1), however, the term ‘abstract’ in the instructions was changed to ‘summary’. Whilst the majority of studies published in the *Proceedings* were still systematic and morphological (some of which had now begun to show results from electron microscopy), during the 1960s, issues contained a growing number of ecological, experimental, and behavioural papers.

In 1970, at the age of 80, Eales handed over editorship of the *Proceedings* to Alistair Graham (Fig. 2I). Graham, who was the Head of Zoology at the University of Reading, was a long-standing member of the Society and like other editors a former President (1954–1957). He is perhaps best known for the 1962 monograph *British Prosobranch Molluscs* (revised in 1994) and the book entitled *A Functional Anatomy of Invertebrates*, both of which were co-authored with his long-time collaborator Vera Fretter. According to Andrews (2001), Graham took over the editorship at a time when the finances of the Malacological Society were in a parlous state. With publication costs rising and the Society in debt, Council concluded that it would have to terminate the contract with Blackwells, who agreed to an early termination without penalty to the Society. Graham and the Society’s treasurer had to take on duties normally carried out by the publisher, and they had to find cheaper production methods. This resulted in a re-shaping of the journal in 1975.

Because of the financial state of the journal, none of the major publishing houses would take it on. However, rescue was at hand when a Reading-based publisher, Angus Graham Associates agreed to sign a contract with the Society, and in August 1975, they published the first more economical volume (41, part 5). In terms of production costs, money was saved in printing by using an offset-lithography method and a side-stabbing binding technique (i.e. issues were stapled together!) (Annual Report of Council, 1975), and reducing the number of free reprints to thirty. Some modifications to the instructions to

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authors were introduced at this time, with authors having to provide a summary and an abstract, although it was not until the 1980s that all papers had abstracts and by the mid-1980s the requirement for a summary was dropped. At this time Council made the decision to change the name of the journal and in 1976, Volume 42 (part 1) was published as the *Journal of Molluscan Studies*, with a slightly changed front cover (Fig. 1). One volume in three parts would now be published each year.

As part of this re-launch, Graham worked hard to modernize the content of the *Journal* and he also instituted a series of supplementary issues many of which were on "*The Prosobranchs of Britain and Denmark*". The first was published in December 1976 with a focus on patellogastropods. Fifteen more supplements appeared over the next nine years and their sales helped raise much needed revenue for the Society. Another change was the acceptance of papers written in French, and a few papers were published in this language from the mid-1970s to mid-1980s, after which French was no longer accepted. A further change made during the editorship of Graham was the appointment of an editorial board (Table 2), their names appearing on the front cover of Volume 49 (part 1) in 1982. Prior to this, each issue had the name of the editor on the front cover with the words "*Under the direction of the publication committee*" (the names of this committee were never revealed). During Graham's editorship, submissions to the *Journal* increased and papers published on molluscan ecology, evolution, behaviour and physiology then outnumbered taxonomic works, reflecting the increasing diversity in molluscan research.

Table 2. The first editorial board of *Journal of Molluscan Studies* convened in 1982 during editorship of Professor Alistair Graham

| Name | Affiliation |
|---------------|-----------------------------------|
| J.A. Allen | University of Edinburgh |
| A.D. Berrie | Freshwater Biological Association |
| T.E. Thompson | University of Bristol |
| J.D. Taylor | Natural History Museum, London |
| E.R. Trueman | University of Manchester |

At the end of 1985 in his 79th year Graham retired as editor handing over to John Taylor (Fig. 2) and Peter Newell (Table 1), in effect returning editorship to a staff member of the Natural History Museum. On taking over the editorship, Taylor found that the nature of Angus Graham's printing company's work had changed, and that printing of the *Journal* was being undertaken between other jobs. Schedules had become somewhat lax and in one instance a paper was published twice over. The journal was also once again in financial peril. However, in 1985 the Journals Division of Oxford University Press (OUP) approached the Society, and following a meeting with them, Alasdair Berry (President of the Society), Alistair Graham and John Taylor agreed on a deal. OUP would take over publication, sales, distribution and marketing with an agreed profit share. This was an important turning point for the Society and the viability of the journal. Initially, there was no profit but gradually this built up to the important income the Society has today. Because of the increase of submissions to the *Journal*, by 1988, Council was able to increase the number of issues in a volume per year to four, and OUP redesigned the front cover, though retaining the Society logo. A further redesign was launched in 1991 (Fig. 1) and the number of re-prints offered to authors was increased to fifty.

After 1988, John Taylor, an international authority on the ecology and phylogeny of bivalves and gastropods, biomineralization, and chemosymbiosis, continued as sole editor for a further 14 years in which time he strengthened the editorial rigor of the *Journal* by appointing a small group of Associate Editors to handle papers in their specialist area, and this undoubtedly improved the *Journal's* reputation. It was at this time that a decision was made to no longer publish the annual reports of Council and the financial report, in the *Journal*. From the mid-1980s more papers on molluscan evolution were published as studies on phylogeny became more prevalent. Such studies were, in part, stimulated by the discovery of new deep sea and vent taxa, the development of allozyme electrophoresis in the study of genetic relationships and in computational phylogenetics using data from a variety of morphological characters that included information from comparative ultrastructure. Issue 4 of Volume 54 contained one paper only (Haszprunar, G. 1988: *On the origin and evolution of major gastropod groups, with special reference to the Streptoneura*) and this is one of the *Journal's* most highly cited papers. During Taylor's tenure other focussed issues of the journal were published. In 1989 one issue was dedicated to papers from a symposium held in Manchester on gastropod feeding, and in 1991 an issue on opisthobranchs to honour Tom Thompson, a former President, and the Society's Treasurer at the time of his accidental death. By the end of the millennium the *Journal's* international reach and standing was reflected in the provenance of authors. In 2000, the authors of papers published in Volume 66 were from 19 countries (Fig. 3). The attractiveness of the journal to an international authorship has continued over the last 20 years with papers from 23 countries in 2019.

Another member of the Natural History Museum, David Reid (Fig. 2K), succeeded Taylor in 2002. Reid, who is widely known for his monographs on Littorinidae and for helping to make the humble periwinkle into a model evolutionary system, was a pioneer of cladistic analysis of morphological characters in malacology, and later was among the first to work with molecular phylogeneticists. Together with collaborators, research assistants and students, he made major contributions to the systematics of Littorinidae, Potamididae, Batillariidae, Muricidae, Patellidae and Bullidae. At this time the rapid development of molecular phylogenetics saw greater number of important papers on molluscan evolutionary relationships being published in the *Journal*.

>HODGSON ET AL CONTINUED

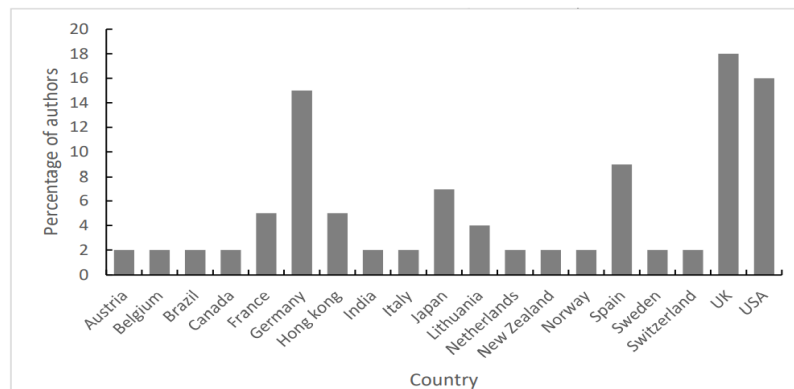


Figure 3. Provenance of authors in 2000 (volume 66) of *Journal of Molluscan Studies*.

When Reid became editor, OUP once again re-designed the front cover of the *Journal* (Fig. 1) and increased the size format from A5 to 297 mm x 210 mm. The front cover received an eye-catching colourful image of a mollusc that was changed annually. During Reid's tenure production of the *Journal* was further modernized. Electronic files replaced typescripts and submissions became on-line. In addition, reprints were replaced by PDFs and URLs, and the entire run of the *Journal* was digitised and made available on-line. Reid also recruited a wider circle of international experts as Associate Editors, and at present the *Journal* has 29 of these from fourteen countries. A further important development at this time was the publication of journal impact factors (IF), and from 2003 onwards under Reid's guidance the IF rose steadily. He was therefore able to hand over to the current editor, Dinarzarde Raheem, a journal that is well positioned amongst zoological journals and held in high esteem by the global malacological community.

For some, the demise of the print version of the *Journal* in the latest phase of modernization will be mourned. However, the nature of the publishing world is changing fast, and the *Journal* faces a number of challenges, including the issue of Open Access (see Cameron, 2020). If the *Journal Molluscan Studies* is to survive, like any successful mollusc, it must continue to respond and adapt to changing conditions.

ACKNOWLEDGMENTS

We would like to thank John Taylor, David Reid and John Grahame for their valuable input during the compiling of this history. We also thank Jon Ablett, Andreia Salavador, Kathryn Rooke and Ceri Humphries of the Natural History Museum for supplying photographs of C.G. Robson, A.T. Hopwood and W. J. Rees from the Natural History Museum Archives. Images of B.B. Woodward and E.A. Smith are from issues of the *Proceedings of the Malacological Society of London*. We thank the following organisations for permission to use other images: H.E. Quick, Conchological Society of Great Britain and Ireland; R. Winckworth, National Museum of Wales; A. Graham, Royal Society of London.

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Grants and Awards

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 copy 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 online (<https://academic.oup.com/mollus>) in annual volumes, each consisting of four issues; members and student members have full access to all articles. The Society no longer produces the *Journal* in a printed format. 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*.

Personal Subscription

Personal subscribers gain access to the on-line archive of *Journal of Molluscan Studies* and receive web access to *The Malacologist* which is issued twice a year. Members are eligible to vote at the Annual General Meeting and to elect the Officers of The Society. The Annual Subscription for Ordinary Members and Student Members is due on 1st January each year. From 2018, subscription rates are:-

| | |
|---------------------------------------|-----|
| Ordinary Member (journal online only) | £45 |
| Student Member (journal online only) | £25 |

Membership subscriptions can be paid as instructed below and are valid from 1st January for a single calendar year. Please remember that a subscription paid in December will therefore only be valid for one month and will have to be renewed the following January.

Application to join the Society:-

Harriet Wood, Membership Secretary,
National Museum of Wales,
Cathays Park, Cardiff.
Wales
CF10 3NP
Harriet.wood@museumwales.ac.uk

Membership Renewal

Existing members can renew their subscriptions from January 1st each year via on-line payment.

Methods of Payment

Payment may be made by:

- On-line payment using Credit or Debit Card (Mastercard, Visa, American Express)
- Cheque (please fill in the Application Form above)

Changes of Address

Please inform the Membership Secretary (see details above) of any change of address.

Institutional Subscriptions

Orders and requests should be made directly to Oxford University Press

See: Publisher's information (Oxford University Press). <http://mollus.oxfordjournals.org/>

Ordering Information for *Journal of Molluscan Studies*

Payment is required with all orders and subscriptions are accepted and entered by the volume(s).

Please send orders and requests for sample copies to: Journals Subscriptions Department, Oxford University Press, Great Clarendon Street, Oxford, OX2 6DP, UK. Tel. (0)1865 267907. Fax (0)1865 267485.

Journal of Molluscan Studies (ISSN 0260-1230) is published quarterly in February, May, August and November by Oxford University Press, Oxford, UK.



Membership Application Form

.....

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

Title:

Name:

*Department:

*Institution:

Street: City:

Post Code/Zip: Country:

Telephone: Fax: Email:

Malacological interests:

Signature: Date:

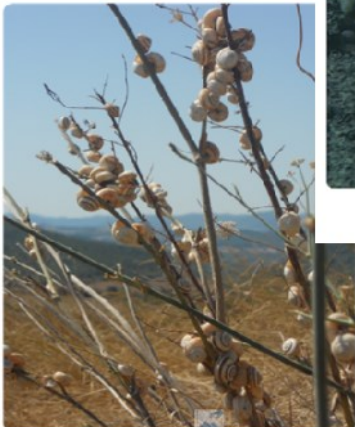
For student membership: Confirmation of student status from Supervisor/Advisor:

Name: Signature:



The Malacological Society of London

128th Annual General Meeting
and symposium, via Zoom, on the theme of
Molluscs in Extreme Environments
Wednesday 24 March 2012



Cernuella virgata escaping soil-surface heat
Heinz-R Kohler *Ecology & Evolution*
doi.org/10.1002/ece3.5607



Cocculina enigmadonta and *Lepetodrilus concentricus*
Kemp Caldera hydrothermal: Marum ROV

Registration is free but please DO register if you want to attend. Email Harriet Wood in Cardiff - harriet.wood@museumwales to register for the Symposium. Please include your full name, email address and professional affiliation. Registration will close on Friday March 19th

Provisional outline of the day
Presentations on the theme, **1015 – 1200** and **1400 - 1600**
AGM (Members of the Society) 1215 - 1330



Annual General Meeting—Announcement

THE MALACOLOGICAL SOCIETY OF LONDON

Registered Charity No. 275980

Hon. Secretary
Dr Rowan J. Whittle



AGM

The 128th Annual General Meeting of the Malacological Society of London (MSL) will take on Wednesday 24th March 2021 from 1215h—1330h. The AGM will take place during a symposium organized by the MSL and entitled *Molluscs in extreme environments*

Agenda for AGM

- Apologies for absence
- Minutes of the last (127th) AGM
- Matters arising
- Financial report
- Annual report of Council (delivered by the President)
- Awards
- Election of Council
- Any other business

| Year of existence | 2020-2021 | 2021-2022 |
|-----------------------------|--------------------------|--------------------------|
| | 127 | 128 |
| President | John Grahame (3) | John Ablett(1) |
| Ex-officio | | John Grahame |
| Vice Presidents | Robert Cameron (3) | Phillip Fenburg (3) |
| | Phillip Fenburg (2) | Fiona Allen (1) |
| Councillors | Debbie Wall Palmer(1) | Alan Hodgson (2) |
| | Alan Hodgson(1) | Philip Hollyman (3) |
| | Andreia Salvador (3) | Vicky Sleight (1) |
| | Fiona Allen (3) | Katie Collins(1) |
| | Philip Hollyman (2) | Aidan Emery (1) |
| | Lauren Sumner Rooney (2) | Robert Cameron (1) |
| Co-opted | Aiden Emery | Rowan Whittle |
| | Victoria Sleight | |
| Journal Editor | Dinazarde Raheem | Dinazarde Raheem |
| Bulletin Editor | Georges Dussart | Georges Dussart |
| Treasurer | Katrin Linse | Katrin Linse |
| Membership Secretary | Harriet Wood | Harriet Wood (1) |
| Hon.Secretary | Rowan Whittle | Debbie Wall Palmer (1) |
| Facebook manager | Tom White/Chong Chen | Chong Chen (1) |
| Web managaer | Tom White | John Grahame (1) |
| Awards Officer | Jon Ablett | Lauren Sumner-Rooney (1) |
| Archivist | | Andreia Salvador (1) |

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

