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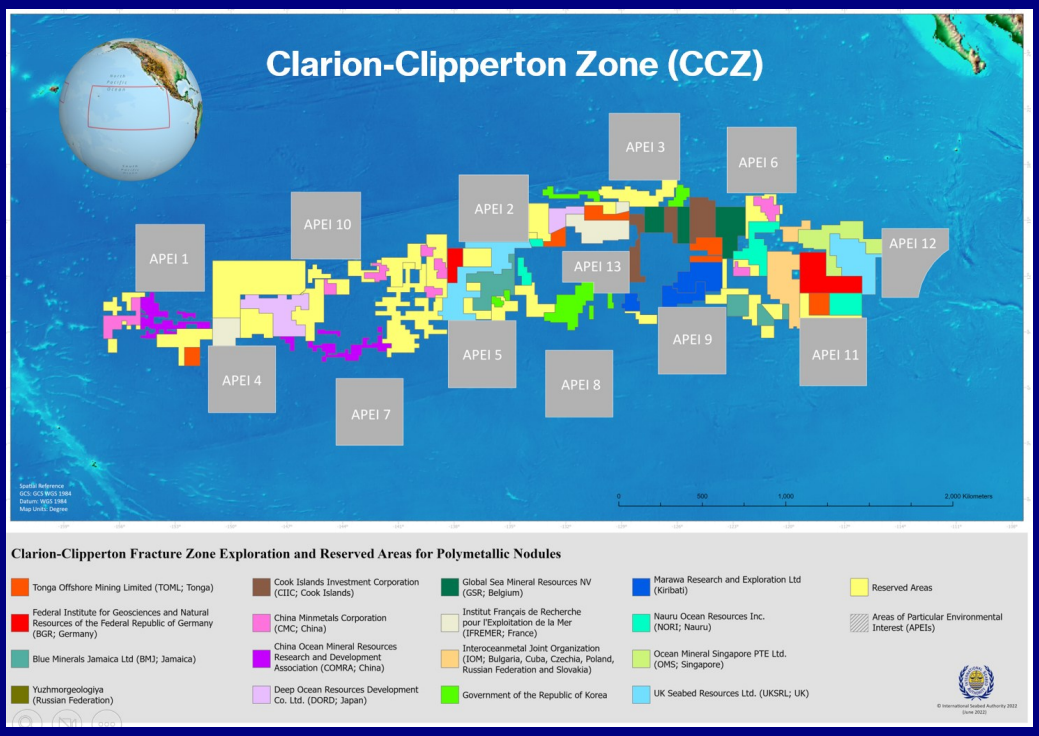
Molluscan Forum 2025

Last November an international group of young malacologists took part in the 26th Malacological Forum at the Natural History Museum, London.
The abstracts of the presentations start inside on page 15.



This image accompanies an abstract entitled *Exploring the growth of deep-sea bivalves in areas of potential seafloor mining* by Lauren Geiser, Crispin Little, Adrian Glover & Clare Woulds, on page 18.

EDITORIAL

As this issue goes through its final preparations, the winter Olympics is taking place. The athletes' achievements are breathtaking, clearly reaching the limits of what is biomechanically and psychologically possible. Sometimes these limits are exceeded, at which point medical intervention is required. One thing that seems clear is that many of these skiers, snowboarders and skaters are young; a major attribute of youth is that it doesn't know what it cannot do. One sees this in many activities. For example in snooker and chess the champions are mostly relatively young. With age and experience comes a knowledge of limitations, and an increasing reluctance to take a risk. It may be why professor manage research and students do it. Thus, in general, the young take risks which are sometimes costly, but can reap the benefit of creative rewards.

The 2025 Molluscan Forum, organised by the Malacological Society of London (MSL) features in this issue of *The Malacologist*. The Forum was developed as a platform for young malacologists to experience a conference in a caring, collegiate environment. After many years, most of the participants still comprise young researchers who bring a freshness and spontaneity to the proceedings. The 2025 Forum comprised a hybrid meeting of 'in person' and 'on-line contributors'. In-person attendees enjoyed the hospitality of the Natural History Museum of London (NHM) on November 5th 2025. The Forum was well-supported and the abstracts are presented on pages 15-30.

This issue also benefits from several research reports from early career researchers whose work was financially supported to some extent by the MSL. For example, Sonia M. Landro & Florencia Arrighetti from the Museo Argentino de Ciencias Naturales, Buenos Aires present a timely report on *The mussel Brachidontes rodriguezii as a sentinel of microplastic contamination* (p.31), Casey Richards from the University of Chicago offers *Characterization of advantageous traits across heterogenous environments in the intertidal bivalve, Mytilus californianus* (p.34), Giada Spagliardi of the Naturalis Biodiversity Centre, Leiden in the Netherlands presents a report on *Integrative taxonomy of cold-water Limacina: type material and historical collections*; in this report, she describes an innovative method by which museum specimens which suffer from deterioration in storage can be digitally restored (pp 36-38). An early career report was also received from Chiara Pinkau of the Ludwig-Maximilian-University in Munich, Germany entitled *Exploring molluscan biodiversity of a protected pre-alpine landscape in Southern Bavaria* (p.39).

The MSL also supports more senior researchers. For example, Dr Ting Hui Ng of the Universiti Malaysia Sabah presents a report on *Aquatic shelled molluscs of Tioman Island, Peninsular Malaysia* and Dr Crispin Little (University of Leeds) and colleagues from several other institutions describe *Mineral coatings on gastropods at hydrothermal vent sites and the implications for fossilization processes.* The MSL also supports the scientific travel aspirations of young researchers. On p.44, Abril Luján Soria of the Universidad Nacional del Sur, Bahía Blanca, Argentina describes her attendance at the XXII World Congress of Malacology, São Paulo, Brazil and on p.45, Renato Dantas of the Universidade Federal de Santa Catarina, Florianópolis, Brazil describes his attendance at The Cephalopod International Advisory Council Conference 2025 in Okinawa, Japan.

The above account comprises eight reports from candidates from seven different countries and four continents. On this evidence, the malacological research support of the MLS is the opposite of parochial.

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

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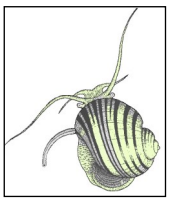
News and notes



Annual General Meeting of the Malacological Society of London, 2026
April 7th 1300h

The 2026 AGM will take place in person and on-line on 7th April 2026 during a meeting of the *British Society for Parasitology* in Glasgow.

Nominations for Council of the Malacological Society of London are presented on page 47 of this issue. For further details about joining the AGM, please contact the President of the Society, Dr Fiona Allan
f.allan@nhm.ac.uk

The British Society for Parasitology (BSP) Spring Meeting 2026 will be held at the University of Glasgow from April 7–9, 2026. On top of exciting science and networking opportunities during the conference, Glasgow city will host a drinks reception for delegates in the City chambers on April 7th, and BSP will host a traditional Ceilidh at the meeting closure in Glasgow University Hunter Halls.

For further information regarding the BSP meeting, please visit :-
https://www.myeventflo.com/event.aspx?m=4&evID=2554&AspxAutoDetectCookieSupport=1

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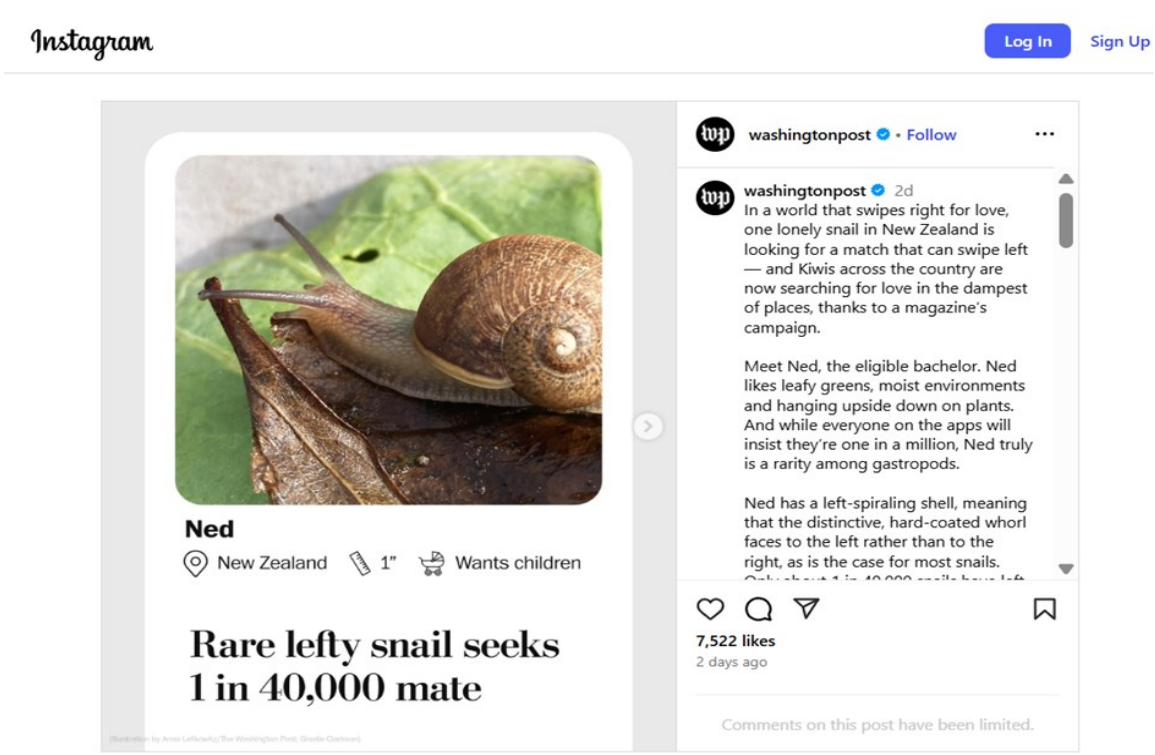

Surprise image on the TV

How to eat a thorny starfish

As if there weren't enough snails in the garden.....

Slug features in BBC's "Have I Got News for You"

In a broadcast on 6 October 2025, the panel on this satirical programme were asked which of these four news items (illustrated) was the odd one out.

Answer
Ryder cup golfing crowd - players complained about the crowd.
Jeremy Clarkson - his pub makes noise about which people complain.
Bavarian slug – neighbours complained as it was ringing doorbells (see the next page).
Bishop of Fulham - exception - he complained about the choir

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Slug vandalism in a German bell-push

The residents of an apartment building in Germany had thought it was neighbourhood kids pranking them, but the endless door bell ringing at night turned out to be another slippery customer altogether. “At first, I thought it was teenagers from the abandoned house across the street,” said Lisa, a retail saleswoman who lived in the apartment block in southern Germany. Lisa’s sister-in-law, who lived one floor up, called asking if her doorbell was ringing too.

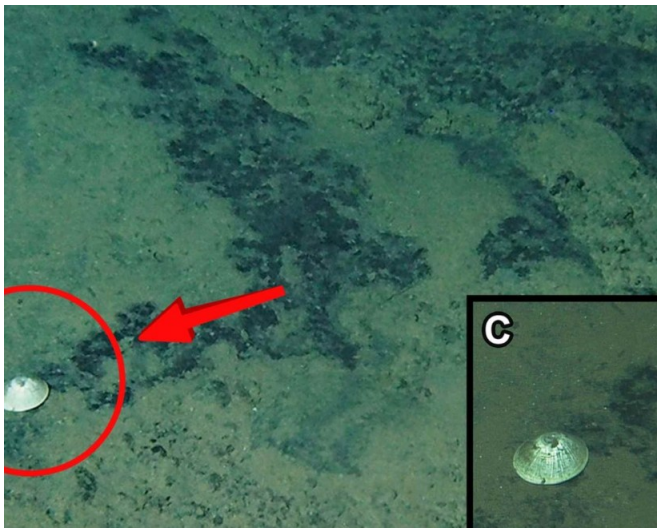
“It just wouldn't stop ringing for her! While I was on the phone with her, it rang again and again. That's when we called the police,” Lisa told local news outlet Bild.
When officers arrived, they searched the courtyard, the stairwell and the basement, the reporting said. But eerily, the ringing continued, despite the fact nobody was at the door and no motion sensors were activated.

With the help of police, residents gathered at the front door where they discovered the prankster wasn’t a group of youths at all, but rather a *nacktschnecke* - German for “naked snail”. The slug had been sliding up and down the door bell plate, buzzing the doorbells.

https://www.stuff.co.nz/world-news/360817520/incessant-doorbell-ringing-keeps-germany-apartment-residents-night-culprit-not-who-they-thought

Chong Chen, a past Council member, leads a team which discovers a new deep-sea limpet species

This finding is reported by website Earth.com at
https://www.earth.com/news/new-species-of-mollusk-bathylepeta-wadatsumi-discovered-at-the-bottom-of-the-ocean/



Bathylepeta wadatsumi
The shell reaches 40.5 millimeters long, which is large for a limpet living so deep. The shell is “thin, translucent, bluish grey, slightly elastic, possibly reflecting high organic content,” writes Chong Chen, lead author and senior scientist at the Japan Agency for Marine Earth Science and Technology (JAMSTEC).
The mollusc under the shell is reddish brown, with an oval, muscular foot. The shell carries clear white streaks that radiate from the top toward the edge. The limpet was found on a rocky escarpment, with a thin layer of sediment. A curving trail behind it showed that it had grazed over that sediment for food. “Several individuals were sighted from the submersible.

… and molluscs on the BBC again

Deep sea research focussing on molluscs of volcanic vents (see the report from Crispin Little on page 43 of this issue) featured in a BBC 2 broadcast of the comedy show **QI**. (Feb 24th 2026 10.23pm Series 22 episode 1).

Molluscs make the news—*the Guardian* Sept 2025

The Guardian

Eur +

News | Opinion | Sport | Culture | Lifestyle

Environment Climate crisis Wildlife Energy Pollution

Marine life

Octopuses prefer to use different arms for different tasks, scientists find

Creatures favour front arms for most tasks, study suggests, despite fact all eight arms are capable of all actions

Nicola Davis Science correspondent

Thu 11 Sep 2025 17.00 CEST

Share

For each clip, the researchers classified the behaviour of the octopus, such as fetching an object or walking, then classified the arm actions involved. Photograph: Blickwinkel/Alamy

While some humans find they have two left feet on the dancefloor, octopuses manage to coordinate eight highly flexible arms across a host of behaviours, from foraging to den-building, or moving around the seafloor.

Now researchers say they have completed the most comprehensive study of its kind, not only identifying the actions and small motions involved in different types of movements, but revealing that – like primates, rodents and fish – the cephalopods prefer to use particular limbs for certain tasks.

"In general, we did see that for most actions the octopuses used their front arms more often than their back arms," said Kendra Burnsch, a co-author of the study who is based at the Marine Biological Laboratory, Woods Hole, in the US. However, she noted there were exceptions.

Writing in the journal Scientific Reports, Burnsch and colleagues reveal how they analysed 25 one-minute video clips of 25 wild octopuses across three species. These were filmed between 2007 and 2015 at six sites ranging from Vigo in Spain to the Cayman Islands, each with a different habitat.

For each clip, the researchers classified the behaviour of the octopus, such as fetching an object or walking, then classified the arm actions involved – such as curling the limb or reaching it away from the body

The team also explored which of the four ways octopus arms can deform – shortening, elongating, bending and twisting – was involved in each action.

Overall, the team identified 15 different octopus behaviours and 12 different arm actions, with some – such as crawling or parachute attack – requiring more arm actions than others, such as backward swimming.

The team found multiple arm actions could occur at the same time on the same or adjacent arms, and that all eight arms were capable of all actions and deformations.

"This means that octopuses can be very flexible and adaptable in many different environments and tasks," said Burnsch.

While the researchers did not find the octopuses had a preference for using their right or left arms, the cephalopods did favour using their front arms over their rear arms, with a split of 61% to 39% respectively when all 12 actions were considered together.

Delving deeper, they found the creatures used their two front pairs of arms more often for reach, raise, lower and curl actions. By contrast, the study suggests they prefer to use their rear two pairs of arms for the stilt action – where the body sits upright on the arms – and for the roll action, where the arm moves like a conveyor belt, both of which are used in locomotion.

The team say the results provide new insights into how octopuses coordinate their eight flexible arms to carry out complex behaviours and multitask, while the findings could also be useful beyond marine science.

"Such demonstrations of flexibility may help inform ethologists, sensory ecologists, neuroscientists and engineers designing soft robotic appendages," they write.

Octopuses changing skin pattern while asleep may show they dream, research shows

Read more

Most viewed

Trump's retreat from Nato was priced in. But his humiliation of Qatar and India spells total chaos
Nesrine Malik

Emmys 2025: full list of winners

Spain's PM calls for Israel to be banned from sports events after Vuelta race abandoned

Channel 4 to mark Trump's UK visit with 'longest uninterrupted reel of untruths'

Donald Trump's UK state visit arrives at awkward moment after Mandelson exit

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Tropical sea slug found in UK waters

Malacological place-names— a German contribution

Regarding your call (in issue **85** of *The Malacologist*), for settlements that have molluscan names, I would like to point to two cases from Germany:

- Schneckenhausen (with a snail in the coat of arms), see https://www.otterbach-otterberg.de/unsere-gemeinden/schneckenhausen/gemeinde/

- Schneckenlohe, see https://www.schneckenlohe.de/

Best wishes from Berlin,
Dr. Parm Viktor von Oheimb
Museum für Naturkunde
Leibniz Institute for Evolution and Biodiversity Science
Invalidenstraße 43
10115 Berlin

Malacological biographies

"On my Facebook page you can find about 450 biographies of malacologist with portraits.
https://www.facebook.com/groups/784313937238895
Best regards
Riccardo Giannuzzi Savellii"

Malacologists Through Time

Harriet Wood (a Malacsoc Council member) posted the following to the Molluscalist web server:-.

"Over the past four years, we have been developing a new zone to the *Mollusca Types in Britain & Ireland* website called ***Malacologists Through Time***, and we are excited to say that it has been officially launched this week! The main focus has been on using our collections and archives to help support the community to find out more about their mollusc collections and collectors, including identification of collection labels. You will see that the authors of the type specimens on the website are now hyperlinked, so that people can jump to the biography page of that person to learn a little more, but you can also go directly to the main pages via the Biography and Label tabs at the top of the website. Here are the main links:

- Introduction page: https://gbmolluscatypes.ac.uk/malacologists-through-time
- Biographies and networks of over 450 people: https://gbmolluscatypes.ac.uk/malacologists-through-time/biographies
- Over 1000 collection Labels: https://gbmolluscatypes.ac.uk/malacologists-through-time/labels/
- Promo video for the website: Malacologists Through Time - YouTube

In the future, we hope to add a section for unidentified label handwriting, so the community can help us identify them, but this will come later. It may be focused on people linked to malacology and conchology in British and Irish collections, but there is a huge crossover with many other collection areas and countries as well. We really hope you find this addition to the website useful in your work."

Harriet.Wood@museumwales.ac.uk

Kathie Way - In memoriam

Kathie Way, past curator of Molluscs at the Natural History Museum in London passed away peacefully on the 7th October. She had been in the grip of advanced Alzheimer's but had been very stable until the last few days when she started to decline.

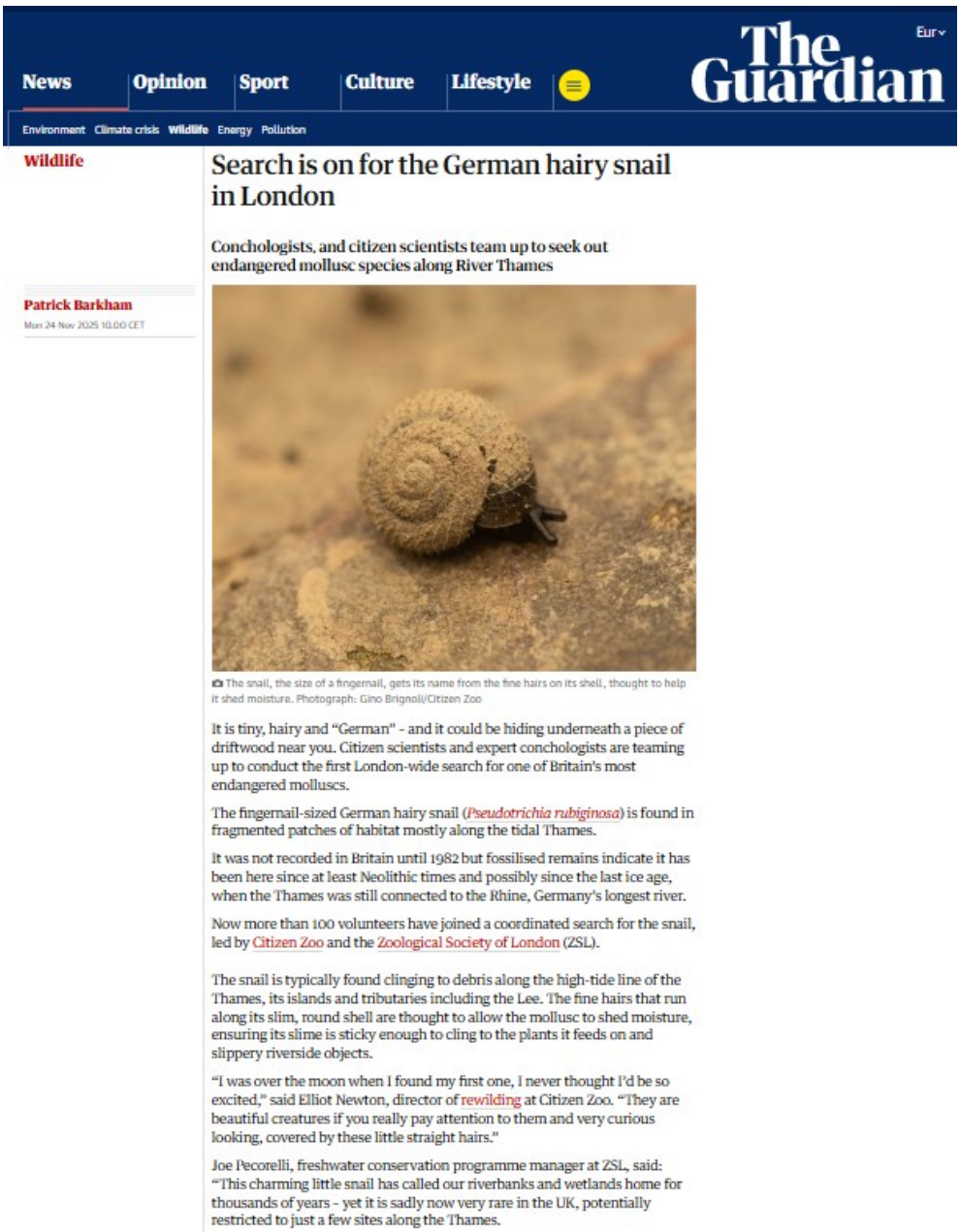
Kathie worked in the section for over 50 years and in addition was the Honorary Curator of the Linnean Society of London's zoological collections for over 22 years. Many of you will have fond memories of her from visits to the section or from her attendance at Molluscan conferences. Kathie had an outstanding knowledge of the history of collections and made a huge impact on the curation and organisation of the Mollusca collections as well as those she worked with.

Funeral—28th of October in Worthing, UK and
For more details please contact Jon Ablett (j.ablett@nhm.ac.uk).

The Mollusca team at the NHM. London
Jon Ablett, Andreia Salvador, John Taylor, Tom White, Suzanne Williams.

Newsworthy snails

https://www.theguardian.com/environment/2025/nov/24/search-for-german-hairy-snail-in-london



News Opinion Sport Culture Lifestyle The Guardian

Environment Climate crisis Wildlife Energy Pollution

Wildlife

Search is on for the German hairy snail in London

Conchologists, and citizen scientists team up to seek out endangered mollusc species along River Thames

Patrick Barkham

Mon 24 Nov 2025 10.00 CET

The snail, the size of a fingernail, gets its name from the fine hairs on its shell, thought to help it shed moisture. Photograph: Gino Brignoli/Citizen Zoo

It is tiny, hairy and "German" - and it could be hiding underneath a piece of driftwood near you. Citizen scientists and expert conchologists are teaming up to conduct the first London-wide search for one of Britain's most endangered molluscs.

The fingernail-sized German hairy snail (*Pseudotrichia rubiginosa*) is found in fragmented patches of habitat mostly along the tidal Thames.

It was not recorded in Britain until 1982 but fossilised remains indicate it has been here since at least Neolithic times and possibly since the last ice age, when the Thames was still connected to the Rhine, Germany's longest river.

Now more than 100 volunteers have joined a coordinated search for the snail, led by Citizen Zoo and the Zoological Society of London (ZSL).

The snail is typically found clinging to debris along the high-tide line of the Thames, its islands and tributaries including the Lee. The fine hairs that run along its slim, round shell are thought to allow the mollusc to shed moisture, ensuring its slime is sticky enough to cling to the plants it feeds on and slippery riverside objects.

"I was over the moon when I found my first one, I never thought I'd be so excited," said Elliot Newton, director of rewilding at Citizen Zoo. "They are beautiful creatures if you really pay attention to them and very curious looking, covered by these little straight hairs."

Joe Pecorelli, freshwater conservation programme manager at ZSL, said: "This charming little snail has called our riverbanks and wetlands home for thousands of years - yet it is sadly now very rare in the UK, potentially restricted to just a few sites along the Thames.

How millions of zebra mussels changed Lake Geneva

The Guardian continues to show a significant interest in molluscs. In this extended article, there is a description of the way in which zebra mussels have changed Lake Geneva for ever. It is a classic case of rhe damage which can be done by an invasive alien species It is well worth a read.

https://www.theguardian.com/environment/2025/dec/18/invasive-quagga-mussels-lake-geneva-aoe?CMP=Share_iOSApp_Other

Mathurin Dupanier indicates the water cooling systems that were blocked by the invasive quagga mussels. Photographs: Phoebe Weston/the Guardian; École Polytechnique Fédérale de Lausanne

The problem with snails is that they are full of themselves.

Broadening Access Membership Scheme (BAMS)

We are excited to invite applicants to the new round of the MSL **Broadening Access Membership Scheme (BAMS)** to help support more postgraduate students from developing economies in their malacological studies.

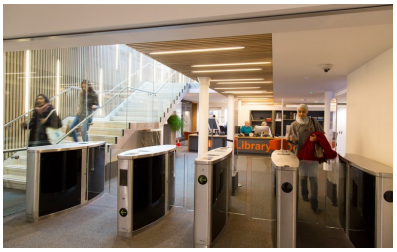
We are offering **10 postgraduate students each year free membership** to *The Malacological Society of London* **for a period of 3 years.**

Students who are studying a postgraduate malacology-related course in countries designated 'developing economies' are invited to apply for this award with the support of their supervisor. Applications are open immediately and will close when all 10 memberships have been allocated. Membership for this round starts on 1st January 2026 and ends on 31st December 2028.

More details on conditions and how to apply can be found on the MSL website: Broadening Access Membership Scheme - The Malacological Society of London (malacsoc.org.uk)

Harriet Wood ***Membership Secretary***

UCL Research Institute for Collections (RIC) - Fellowships



University College London occasionally offers fellowships for research in their collections. The Malacological Society of London received a notice of the current round. Unfortunately, the call will have closed by the time this issue of *The Malacologist* is published, but interested parties might make enquiries to see if a similar round will be offered in late 2026.

"The UCL Research Institute for Collections (RIC) offers grants for researchers, collection professionals, and artists to visit UCL and conduct projects using our extensive holdings of archives, rare books, records, and museum collections for six weeks (or part time equivalent). I am writing to you because UCL Special Collections holds your archive (i.e. the library archive of the MSL) so your members may be interested in this opportunity. Could you please share this email with them?

We are now accepting applications for the following **2026 fellowships**:

Liberating the Collections Fellowship
Museum Collections Visiting Fellowship

For full details on each fellowship and guidance on how to apply, please visit the individual fellowship pages and our **FrequentlyAsked Questions** section.

Deadline for applications:

All applications must be submitted by **23:59 (GMT) on Monday, 12 January 2026**. Late submissions will not be considered. Applications should be sent to **ric-forms@ucl.ac.uk**. Applications can be submitted by using the application form or a five minute video. If these do not work for you please do get in touch to discuss other options.

Important:
Applicants are strongly encouraged to contact UCL before submitting an application to discuss the level of access to collections required for their proposed research. Please email **Rebekah Seymour, RIC Support Officer** at **rebekah.seymour@ucl.ac.uk**. Collection curators can confirm:

- Availability for consultation
- Extent and suitability of collections for your project
- Capacity and resources required to support potential outputs

Enquiries are welcomed until **Monday, 12 December 2025**.

Tiny snail may topple Donald Trump in barrier battle at Doonbeg

This is a malacological item reproduced from the Irish Examiner at
https://www.irishexaminer.com/news/arid-20408465.html
https://www.irishexaminer.com/news/munster/arid-41770067.html

The microscopic 2mm whorl snail, *Vertigo angustior,* may yet 'trump' US billionaire Donald Trump in his battle to build a €10m rock barrier at Doonbeg. This follows Clare Co Council expressing concerns over the impact the 2.8km 200,000 tonne Trump rock barrier will have on the EU- protected vertigo angustior and sand dune system at Doonbeg golf resort. The council was due to make a planning decision on the application yesterday, but the local authority has stated that it doesn't have sufficient scientific evidence that would allow it conclude that the barrier would not adversely impact on the integrity of the EU designated Carrowmore Dunes — a special area of conservation at the site. After making a request for 51 items of further information on the contentious proposal in eight pages, the council has set back the plan a number of months with the volume of information that it has requested from the applicants. More than 110 submissions have been lodged with the council with more than two to one in favour of the application. The plan has the almost universal support of the Doonbeg community while An Taisce, Friends of the Irish Environment, the Save Doughmore Beach Protection Group, surfer groups and over 30 individuals living outside Doonbeg have objected to the plan. One of the areas on which the council has focused in its request for further information is the fate of *Vertigo angustior* which has legal protection under the EU Habitats and Species Directive. In the planning application, TIGL Ireland Enterprises Ltd states that in a 'do nothing' scenario, "the prospects for *Vertigo angustior* will remain bad and the population will ultimately diminish and be removed from the site". The warnings echo the dire prediction elsewhere in the Environment Impact Statement which state that the 'do nothing' scenario in the medium term "will bring

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the viability of the entire resort and its potential closure into question". However, in its request for further information, the council states that the rock barrier proposal by its very nature may interfere with the existing dynamic processes which operate at the dune system at Doughmore. The council states that the EU habitat requirements for *Vertigo angustior* and fixed dunes "rely on this dynamic process and therefore concerns are expressed regarding the impact of the proposal on same". The Trump firm stated in the environmental impact statement there is no evidence that the wetland special area of conservation areas at Doonbeg have value to *Vertigo angustior* . However, the council states that this wetland area "is important to this species and as such considers that hydrological changes could potentially affect the wetland special area of conservation outliers, dune slacks and the habitats and micro-habitats of *Vertigo angustior* ". The council has requested the Trump firm to submit a revised Natura Impact Statement which examines the hydrological effects of the proposed development on *Vertigo angustior* and the fixed-dune system.

Help discover the exotic shells hidden in art!

I am delighted to invite you to take part in a new participatory science project dedicated to identifying exotic seashells depicted in European paintings throughout history.

Many artworks — still lifes, coastal scenes, or symbolic compositions —feature finely detailed shells. By helping to identify them, you will contribute to research on past biodiversity, trade routes, artistic exchanges, and the movement of natural objects across time and cultures, helping us reconstruct the ecological history of these species.

Participation is simple: through the *Zooniverse* citizen-science platform, you will examine digitized paintings, spot identifiable shells, and indicate their common (or Latin) name when identification is possible. The only expertise required? Yours — the one that comes from your passion for shell collecting. Your observations are valuable, and every contribution counts.

You can begin here: https://www.zooniverse.org/projects/loouisem/biodivaquart-shellart/classify

Thank you for considering taking part in this collaborative initiative. Your help will reveal fascinating links between art and natural history, often hidden in plain sight. Feel free to share this email with anyone who would be interested!

If you're curious, you can read our latest article on Italian early modern paintings and what they reveal about past biodiversity here: https://www.nature.com/articles/s44185-025-00103-8

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Rare snail (*Bertia cambojiensis*) featured in the New Scientist May 2025

The Guardian newspaper continues to show a secret enthusiasm for molluscs in an article on the quagga mussel, _Dreissenia bugensis_

https://www.theguardian.com/science/audio/2026/feb/05/everything-is-quagga-mussel-now-can-invasive-species-be-stopped-podcast

Science Weekly
Science

'Everything is quagga mussel now': can invasive species be stopped? - podcast

00:00:00 00:00:00

On a recent trip to Lake Geneva in Switzerland, biodiversity reporter Phoebe Weston witnessed the impact of one of the planet's most potent invasive species, the quagga mussel. In just a decade the mollusc, originally from the Ponto-Caspian region of the Black Sea, has caused irreversible change beneath the surface of the picturesque lake. While ecologists believe invasive species play a major role in more than 60% of plant and animal extinctions, stopping them in their tracks is almost impossible. Phoebe tells Madeleine Finlay how invasive species spread, how conservationists are trying combat them and why some think a radical new approach is needed.

'It's an open invasion': how millions of quagga mussels changed Lake Geneva for ever

Support the Guardian: theguardian.com/sciencepod

Photograph: Stephan Jacquet/INRAE

Presented and produced by **Madeleine Finlay**, *with* **Phoebe Weston**, *sound design by* **Ross Burns**, *the executive producer was* **Ellie Bury**

Thu 5 Feb 2026 05.00 GMT

the Molluscan Forum 2025

took place on 5th November 2025
in the Flett lecture theatre
Natural History Museum, London

***Euglandina tenella* (Strebel, 1875) and *Helicina* sp., with kind permission of Tadeo De Jesús Esquivel Blanco and Luis Armando Navarro Zarco**

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THE NATURAL HISTORY MUSEUM, LONDON

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Schedule

09.00 - 09.45 Registration, coffee & set up of posters

09.45 - 10.00 FIONA ALLEN: Welcome and introduction to the day

10.00- 11:15 SESSION I

(Full Talks)

10:00 CARMEN COBO
ExploDES: Exploring the Diversity of European Solenogastres (Mollusca, Aplacophora)

10:15 VIKTORIE KLOBUŠICKÁ
Integrative taxonomic revision of selected Holarctic Planorbidae snails: an exploration of local endemism in ancient Balkan lakes

10:30 EMILY CRAMER
Divergence in sperm size between *Littorina saxatilis* (Caenogastropoda: Littorinidae) eco-types

10:45 TADEO DE JESÚS ESQUIVEL BLANCO
Stories from the Understory: Land Snails in an Endangered Mexican Rainforest Ecosystems

11:00 YASUTO ISHII
Reticulate evolution and speciation of the *Euhadra peliomphala* species complex

11:15-11:45 BREAK / POSTER SESSION

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11:45 - 13:00 SESSION II

(Lightning Talks)

URALOV ULUGBEK BAKHRIYEVICH (Virtual)
Distribution of molluscs on the Northern Slopes of the Zarafshan Mountain Range
RAGHVENDRA S. VANJARI (Virtual)
Comparative analysis of molluscan assemblages across lotic and lentic habitats in the Bhima River Basin, India.

(Full Talks)

12:00 AKEWUGBERU AMOTULBASIT OLAJUMOKE
Metallic oxides concentration in epiphragm of giant African Land Snail (*Archachatina marginata*) during aestivation.
12:15 CAMILO MUÑOZ SCHULER
The Self in the Shell: Single-Cell Insights into Molluscan Immunity
12:30 ABIGAIL INGRAM
A Raman survey of green and blue bivalve mollusc shells
12:45 AMAL SHAKIR
Mapping the presence of calcite in order Mytilida

13:00 - 14:00 LUNCH BREAK

14:00 - 15:30 SESSION III

(Lightning Talks)

AYANO OMURA
Large Breeding Aggregations in the Broadclub Cuttlefish *Ascarosepion latimanus*
JASNA SIMONOVÁ
How do snails fly? Insights into land snail ectozoochory from experiments with racing pigeons

(In Person Talks)

14:15 LAUREN GEISER
Exploring the growth of deep-sea bivalves in areas of potential seafloor mining
14:30 EVA SAMBOURG
Palaeomalacological studies on calcareaous tufas in temperate Europe for palaeoenvi ronmental and palaeoclimatic reconstitutions of the Eemian (130 ky, ≈MIS 5e)
14:45 SAURAV DUTTA
Antarctic molluscan responses to climate change: isotopic evidence for seasonal growth adaptations during the Eocene-Oligocene transition
15:00 BETHANY KING
Low salinity limits size and affects shell thickness and shape in Baltic *Cerastoderma glaucum*
15:15 ZHIYI LI
Climate change and estuarine molluscs: understanding environmental change and biological Responses

15:30 - 16:00 BREAK / POSTER SESSION

16:00 - 17:15 SESSION IV

(Lightning Talks)

JANINA TRAUE
"Sediment stirring" in *Callianax biplicata* (Olividae, Caenogastropoda): a novel mode of food acquisition?
KATARZYNA ŁAPKIEWICZ
Molluscs as a great bioindicators

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(In Person Talks)

16:15 MILENA WIŚNIEWSKA
One, two, three – phally polymorphism of *Vertigo antivertigo*
16:30 AYANO OMURA
Absence of a hectocotylus and associated mating behaviour in the paintpot cuttlefish (*Ascarosepion tullbergi*)
16:45 ANYA ROOPA GAJANUR
Inferring cephalopod diversity of Southeast Asia from accessible natural history collections
17:00 EMMA ATKINS
Interactive fiction as a tool for teaching molluscan conservation stories to school-age children

17:15 FIONA ALLEN: Closing remarks

17:15 - 18:30 Wine reception

Poster Presentations

HOLLY HAMILTON
Morphological variation of *Nucella lapillus* with geographical region, a study using Computer Vision AI

ALEKSANDRA JASZCZYŃSKA
A new obligate stygobiont sufamily of the Hydrobiidae Stimpson, 1865 (Caenogastropoda: Truncatelloidea) and its radiation at the West Balkans.

KATEŘINA KUBÍKOVÁ
When snails go boom: The rapid expansion of forest species during the Early Holocene

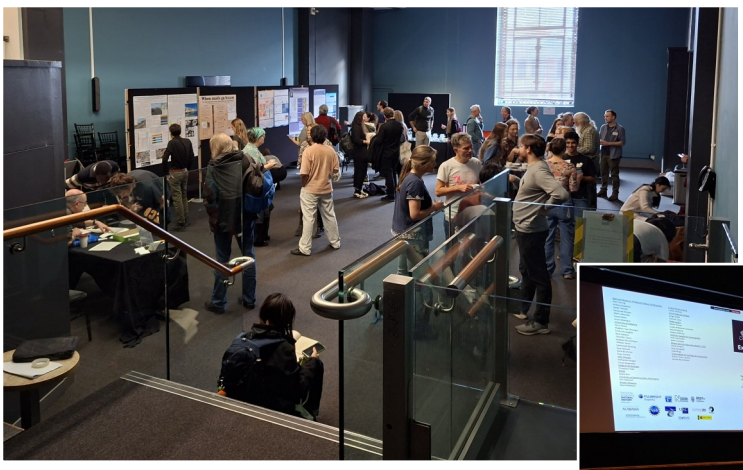
ŁUKASZ NIEDZIAŁKOWSKI
Echinostomatidae and Mollusca: transmission and public health links

WIKTORIA PACEK
Unionidae under digenean pressure: low diversity, high consequences?

KATE SMITH
Regressive evolution of eye loss in deep-sea snails

JAMES WITTS
Quantifying extinction and ecological change across the Cretaceous-Paleogene (K-Pg) boundary on Seymour Island, Antarctica

JAMES WITTS, ChaSE TEAM
The Chalk Sea Ecosystems Project



Photos—James Witts

Abstracts

Alphabetical by presenter. (Presenter is underlined).

Interactive fiction as a tool for teaching molluscan conservation stories to school-age children

Emma Atkins
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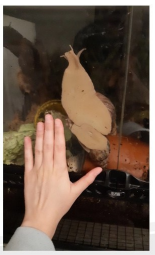
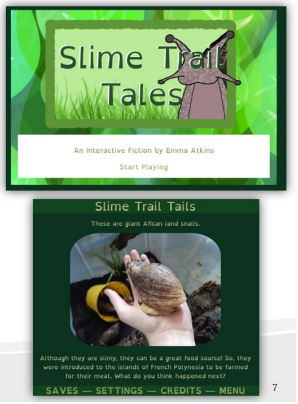
Email: EA1098@live.mdx.ac.uk



Gamification and storytelling are well-documented as useful pedagogical tools for increasing engagement, curiosity and motivation in educational pursuits, particularly amongst school-age children. These tools can increase accessibility, sensory stimulation and interactivity to assist in learning both within, and outside, of the classroom. In areas of sustainability, conservation and biodiversity education, storytelling and gamification are shown to influence attitudes, raise awareness, build empathy and encourage action. There is an increasing need for education centred around sustainability, conservation and biodiversity for school-age children to foster the environmental champions of the future. In particular, I feel there is a need for greater education around the often-overlooked underdogs of the conservation world: molluscs, whose endangered status is often overshadowed by that of mammalian flagship species. Although these flagship species are important representatives of wider conservationefforts in their associated habitats, the lack of attention awarded to molluscan conservation stories, both successful and ongoing, is detrimental to a well-rounded understanding of how ecosystems function and the vital part molluscs play both culturally and in their respective habitats. This project reflects on the creative process of producing an interactive fiction game that aims to broaden the reach of global molluscan conservation stories and reframe them in a more engaging and accessible way for school-age audiences. It considers the challenges in adapting conservation stories for young audiences, maximising digital accessibility and implementing interactive and audiovisual elements. The project also intends to set up further research in the area of interactive storytelling as a pedagogical tool for sustainability, conservation and biodiversity education by suggesting ways interactive fiction can be used in classrooms and for home learning. I also intend for the completed interactive fiction game to act as a framework for future creative projects aimed at furthering the reach of conservation stories.



Stories from the understory: land snails in an endangered Mexican rainforest ecosystem

Tadeo de Jesús Esquivel Blanco[1,2], Rodrigo Rangel Velasco[1], Luis Armando Navarro Zarco[3], María Fernanda Sánchez Cortés[3], Edna Naranjo García[1], María Guadalupe Barajas Guzmán[1] & Gabriela Castaño Meneses[3]
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[2]Institute of Biology, Freie Universität Berlin, Germany,
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Land snails are key decomposers and indicators of ecosystem integrity, yet their diversity and ecology remain poorly documented in tropical forests. The understory of Los Tuxtlas rainforest, located in Mexico at the northernmost limit of tropical rainforests in the Americas, harbors unique communities of terrestrial gastropods. This ecosystem is under severe threat from deforestation, fragmentation, and land-use change, having lost more than 80% of its original cover. Despite its importance, information on snail assemblages here is mainly restricted to isolated records. The present study compares land snail communities between rainy and dry seasons, to evaluate differences associated with forest conservation status, and provides a temporal comparison with surveys carried out more than thirty years ago. Fieldwork is focused on the

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understory and suspended litter, using standardized sampling at two vertical ranges: (1) from 20 cm to 2.20 m above ground, and (2) from 2.20 m to 4.20 m, including leaves and litter accumulated on plants and over the palm *Astrocaryum mexicanum*. Access to elevated microhabitats was achieved using a ladder. Data analysis is still in progress but preliminary observations suggest a seasonal differentiation in land snail assemblages between rainy and dry periods. Moreover, despite the presence of forest areas natural regeneration, terrestrial snail communities appear not to have recovered even after more than 50 years of disturbance. The study suggests that the surrounding area that has been transformed mainly to cattle ranches avoids recolonization from other tropical rainforest patches. At the same time, this study provides the first *in situ* photographic documentation of live land snails in Los Tuxtlas, offering a unique visual complement to taxonomic and ecological surveys. By integrating vertical, seasonal, and temporal dimensions, this project aims to deepen our understanding of tropical understory snail communities and to provide essential baselines for conservation and restoration in one of Mexico's most endangered rainforest ecosystems.

ExploDES: exploring the diversity of European solenogastres (Mollusca, Aplacophora)

M Carmen Cobo[1,2]

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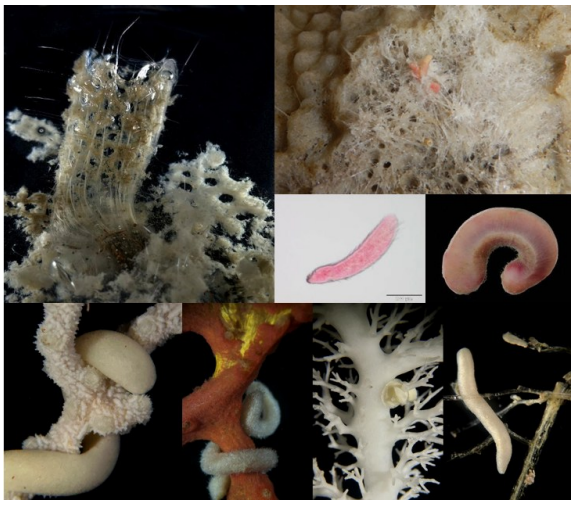
[2]Department of Invertebrate Zoology, National Museum of Natural History-Smithsonian Institution. Washington D.C., USA
Email: mccobollovo@gmail.com

Solenogastres are a distinctive lineage of worm-shaped marine molluscs with major evolutionary and ecological relevance, yet they remain among the least investigated molluscan classes. Most species are known only from their original descriptions, with a few reported or assumed to have relatively broad distributions (e.g., from the Mediterranean Sea to the Northern European Atlantic), but this has never been rigorously tested. In the face of accelerating biodiversity loss, ExploDES, funded by the Marie Skłodowska-Curie Actions, emerges as a vital initiative. Accurately associating scientific names with species is essential for reliable biological references, forming the basis of phylogenetic research, conservation, and ecological assessments. This project addresses two challenges in modern taxonomy: (1) applying empirical rigor to species hypotheses and (2) expediting the description of biodiversity, using Solenogastres as a model group. Focussing on taxa with putative wide ranges, we will compare traditional morphology-based primary species hypotheses with multi-evidence secondary hypotheses, analyse genetic structure and connectivity between Mediterranean and Atlantic lineages, and explore the evolution of key morphological traits within a phylogenetic framework. By integrating the study of historical museum collections with targeted field sampling, the project will refine species boundaries, reassess distribution patterns, and produce the first genetic and ecological data for several key taxa. Moreover, the description of new species is anticipated, as well as the systematic revision of targeted groups. The results will enhance our understanding of European marine biodiversity, illuminate molluscan evolution, and provide improved methodologies for taxonomic practice. Beyond its scientific contributions, ExploDES will inform marine conservation strategies while fostering public awareness and appreciation of the ecological value of marine biodiversity.



Divergence in sperm size between *Littorina saxatilis* (Caenogastropoda: Littorinidae) ecotypes

Emily Cramer[1], Luisa Kumpitsch[1], Gabriella Malmqvist[1], Kerstin Johannesson[1] & Erica Leder[1,2]
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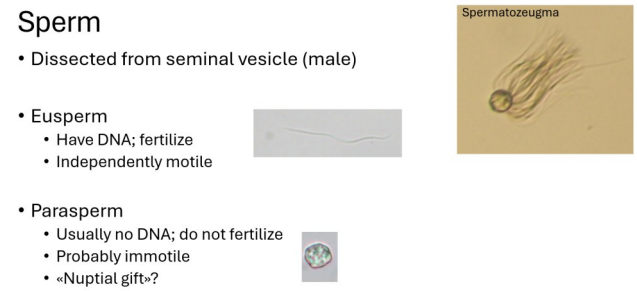
[2]Natural History Museum, University of Oslo, Oslo, Norway
Email: becky.cramer@gu.se

Littorina saxatilis is a dioecious, intertidal, North Atlantic snail that has become a model system for speciation because it repeatedly diverges into ecotypes. In Sweden, there are commonly two ecotypes: the "crab" ecotype that inhabits boulder fields with high predation pressure from crabs, and the "wave" ecotype that lives on exposed rock outcroppings that experience strong wave action. These two ecotypes interbreed and produce fertile hybrid offspring in narrow hybrid zones, making this species an ideal model for the early stages of speciation. We recently discovered that, in addition to myriad ecologically-relevant traits, these ecotypes also diverge in sperm size—of both the filiform eusperm that carries DNA and fertilizes the egg, and, to a lesser extent, in the globular, non-flagellated parasperm that does not carry DNA. In other groups, divergences in the size and shape of sperm can cause reduced fertilization success for between-species crosses, particularly when sperm from the same species is also present in the female reproductive tract. Whether sperm divergence causes a reproductive barrier between *L. saxatilis* ecotypes is not known. However, such a barrier appears plausible, since females store sperm for a prolonged period and may have sperm from up to 23 males at a time. There is therefore ample opportunity for females to have evolved mechanisms that favor particular sperm phenotypes. We describe the repeated differentiation of sperm between the ecotypes on several separate island populations and present results of a transcriptomic study on testes, where we find numerous genes with expression patterns that correlate with the size of the eusperm or the parasperm. These genes appear over-represented on chromosomal inversions, which are known to impact the repeated evolution of ecologically-relevant adaptations between ecotypes. Further, we describe planned experiments to test the relative success of within-versus between- ecotype fertilizations.



Antarctic molluscan responses to climate change: isotopic evidence for seasonal growth adaptations during the Eocene-Oligocene transition

Saurav Dutta[1], Rowan Whittle[1], Katie Collins[2], Melanie Leng[3], James Witts[2], Carol Arrowsmith[3], Samuel Hunt[1] & Andy Moles[1]
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[2]Natural History Museum, London, United Kingdom,
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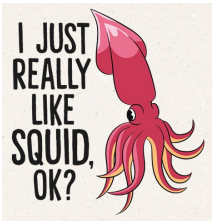
The Eocene-Oligocene transition (~34 Ma) represents Earth's most dramatic Cenozoic climate shift from greenhouse to icehouse conditions, culminating in Antarctic glaciation. We investigated molluscan responses using exceptionally preserved fossils from Seymour Island (Eocene) and King George Island (Oligocene), Antarctica, conducting oxygen isotope analysis on Cucullaea and Retrotapes bivalves throughout the Eocene sequence. Inter-individual and inter-species variability among these Eocene bivalves proves minimal, indicating consistent environmental conditions during this interval. However, Perissodonta gastropods, restricted to earlier Eocene units, consistently maintained lower $\delta^{18}O$ values than cohabiting bivalves, probably preferring higher temperatures, and showed systematic size reduction before disappearing from the stratigraphic record as cooling progressed. Detailed analysis of Perissodonta growth bands reveals differential isotope signatures between ridges and valleys, demonstrating clear seasonality patterns. Growth cessation signatures indicate a consistent shift from winter growth, when overall temperatures were warmer, to summer growth as overall temperatures decreased, except in one unit. Temperature reconstructions from Seymour Island reveal expected cooling trends, declining from 15°C to 5°C during the Eocene. In contrast, King George Island Oligocene deposits present a striking paradox where *Leoclunipecten gazdzickii* records minimum temperatures reaching expected near-freezing values (0°C), yet certain units yield temperatures exceeding 15°C—warmer than peak Eocene conditions. The anomalous Oligocene temperature signatures require further investigation to understand Antarctic post-glaciation climate dynamics and their implications for interpreting ancient polar environmental records.

Inferring cephalopod diversity of Southeast Asia from accessible natural history collections



Anya Roopa Gajanur[1], Tan Siong Kiat[2], Eric J. Hilton[1] & Zeehan Jaafar[3]
[1]Natural Resources, Virginia Institute of Marine Science, College of William & Mary,
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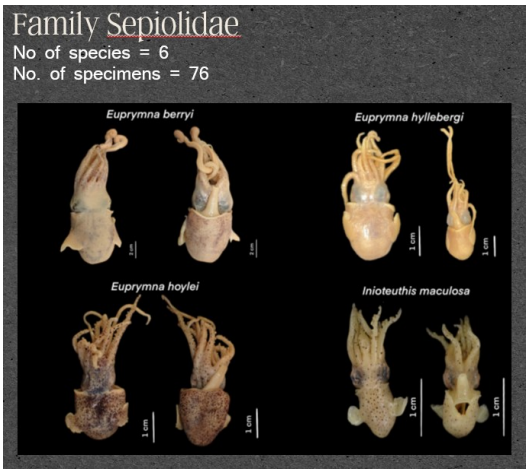
The diverse marine ecosystems of Southeast Asia host numerous cephalopod species, but comprehensive data on their diversity and distribution remain limited. This informationgap can hinder conservation efforts, especially since the impacts of coastal urbanization, climate change, and fisheries on cephalopods in Southeast Asian countries, like Singapore, are still unknown. Thus, preserved specimens of cephalopods in the Zoological Reference Collection (ZRC) of the Lee Kong Chian Natural History Museum, National University of Singapore were examined to better understand regional cephalopod biodiversity, with a focus on taxa from Singapore. Specimens from Southeast Asia in collections of museums in the United States, such as the Yale Peabody Museum, the Smithsonian, and the Voss Marine Invertebrate Collection, were also examined to obtain comparative material. A total of 1100 preserved specimens were digitized, and species identification, morphometric, and distribution data were collected; 81 species across 15 families were recorded. The ZRC consists of a diverse assemblage of well-documented and lesser-known coastal and deep-sea species. This includes some new records for Singapore, such as *Inioteuthis maculosa* and *Macrochlaena winkworthi,* as well as the globally largest collection (n=31) of "*Octopus" cf. favonius* collected from Singapore. Many species digitized in the collection, including those mentioned above, lack detailed morphological descriptions in the literature. Thus, this review of the LKCNHM Zoological Reference Collection will form the basis for an annotated checklist of Singaporean Cephalopoda, including representative images of specimens and differential diagnostics where necessary. This improvement in the taxonomic resolution of the collection will help update and contribute to Singaporean and regional diversity databases. The outcome of this study provides a firm foundation for future work on cephalopods, while broadly contributing to the conservation of marine resources within Singapore and Southeast Asia.



Exploring the growth of deep-sea bivalves in areas of potential seafloor mining

Lauren Geiser[1], Crispin T.S. Little[1], Adrian Glover[2] & Clare Woulds[3]
[1]School of Earth and Environment, University of Leeds, Leeds, UK,
[2]Department of Life Sciences, Natural History Museum, London, UK,
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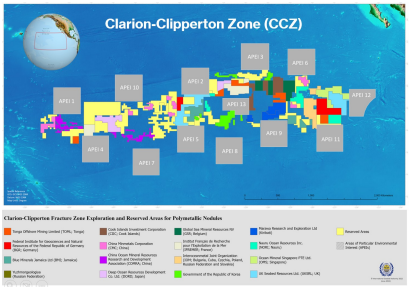
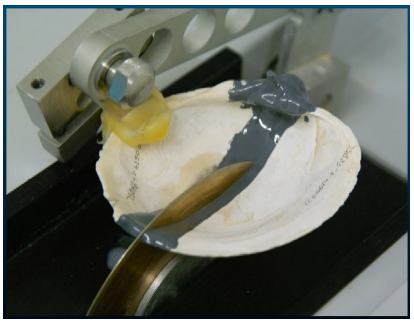
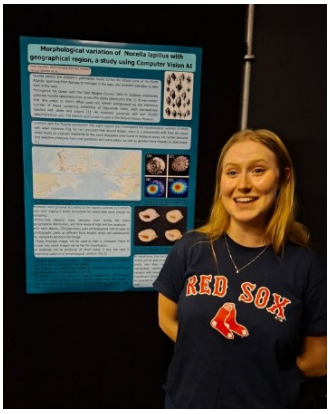
The Clarion Clipperton Zone (CCZ) is a region of the Pacific Ocean currently being targeted for deep-sea mining due to its exceptionally high concentration of polymetallic nodules. Found on the abyssal seafloor at depths of 4,000–6,000 meters, these nodules contain economically valuable minerals such as copper, cobalt, and nickel. Importantly, they also serve as one of the few hard substrates in this vast sedimentary environment, offering diverse microhabitats that support a range of benthic fauna—both on their surfaces, within their crevices, and in the surrounding sediment. Among these organisms, bivalve molluscs are particularly abundant. Bivalves grow by accretion, adding new shell material at the growth margin, which produces consecutive growth lines. This process is influenced by a combination of environmental factors (e.g., water temperature, food availability and quality) and endogenous biological rhythms. The study of these growth patterns—known as sclerochronology—has traditionally focused on shallow-water species, which are larger and exhibit growth on tidal, daily, monthly, seasonal, or annual cycles. This research seeks to extend sclerochronological techniques to deep-sea bivalves from the CCZ, many of which are newly discovered or remain undescribed, to investigate age, growth rates, and longevity. Given the relatively stable environmental conditions of the abyssal CCZ, it remains uncertain whether these bivalves exhibit discernible internal growth patterns. To address this, conventional sclerochronological methods—such as shell cross-sectioning and staining—have been adapted to accommodate the small size and fragility of these deep-sea specimens. Preliminary findings from these methodological adaptations are presented and discussed.





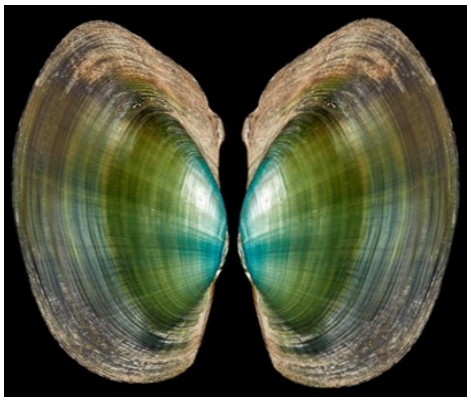
Morphological variation of *Nucella lapillus* with geographical region; a study using computer-vision AI



Holly Hamilton[1], Philip Fenberg[1], Jack Hollister[2]
[1]School of Ocean and Earth Science, National Oceanography Centre, University of Southampton, Southampton, UK
[2]Natural History Museum, London, UK
Email: hsh1g21@soton.ac.uk

Nucella lapillus are predatory gastropods found across the littoral zone of the North Atlantic, spanning from Norway to Portugal in the east, and Southern Labrador to New York in the west. Throughout his career, J. H. Crothers (a past member of the Council of MSL - Ed.) extensively collected *Nucella* specimens from across this entire distribution. These specimens have been used to comprehensively study patterns of shell shape and size with environmental exposure, but research has not yet identified whether morphological variation exists across regions of the species' global distribution. Should variation occur with region, particularly with latitude, this study will help to identify potential impacts of future climate warming, as climate change causes shifts in the global distributions of some species. Stations were grouped according to the regions outlined by Crothers', with their exposure levels, derived from the same research, being accounted for when sites were chosen for sampling. Geographical proximity was also accounted for, with sites chosen where the areas were geographically closer, but still varying in exposure. Thirty-nine stations were sampled, from across the entire geographical distribution, and from areas of high and low environmental exposure. For each station, 100 specimens were photographed (with at least six photographs taken at different focal lengths which will subsequently be stacked to produce one image). Where 100 specimens weren't available for a site, all specimens from that station were photographed. These finalised images will be used to train a computer vision AI model, into which images will be fed for classification. A heatmap will be produced of which areas, if any, are used to determine patterns of morphological variation. We hypothesise that specimens collected at the range edges of the species' distribution will exhibit significantly different morphological characteristics than those collected within the central areas of their distribution.

Raman investigation of green and blue-shelled bivalve molluscs



Abigail L. Ingram, Joseph Razzell-Hollis & Suzanne T. Williams
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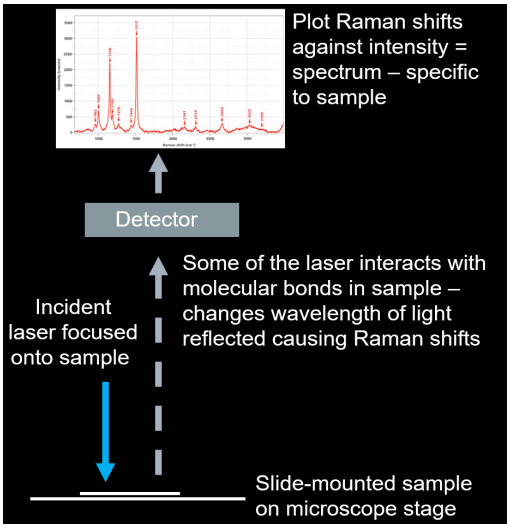
Green and blue colours are surprisingly rare in the animal kingdom and green/blue pigments are even rarer. Few have been identified in Mollusca and none from the Bivalvia. Where these rare colours do occur, it is not known whether they are due to the same pigments shared across taxonomic groups, since similar shell colours can arise from different pigments and are not necessarily homologous. Identifying these pigments and determining how they are produced is the first step towards understanding how and why these unusual, and possibly metabolically costly, pigments have evolved. Raman spectroscopy was used to investigate slide-mounted resin-embedded cross-sections of a single valve from the green and blue shells of 14 bivalve species. Species were chosen to reflect the diversity of shell structures that can exhibit green and blue colouration (periostracum vs calcareous shell), location of colour (inside or outside of shell valve, or layers within shell) and phylogenetic diversity. Cross-sections showed green shell colour was distributed in layers in the organic periostracum of all species with external colour, and in proteinaceous sheets in the calcareous shell of species with internal colour. As in previous studies, no pigment peaks were observed for most green shells using lasers with excitation at 532nm or 785nm, irrespective of colour location. Modified carotenoid pigments were detected in blue species and distributed diffusely in the calcareous shell. The absence of detectable green pigments suggests the colour may be structural in nature. Structural shell colour has only been demonstrated in a handful of mollusc species and is only known to occur in one bivalve mussel genus. To assess whether structural colours are more widespread, we have begun to analyse the nanostructure of green species with focussed ion beam (FIB)-SEM 3D tomography. This will provide accurate optical models of any quasi-ordered nanostructures in bivalves



Reticulate evolution and speciation of the *Euhadra peliomphala* species complex

Yasuto Ishii[1], Satoshi Chiba[1,2], Shun Ito[3]
[1]Graduate School of Life Sciences, Tohoku University, Miyagi, Japan,
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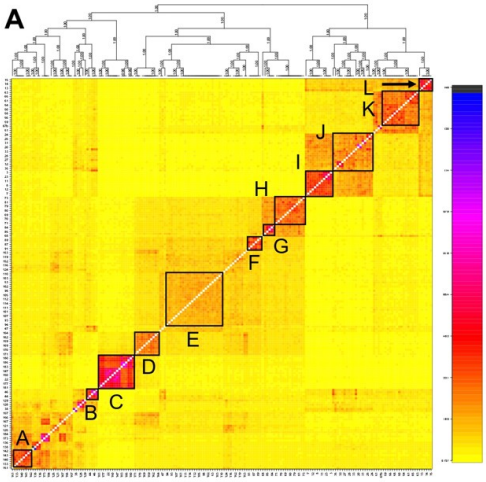
Reticulate evolution and its effect on speciation attracted much attention in recent years. In particular, homoploid hybrid speciation (hybrid speciation without the change in the chromosomal number) is intensively discussed, although empirical cases are still scarce. We focused on the *Euhadra peliomphala* species complex, comprising 12 genetically differentiated lineages. In a previous study, we revealed reticulate evolution in the *E.peliomphala* species complex, including three reticulate events before the lineages established, and found hybrid zones between multiple pairs of the lineages. In the present study, we conducted extensive sampling along the boundary of two lineages, and obtained genome-wide SNPs. The results confirmed extensive hybrid zones along a river. Furthermore, interestingly, we found a site where hybridized and unhybridized populations coexist sympatrically. The result of flow-cytometry suggested that whole genome duplication did not occur, a result which rejects allopolyploid speciation. Collectively, these results indicate the occurrence of homoploid hybrid speciation in the *E. peliomphala* species complex. The implication of these findings will be discussed in the talk.



Low salinity limits size, and affects shell thickness and shape, in Baltic *Cerastoderma glaucum*

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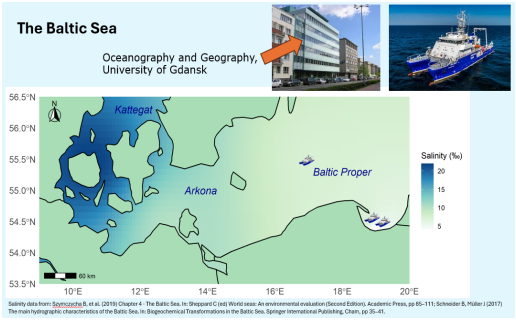
As one of the world's largest brackish water habitats, the Baltic Sea presents an excellent natural laboratory for examining the long-term effects of low salinity on marine organisms. For shell-building creatures, the maintenance and production of their shells can be especially challenging. Reduced availability of the ions for calcification and prolonged periods of aragonite undersaturation constrain biomineralisation and increase susceptibility to shell dissolution. Many studies have investigated the corrosive effects of ocean acidification, but few have considered the impact of ocean freshening. We examined variations in the shell thickness, shape and condition of *Cerastoderma glaucum* collected across a transect of the southern Baltic salinity gradient (3–15‰). Comparisons were made with populations of *C. glaucum* inhabiting dynamic coastal lagoons in the UK and the South of France, where seasonal salinity fluctuations can range from <7‰ to >50‰. Baltic populations exposed to consistently low salinity conditions of <10‰ produce shells that are up to 85.2% thicker, and distinctly more globular in shape, than populations inhabiting more variable salinity conditions. Maximum size, however, appears to be limited to approximately 20 mm, around 58% of the usual length reached by species where salinity is generally >10‰. This significant increase in shell thickness appears counterintuitive in conditions unfavourable for biomineralisation, and contradicts findings in Baltic *Mytilus*. But, made wholly of aragonite, *C. glaucum* shells are naturally more soluble than those composed of calcite suh as *Mytilus* spp. Indeed, dissolution was obvious and extensive on the shell surface of *C. glaucum* from Baltic sites. Shell integrity is vital to bivalve survival, providing protection to the soft-bodied animal inside from predation and unfavourable ambient conditions. This significant shell thickening is probably a compensatory response to better resist the corrosive low salinity. Future predicted declines in the salinity of the Baltic Sea, coupled with increasing temperatures, pose significant threats to organisms already living at the limits of their tolerance. Understanding how calcifying organisms respond to low salinity is key for assessing their capacity to adapt to predicted episodes of ocean freshening in coastal and marginal habitats, as precipitation and ice melt continue to increase with continued climate change.



Integrative taxonomic revision of selected Holarctic planorbid snails: an exploration of local endemism in ancient Balkan lakes

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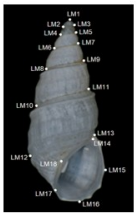
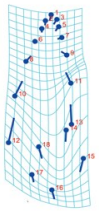
Ancient lakes are unique ecosystems that contain high levels of endemism. Their isolation, stable environment and long-term existence make them an excellent system for studying evolutionary diversification and genetic speciation processes. Molluscs are a particularly informative model group for such a study due to their slow mutation rates, wide distribution and extensive fossil record. This allows reconstruction of deep evolutionary histories and adaptive radiations. However, unclear phylogeny and ambiguous taxonomic status of many, often endemic, species hinder accurate analysis. Preliminary research on the family Planorbidae in Balkan lakes has already produced convincing evidence for taxonomic inflation. Specifically, within the genus Gyraulus, molecular analyses reduced eight putative endemic species to two, restricted to paleolakes, while the others were synonyms of already described species. These findings suggest endemic diversity may also be overestimated in other genera. Once the taxonomic revision and phylogenetic reconstruction are complete, we will be equipped to re-evaluate the morphological characters traditionally used to delimit species within this family. Ultimately, we will be able to study local endemism and compare the mechanisms that drive speciation in both ancient lakes and geologically recent lakes in Balkan region. This distinction will provide important insights into diversification processes shaping biodiversity in ancient lakes. Specifically, we will be able to assess whether endemic taxa constitute a species flock, representing a monophyletic group that has undergone adaptive radiation within the lake, or whether they form a species scatter, comprising independent lineages that have persisted in the lake for millions of years without dispersing into surrounding environments.





When snails go boom: The rapid expansion of forest species during the Early Holocene

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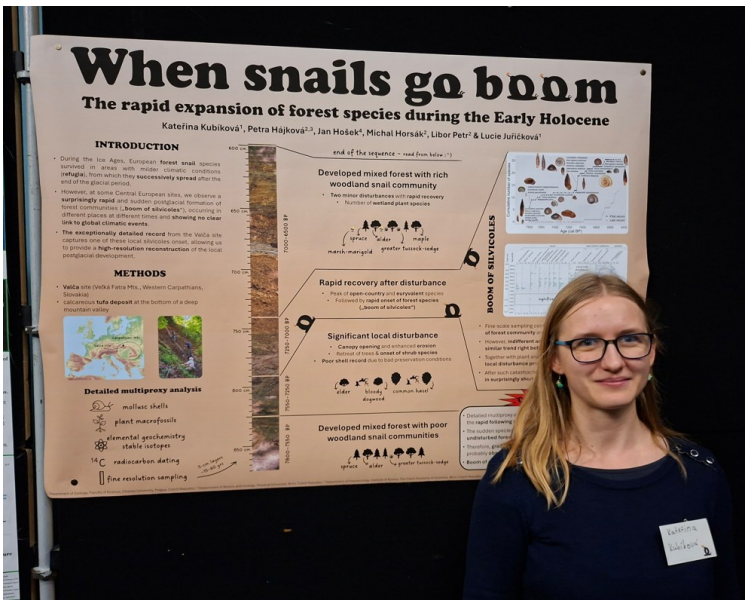
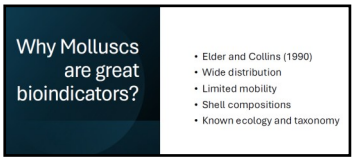


During the ice ages, European silvicolous mollusc species repeatedly withdrew to forest refugia in areas with milder climatic conditions. Such refugia were not only present in southern regions, but also in higher latitudes, which is reflected by an early onset of forest species on many Central European sites after the end of glacial. This increase in species number, often rather sudden and rapid ("boom of silvicoles"), usually takes place at different times on different localities, without any apparent links to macroclimatic events. In this multi-proxy (mollusc shells, plant macrofossils, stable isotopes and geochemistry analyses) study, we documented the boom of forest inhabiting molluscs in the Western Carpathians (Valča, Malá Fatra Mts.) with exceptionally fine-scale temporal resolution, based on 5-cm sampling (~ 15–60 years), and anchored by radiocarbon dating. Rapid onset of strictly forest species appeared around 7200 BP and during 200 years, the number of forest species almost doubled. Among the species that arrived during the steepest increase were *Sphyradium doliolum*, *Cochlodina orthostoma* and *Ena montana*, while one of the later colonizers was the thermophilic *Discus perspectivus*. Surprisingly, a developed mixed forest was present on the site hundreds of years before the silvicoles boom, sparsely inhabited by several more tolerant forest molluscan species such as *Discus ruderatus*, *Faustina faustina*, *Vertigo pusilla* and *Vitrea crystallina*. This, together with apparent lack of correlation with any climatic changes, hints at local rather than global causes of this boom, such as increased landscape connectivity, and change of forest undergrowth.

Molluscs as a great bioindicators



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Molluscs are valuable bioindicators because of their high sensitivity to a wide range of environmental changes like pollutions, temperature fluctuations or habitat changes. Some aquatic species, like freshwater snails and bivalves, are organisms that can be filtrators, which means that they obtain their nourishment by water filtration. By consuming and excreting great volumes of water, they can accumulate pollution; furthermore when examining their body contents, we can find out information about water quality like presence of heavy metals, toxins or other contaminations. They provide reliable insights into water quality and long-term exposure to these pollutants. Also, there are terrestrial gastropods which reflect changes in soil like humidity, acidity or chemical pollutions. Presence or absence of particular terrestrial snails can indicate that a specific area is contaminated or changed for some time. Some marine species exhibit adaptations in response to environmental fluctuations, such as changes in temperature of both upper and lower thermal thresholds. These adaptive capabilities suggest a potential for resilience or acclimatization in the face of ongoing global climate change. All these mentioned groups together provide complementary perspectives on environmental change. Because of molluscs, we can help the whole ecosystem get back to the right parameters by using appropriate methods to purify water reservoirs, terrestrial lands or to prevent any dangerous changes in many environments. Molluscs can help us to take good care of our world.

Climate change and estuarine molluscs: understanding environmental change and biological responses

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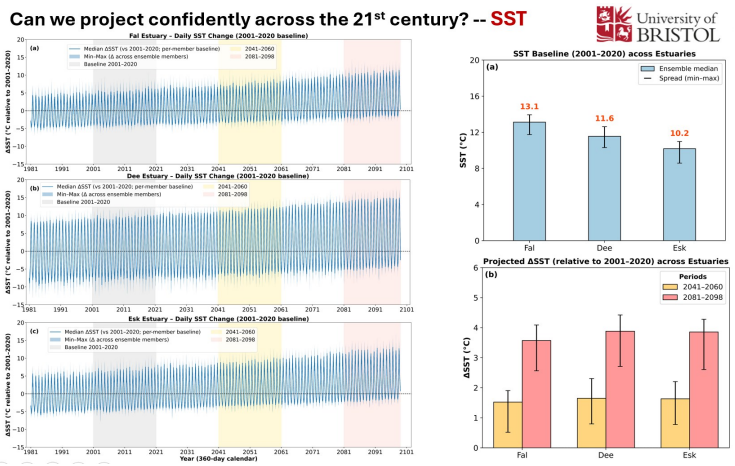
Estuaries are key habitats for many molluscs, providing food, shelter, and essential conditions for growth and reproduction. However, climate change is expected to alter freshwater input, salinity, and temperature in these systems, threatening their role as critical habitats. Key knowledge gaps remain on whether future estuarine habitats remain suitable for molluscs and what physiological challenges they may face, including impacts on adaptation and potential mitigation options. Consequently, we need to assess both future environmental changes in estuaries and their biological consequences for this key species. This study examines three UK estuaries—the Fal, Dee, and Esk—which represent diverse climatic, hydrological, and ecological conditions. To assess the adequacy of currently available modelling approaches that can be used to inform future habitat characteristics, we use a high-resolution climate projection dataset developed on the Northwest European Shelf Seas by Tinker et al. (2024) and extract hourly outputs for salinity and temperature from 1981–2098 (12-member ensemble). The modelled salinity and temperature are compared with Environment Agency observations from 2000–2023 to evaluate model performance. The dataset reliably captures long-term sea surface temperature (SST) trends, with ensemble members showing strong agreement, but tends to overestimate salinity and underrepresents its seasonal and interannual variability. To quantify potential impacts, we replace time with geography to quantify changes in growth rates and material properties of the common mussel. We focus on salinity and temperature effects on bivalve growth and shell material properties, as these traits are closely related to survival, fitness, and ecological function.



Echinostomatidae and Mollusca: transmission and public health links

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Echinostomatidae are a diverse family of trematodes in which molluscs act as the first intermediate hosts, while numerous second intermediate hosts (including other molluscs, fish and amphibians) acquire infections with metacercariae. A hallmark of the group is the low specificity of cercariae towards second intermediate hosts, which facilitates multi-host transmission and maintains parasites within complex freshwater food webs. Selected species cause echinostomiasis in humans; infection occurs after ingestion of metacercariae in undercooked or raw tissues of second intermediate hosts. The clinical picture includes gastrointestinal symptoms, with the potential for acute enteritis. Most human cases are recorded in Asia, reflecting regional culinary practices, yet in Central Europe numerous echinostome species are common in first intermediate hosts, serving as environmental sources of cercariae. We emphasise the importance of local molluscan biodiversity, seasonality and environmental conditions for transmission dynamics, and we draw attention to the need for integrated detection methods (dissection/histology and molecular techniques). We also draw attention to the public health implications and emphasise the necessity of monitoring mollusc populations as a key measure to reduce the risk of echinostomiasis.

Metallic oxide concentrations in the epiphragm of the Giant African Land Snail (*Archachatina marginata*) during aestivation

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The epiphragm is a temporary structure that snails create to seal the opening of their shells during periods of adverse environmental conditions. Oxides in the epiphragm of snails can provide important physiological, ecological and environmental insights. This study aimed to determine the metallic oxides concentration in the epiphragm of Giant African Land Snail (Archachatina marginata) during aestivation. The snails were induced to enter aestivation by withdrawing food and water and ceasing sprinkling. Epiphragm samples were collected at different days of aestivation: days 5, 10, 15, 20, 25. Epiphragm weight, breadth and length was measured using digital weighing scale and vernier caliper respectively. The oxide composition of the epiphragm was measured using the energy dispersive X-ray fluorescent (XRF) spectrometer at 0, 800, 850 and 9000^{o}C calcined temperatures for 3hrs. Epiphragm weight increased with the days of aestivation from day 5 to 20. `there was no significant difference in the breadth of the epiphragm of the experimental snails. Oxides of epiphragm at intervals showed that some elements were not present while those present were in low concentrations. ZrO_2 had the highest values (1.96, 2.03, 1.49, 2.45 and 1.98) for days 5 to 25 respectively. BaO and CeO_2 were detected only on day 20 with 0.0705 and 0.0103 respectively while ReO_2 was detected on day 5 with 0.0029 %mass. RuO_2, Rh_2O_3, PdO, CdO, Ti_2O_3, PbO, HgO and OsO_4 were not detected in the epiphragm of the experimental snail. Oxides of major elements of epiphragm showed that Na_2O, MgO, Y_2O_3 and Nb_2O_5 were not detected. CaO was present in higher concentrations than other major elements. In conclusion, as the days of aestivation increased the metallic oxide concentrations of the epiphragm also increased.

Large breeding aggregations in the Broadclub Cuttlefish *Ascarosepion latimanus*

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The broadclub cuttlefish (*Ascarosepion latimanus*) is the second-largest cuttlefish species and plays an important role as a keystone species in coral reef ecosystems. Most cuttlefish, including this species, are considered solitary. During reproduction, males typically engage in intense contests over females and guard their mates after copulation. Recently, however, a group of nine juvenile *A. latimanus* was reported swimming together, but whether such aggregations are also involved in breeding has remained unclear. To clarify this, we conducted underwater observations in Okinawa, Japan, during the reproductive season (February to April) from 2018 to 2020. A total of 36 scuba dives were conducted with local divers to record

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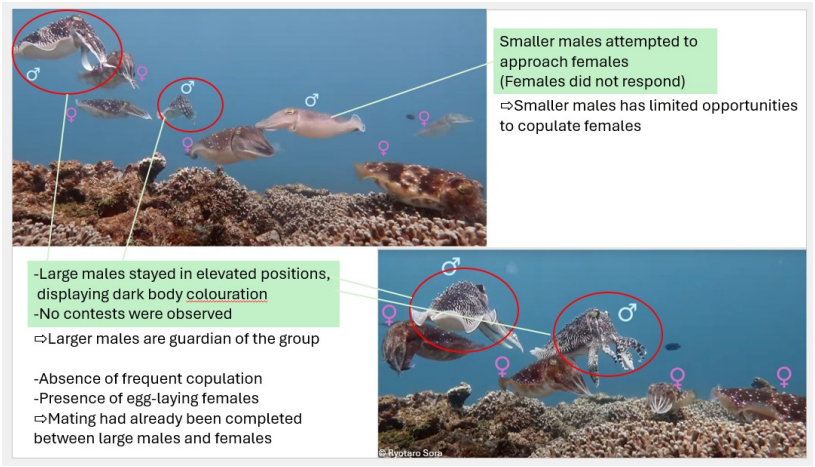
reproductive behaviour. Observations were carried out on reef slopes dominated by *Porites cylindrica*, at depths of 5–18 m, and detailed records of individual interactions and group composition were kept . When more than 10 cuttlefish were present, the two largest males stayed at elevated positions, displaying the dark body coloration associated with aggression. However, they did not fight with other males or court females. Several females laid eggs, while medium- and small-sized males swam among them. Male–male contests were not observed. Smaller males sometimes attempted to approach females, but the females did not respond, and copulation was rarely observed. These findings suggest that in large aggregations, dominant males may function as sentinels, defending the group and overseeing reproduction, while occasionally allowing smaller males limited opportunities. Moreover, the absence of frequent copulation and the presence of multiple egg-laying females that appeared to have already completed mating suggest that large males and females had probably mated at deeper sites before arriving at the shallow spawning grounds. While group swimming of *A. latimanus* has previously been reported in Okinawa, this study provides the first description of large breeding aggregations and discusses their potential adaptive significance.



Absence of a hectocotylus and associated mating behaviour in the Paintpot Cuttlefish (*Ascarosepion tullbergi*)

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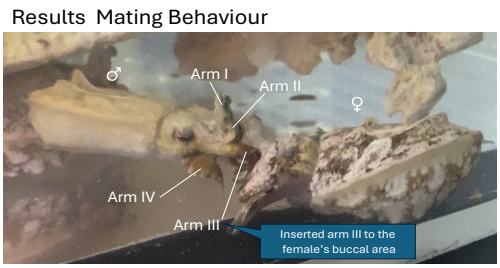
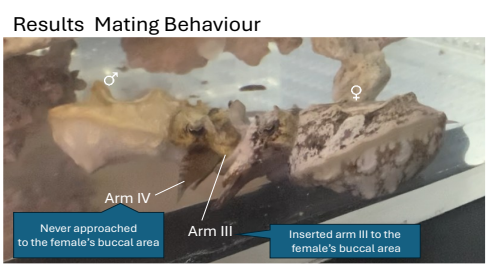
Behavioural observation of two pairs of cuttlefish were conducted at Okinawa Churaumi Aquarium, Japan in a natural sea water open system at 22 °C

A hectocotylus is a morphologically specialized arm in male cephalopods adapted for transferring spermatophores to females. In most cuttlefish (Sepiidae), it corresponds to arm IV, where basal suckers are reduced or absent—a modification thought to enable spermatophore transfer without premature rupture (Hanlon et al., 1999). Without such modification, normal suckers would likely create friction and pressure, causing rupture during transfer. In the paintpot cuttlefish (*Ascarosepion tullbergi*), however, the presence or absence of a hectocotylus remains unresolved. Jereb and Roper (2005), citing Okutani *et al*. (1987), described a hectocotylus on left arm IV, whereas Appellöf's (1886) holotype description reported none. If a hectocotylus is absent, it is unclear how spermatophores are transferred with unmodified arms. To clarify this issue, we examined (1) whether males possess a hectocotylus and (2) if not, how spermatophores are transferred. Examination of the holotype and additional museum specimens confirmed the absence of a hectocotylized arm. Behavioural observations from observed mating in aquarium specimens further showed that left arm IV, previously regarded as the hectocotylus, never approached the female's buccal membrane near the seminal receptacle, but instead hung ventrally. Instead, males inserted arm III, supported by arm II, into the female's buccal membrane during copulation. After copulation, males rubbed arms II and III together for about 10 seconds. These findings indicate that *A. tullbergi* lacks a hectocotylus and transfers spermatophores using arm III with arm II. The post-copulatory rubbing may function to remove mucus adhering to the arms during transfer. Unlike other cuttlefish species with modified arms and reduced suckers to prevent premature rupture, *A. tullbergi* may rely on the mucus coating of spermatophores to reduce friction, thereby preventing rupture and enabling successful transfer. The implications of this reproductive strategy are discussed in relation to the locomotor ability and lifestyle of *A. tullbergi*.





Unionidae under digenean pressure: low diversity, high consequences?

Wiktoria Pacek
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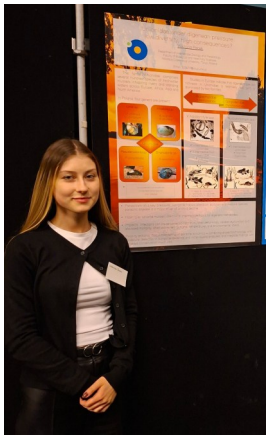

The family Unionidae comprises several hundred species of freshwater mussels inhabiting rivers and standing waters across Europe, Africa, Asia and North America (the exact number depends on the taxonomic concept adopted). In Poland, four genera are present: *Unio, Anodonta, Pseudanodonta* and *Sinanodonta*; the last of these is represented by a non-native species (*S. woodiana*). Around half of Poland's native unionid species are legally protected. These mussels play a key role in freshwater ecosystems as filter feeders and "ecosystem engineers", influencing water clarity, nutrient cycling and habitat structure. Declines in unionid populations result from a combination of factors, including river-channel and floodplain modification, pollution, drought and climate warming, competition from invasive species, and parasitic diseases. Unionid mussels serve as important intermediate hosts for digenetic trematodes. In Europe, infections are most commonly reported from the families Bucephalidae and Gorgoderidae; the former includes *Rhipidocotyle* spp., while within Gorgoderidae, *Phyllodistomum* spp. have been recorded in unionids. Such infections may cause parasitic castration, shell deformities, cardiac dysfunction and increased mortality, with effects often exacerbated by elevated temperatures and environmental stress. Robust risk assessment requires monitoring that combines traditional dissection and histology with molecular techniques (e.g. parasite DNA detection), alongside analyses of seasonality and water quality. Given the ecological importance of Unionidae to inland waters, regular surveillance of parasitic infections is recommended, integrated with conservation actions and measures that reduce other environmental pressures.

Palaeomalacological studies on calcareaous tufas in temperate Europe for palaeoenvironnemental and palaeoclimatic reconstitutions of the Eemian (130 ky, ≈MIS 5e)

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Active tufa waterfall in the Jura

As reconstruction of the Eemian environmental dynamics is limited in Western Europe, studies on calcareous tufas have been favoured in recent years to overcome the lack of archive. These deposits record the climatic and environmental conditions contemporary to their formation and favour a good preservation of mollusc shells. The combining approach of malacology and isotopic geochemistry ($\delta^{18}O$ and $\delta^{13}C$ on tufa calcite) used on several Pleistocene calcareous tufas has demonstrated its effectiveness for such studies of past interglacials. This work aims to study an east-west European transect on Eemian tufas to report on the evolution of malacofaunas and the associated environments during this period. Similar data obtained for the Holocene show a decrease in biodiversity towards the west linked to a distancing from the main European refuge zone, the Carpathian Mountain range. Since the current distribution of species on the continent are intrinsically linked to Quaternary climate fluctuations, the existence of a similar gradient remains to be demonstrated for Pleistocene interglacials. This study will ultimately improve knowledge 1) on the chronology of the Eemian interglacial in Europe, and 2) on the current and fossil distribution of molluscs. Two main Eemian tufas form the core of this project: Resson (France) and Burgtonna (Germany). The communication will discuss the first results obtained at both sites and aims to highlight their importance as "new" reference sequences of the Eemian in Western and Central Europe. At Resson, the malacological analysis shows a general trend in the evolution of the malacological cortege that reflects the interglacial dynamics over time with several species diagnostic of the period uncovered (like *Daudebardia rufa* which is out of its current expansion range) and the maximum forest development identified at the top of the sequence. Burgtonna tufa, formerly known through the work of D. Mania (1978, 2024) has been selected for its impressive malacological content. Preliminary results confirm its importance for understanding the Eemian in the region with multiple forest phases identified. It also constitutes a key point for the study due to its position at the junction between Western and Eastern Europe.

Study material

Calcareous tufas

Resson eemian tufa (Aube, France)

Molluscs

Arianta arbustorum from Burgtonna tufa (Thuringia, Germany)

The self in the shell: single-cell insights into molluscan immunity

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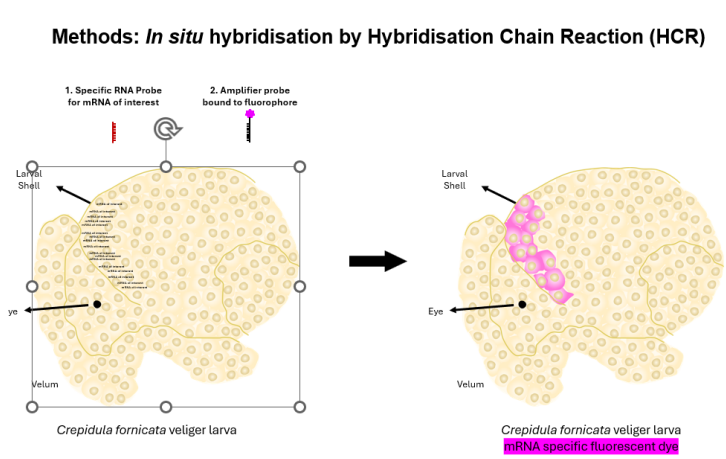
The immune system of molluscs plays a central role in their survival and is therefore a critical focus for both aquaculture and conservation. While certain immune functions and mechanisms in molluscs are relatively well characterized, significant gaps in fundamental knowledge continue to limit our understanding of molluscan immunity and impede progress in the field. Recent advances in high-throughput omics technologies now enable the generation of high-resolution and large-scale datasets within shorter times, offering new opportunities to address these knowledge gaps while tackling novel questions. Taking advantage of these technologies, we applied single-cell RNA sequencing to whole embryos of the caenogastropod *Crepidula fornicata*, producing the first whole-organism single-cell atlas for a gastropod. This approach allowed us to identify and spatially localize haemocytes, the canonical immune cells of molluscs, during larval development. Our ongoing work focuses on embryonic haemocytes, with the aim of elucidating their early differentiation pathways and providing new insights into the structure, development, and evolution of the molluscan immune system. Beyond haemocytes, we also characterized major cell types present across mid- to late-larval stages at molecular resolution, such as nervous cells, digestive cells and shell-related cells. Together, these findings provide a valuable resource for the malacological community and open new opportunities for a broad range of mollusc related studies.



Mapping the presence of calcite in order Mytilida

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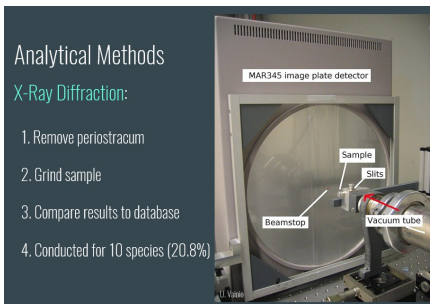
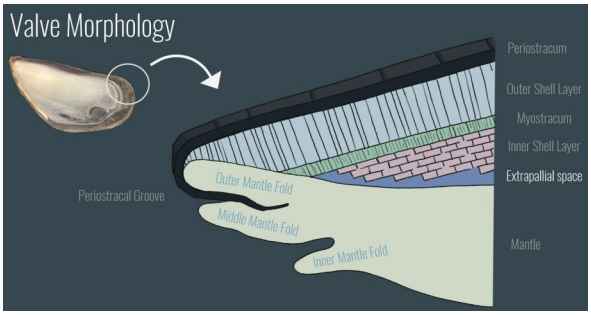
The shell mineralogy of the marine mussels (order Mytilida) is uncommon amongst the bivalves due to the group's inconsistent use of calcite. Whilst all bivalves produce aragonite in their shells, layers of calcite are also found in certain orders, where its use is usually ubiquitous. This creates difficulty when attempting to identify potential evolutionary drivers of calcite's adoption. Since order Mytilida is the major exception to this trend, describing calcite's presence within the group provides a valuable framework to further investigate the evolution of bivalve shell mineralogy. Using Feigl's solution, scanning electron microscopy, and x-ray diffraction analysis, 70 specimens were studied, covering 25 genera across all 13 subfamilies within order Mytilida. The results confirmed the highly patchy distribution of calcite within the group, with shell mineralogy differing between species of the same genus in certain cases. Of particular note were the unique anvil-headed calcite prisms found in both major *Mytilid* clades. For example, within the intertidal genus *Mytilus* (family Mytilidae) and the deep sea genus *Bathymodiolus* (family Modiolidae). This, alongside Mytilida's close relation to other calcite bearing Pteriomorph bivalves, strongly suggests that calcite is ancestral to the group and that it has been subsequently lost in certain taxa. Whilst hypotheses for calcite's adaptive benefits have been posited, most lack strong evidence and harbour inconsistencies. For example, some argue calcite may help prevent dissolution in cold waters, however, many cold or deep water species lack outer calcite layers. This study aims to lay a foundation for further investigation by mapping its findings onto a recent molecular phylogeny of the group. A better understanding of the role various shell mineralogies play in separating mussels from their environment may prove key to predicting how these economically and ecologically important taxa respond to a rapidly warming and acidifying ocean.





How do snails fly? Insights into land snail ectozoochory from experiments on racing pigeons

Jasna Simonová[1], Barbora Kadlecová[2], Jan Simon Pražák[1,3], Vendula Dronská[1], Karel Peyerl[1], Jiří Hadrava[1] & Lucie Juřičková[1]
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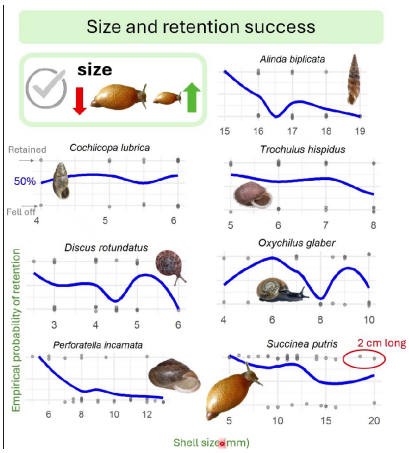

Snails are not capable of moving quickly over long distances. Nevertheless, they can sometimes spread rapidly, colonizing distant or isolated habitats across a range of spatial scales – from individual trees within otherwise unsuitable vegetation to remote oceanic islands. While humans play a major role in the dispersal of many species today, natural vectors must also account for certain distribution patterns. One possible mechanism is avian-mediated dispersal, as snails are occasionally found attached to birds (e.g., during bird ringing or ectoparasite surveys). To investigate this process, we conducted experiments in which live snails were placed on racing pigeons. After flights of 5 km, the birds were examined for any remaining snails. In total, 30 flights were carried out with 249 snails. Of these, 40% (n = 100) remained attached to the birds' bodies throughout the entire flight. We further analyzed the effects of snail species, shell dimensions, and attachment site on the bird's body on the efficiency of transport. This study was supported by GA UK (project no. 634120).

Regressive evolution of eye loss in deep-sea snails

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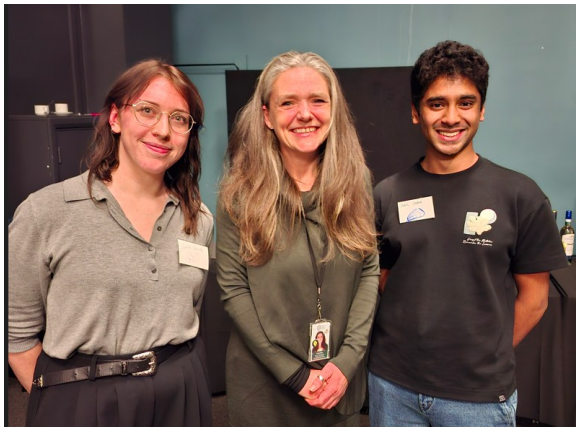
Eye loss as an adaptation to the deep-sea environment has occurred multiple times across various clades This project examines one particular family of marine snails, Solariellidae, which have not only lost their eyes multiple times within the same family but have done so along different morphological trajectories. The project combines transcriptomic datasets and histological analyses to compare a number of different species, both with apparently functional eyes and those with non-functional eyes (evidenced by loss of pigment) on both a morphological and genetic basis. The aim of this project is to better understand the mechanics of eye loss, and the potential conservation or lack thereof in this process not only in the Solarellidae but across the metazoa.



The President of the Malacological Society of London (MLS)
(Dr Fiona Allan –centre) presents awards to :-

Kate Smith (left—MLS prize for the best student poster at the Forum)
and the Oxford University Press prize to
Amal Shakir (right—best student oral presentation at the Forum)

"Sediment stirring" in *Callianax biplicata* (Olividae, Caenogastropoda): a novel mode of food acquisition?

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The Purple Dwarf Olive, *Callianax* (formerly *Olivella*) *biplicata* (G.B. Sowerby I, 1825), lives in dense populations on sandy beaches from British Columbia to Baja California. Like larger predatory olivids, the comparatively small *C. biplicata* (up to 28 mm shell length) forages actively for prey and readily accepts carrion; food items are secured in a pouch formed by the posterior foot. In many aquatic gastropods including Olividae, crawling locomotion depends on the activity of cilia on the entire body surface. The process becomes visible when sand grains travel along dorsal surfaces in stationary animals, as frequently observed in *C. biplicata*. In burrowed individuals, this may result in a continuous rotation of sediment above the anterior body. Such 'sediment stirring' may continue for >10 minutes and has, to our knowledge, not been described before; its function is obscure. We hypothesize that it may be related to food acquisition, as microbe layers on sediment grains may be caught in the mucus, which then is eaten. So far, sediment stirring only has been observed coincidentally and filmed in aquaria during an unrelated study. It would be possible to expand our knowledge of sediment stirring by direct observations of *C. biplicata* in its natural habitat. If sediment stirring represents a feeding mode based on a mucus-microbe-trap mechanism as hypothesized, the frequency of its occurrence should correlate with the abundance of microbes on the sediment particles. To test this hypothesis, the gastropods' behaviour could be compared between tanks with sediment taken directly from the natural habitat including its natural microbe fauna, and tanks with cleaned sediment that lacks microbes and organic materials in general. Videos of all the behaviour described above are shown as essential parts of this presentation.

Comparative analysis of molluscan assemblages across lotic and lentic habitats in the Bhima River Basin, India.

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A comparative study was conducted to assess the diversity and community structure of freshwater molluscs inhabiting lotic and lentic ecosystems within the Bhima River basin, India. A total of 18 molluscan species representing 4 orders and 7 families were documented across both habitat types. The most abundant species observed were *Bellamya bengalensis* (Viviparidae), *Thiara lineata* (Thiaridae), and *Bellamya dissimilis* (Viviparidae). Species richness was slightly higher in the lotic habitat compared to the lentic habitat. Notably, *Lamellidens corrianus* and *Lamellidens marginalis* (Unionidae) were commonly found in both environments, indicating their ecological adaptability. Gastropods were more prevalent than bivalves across the study sites. The findings also suggest that variations in physico-chemical parameters influence molluscan community assemblages. This study contributes to understanding habitat-specific biodiversity patterns and the ecological factors shaping mollusc distribution in freshwater systems. Gastropods were more prevalent than bivalves across the study sites. The findings also suggest that variations in physico-chemical parameters influence molluscan community assemblages. This study contributes to understanding habitat-specific biodiversity patterns and the ecological factors shaping mollusc distribution in freshwater systems.

Study Area

One, two, three – phally polymorphism of *Vertigo antivertigo*

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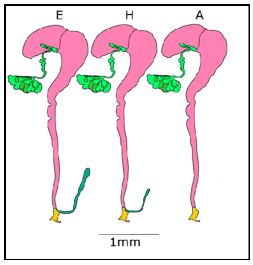
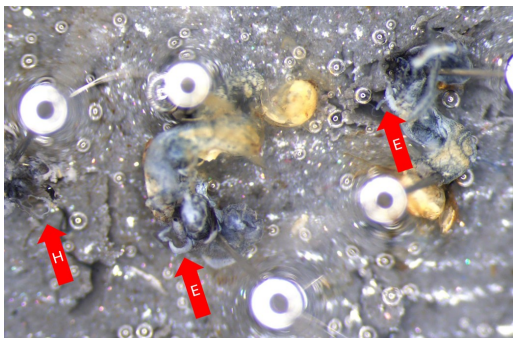
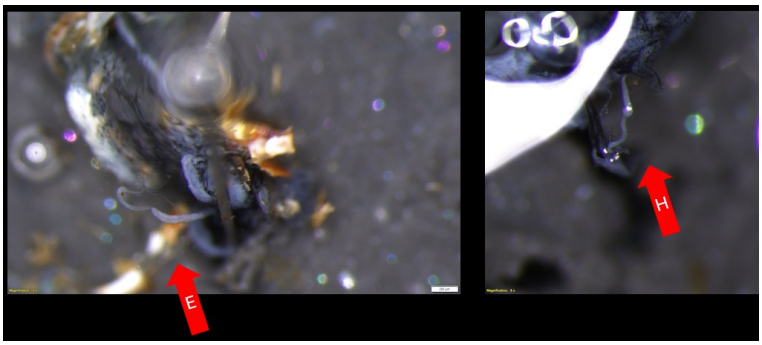
Hermaphroditism in snails provides a chance to observe phally polymorphism. In minute land snails *Vertigo* sp., it is expressed as co-occurrence of three different sexual morphs in a single population. These are: euphallics, whose penis is fully functional, hemiphallics with reduced, nonfunctional phally and aphallics – without a penis. Despite this variation, every morph can still self-fertilize. The mechanism behind phally polymorphism in *Vertigo* sp. remains unknown. One of the reasons is the size of said snails. Adult shells measure 1,2–1,4mm in width and 1,7–2,3mm in length with 4 to 5 whorls. This alone makes research complicated. To determine factors influencing sexual morph development, we monitored the offspring of *Vertigo antivertigo* individuals collected from various regions of Poland. We examined the effects of egg development, juvenile growth and type of substrate (soil, autoclaved soil, cotton wool, plaster) on morph type. Each snail was reared separately, beginning at the egg stage. Upon reaching adulthood, snails were preserved in ethanol and dissected to determine type of the phally. The results will be available soon.



Phallial morphs in *Vertigo antivertigo*
E = euphally, H = hemiphally
A = aphally





Quantifying extinction and ecological change across the Cretaceous-Paleogene (K-Pg) boundary on Seymour Island, Antarctica

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The highest southern latitude onshore record of the Cretaceous-Paleogene (K-Pg) mass extinction is found on Seymour Island, Antarctica. The boundary occurs within the upper levels of the abundantly fossiliferous and expanded (sedimentation rates of 0.2 cm/yr) López de Bertodano Formation. Previous studies based on species richness data has led to persistent debate as to the timing of the K-Pg mass extinction in Antarctica, but no quantitative work exists which examines ecological or environmental change across the boundary at high latitudes. In early 2024, we conducted a detailed study of the K-Pg interval on Seymour Island, measuring multiple sections and making quantitative macrofossil collections across the K-Pg along strike for ~2.5 km. New faunal data indicate that existing macrofossil collections from Seymour Island may provide an accurate picture of species richness, but do not adequately capture the ecological composition of the marine ecosystem in either the pre- or post-boundary intervals. Shifts in dominance and abundance of certain taxa occur within the final ~1 million years of the Maastrichtian, but the only significant ecological change occurs at the K-Pg itself, with an impoverished early Danian community dominated by the infaunal bivalve *Lahillia larseni*. Preliminary geochemical data from organic biomarkers suggest minimal temperature change across the boundary. New observations extend the stratigraphic ranges of several taxa closer to, and in one case across, the K-Pg boundary. These data confirm a single extinction event at the K-Pg boundary in Antarctica. Early disappearances of taxa are probably a result of insufficient sampling and poor taxonomic resolution.

The ChaSE project: Chalk Sea Ecosystems and Cretaceous environmental change in the Chalk Group of the United Kingdom

James D. Witts[1], Deborah Tangunan[2], Emma L. Bernard[1], Harriet Bohun[1,3],Katie Collins[1], Leila D'Souza[1], Michael Day[1], Timothy A.M. Ewin[1], Thomas Fogerty[1], Chloe Griffiths[2], Richie Howard[1], Zoë Hughes[1], Marc Jones[1], Giles Miller[1], Kaia Spence[1,2], Stephen Stukins[1], Sarah Jamison-Todd[1,2], Jonathan A. Todd[1], Julie Brown[2], Andrew S. Gale[4], Liam Gallagher[5], Charlie J. Underwood[6], Paul R. Bown[2], Rich & J. Twitchett[1]

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This poster showcases the ChaSE (Chalk Sea Ecosystems) project. The onshore Chalk Group of the United Kingdom provides a continuous and well-exposed rock and fossil record spanning the Late Cretaceous (Cenomanian – Maastrichtian stages, ~100 - 72 Ma). As an economically important resource, the chalk has been quarried and studied for >200 years and a detailed stratigraphic framework is available. The sequence is abundantly fossiliferous, recording every marine trophic level from nanno- and phytoplankton to benthic and nektonic molluscs and apex predators. Key events recorded in the Chalk include peak Cretaceous warming and biodiversity crises across the Cenomanian – Turonian boundary (Oceanic Anoxic Event 2), the highest global sea-levels of the last 250 myrs during the Turonian, and a long-term cooling which culminates in the Maastrichtian with the coldest temperatures of the Late Cretaceous. The Natural History Museum, London (NHMUK) contains >55,000 UK Chalk Group macrofossil specimens, including rare taxa and material from now inaccessible localities. Only a fraction of these have been published or are available in public datasets. Many specimens contain limited metadata, and ages or stratigraphic position are poorly constrained. To unlock these 'dark data' we are re-dating >1,500 macrofossil specimens using calcareous nannofossil biostratigraphy. Combining these with data from new fieldwork, we are conducting the first 'whole-ecosystem' study of the functional diversity and ecology of the Chalk Sea, providing an unprecedented record of the effects of global Cretaceous climate change on marine ecosystems at a variety of temporal and spatial scales, all within the same depositional system.

Early career research grant reports

Research financially supported by the Malacological Society of London

The mussel *Brachidontes rodriguezii* (d'Orbigny, 1846) as a sentinel of microplastic contamination in a Southwestern coastal area

Sonia M. Landro, & Florencia Arrighetti

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Background and general aim

Plastics can enter the aquatic environment either through human land-based or maritime activities, and because of their widespread use and endurance, plastic pollution represents one of the major problems of the last decades. Microplastics (MPs) are any synthetic solid particle or polymeric matrix between 1 µm and 5 mm in size. They can be either primary MPs, which are manufactured to have microscopic dimensions, or secondary MPs, which are formed by the weathering and fragmentation of larger plastic waste items (Bessa *et al*., 2019).

Nowadays, monitoring studies are based on an integrated approach that combines the assessment of contaminant accumulation in different matrices (water, sediment, biota) with biomarkers of environmental stress, which are quantifiable biological responses used to evaluate adverse effects on the biota. The ingestion of MPs has been thoroughly documented across various species but bivalves, especially mussels, are the most studied because of their ideal qualities as sentinel species: they are worldwide distributed and easy to collect, sessile, and filter-feeders, so they are directly exposed to MPs in the water column (Xu *et al*., 2020).

In Argentina, there is limited research on the distribution and abundance of MPs in marine environments and their effects on sentinel mussels (Ronda *et al*., 2025). Therefore, we aim to analyze MPs accumulation in combination with different biological responses in a sentinel mussel inhabiting coastal areas with different types of anthropogenic impact in Buenos Aires (Argentina). We selected the mussel *Brachidontes rodriguezii* (d'Orbigny, 1846) because it is a recommended sentinel for anthropogenic disturbances and different contaminants, including MPs (Landro *et al*., 2025; Migliarini *et al*., 2025).

Planning and study area

When we submitted our proposal to the MSL early career research grant, we had selected two large areas of the coast of the Province of Buenos Aires — Quequén and Mar del Plata — to sample the mussels. However, after delaying the sampling because the Argentine scientific system is experiencing one of the greatest defunds of the last years, we made certain modifications to the original plan. We decided to focus our research efforts on Quequén, the area that lack any MPs contamination reports. There, we selected three sites with different anthropogenic impacts: the presence of a fishing port, discharge of sewage effluents, and a beach for recreational use. In addition to mussel samples, we chose to include water samples from each site to enhance our study (Figure 1). The three selected sites at Quequén were: Punta Carballido Sewage Effluent (S1: 38° 34' 07,6''S; 58° 39' 06,28''W), Quequén Port (S2: 38°33' 20''S; 58°42' 58''W), and Quequén Beach (S3: 38°34' 22''S; 58°40' 45''W).

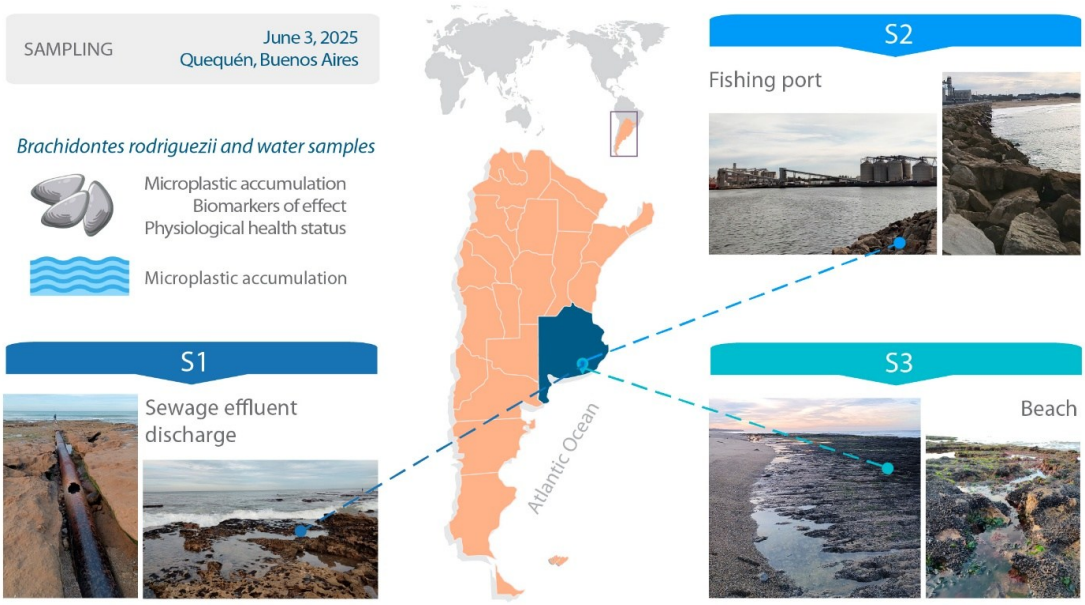

Figure 1. Study sites in the coast of Quequén in Buenos Aires, Argentina.

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Sampling and sample processing

On June 3rd 2025, we conducted the sampling at the study sites collecting 1 L of superficial water (n = 3 per site) and adult mussels (n = 70 per site) from the intertidal rocky shore. Additionally, we recorded physico-chemical data such as water temperature, salinity, and pH from each site using a multi-parameter sensor.

From each site, 10 mussels were immediately stored at -20 °C in sealed bags for the MPs quantification analysis, 30 mussels were stored at -40 °C to analyze several biochemical biomarkers of effect, and 30 mussels were used to assess their physiological health status through a condition index (CI). For the CI, mussels were cleaned, and their byssus removed. We measured the valve length with a precision caliper (0.01 mm) and we weighed them using a precision scale (0.01 g) (Denver Instrument APX-200). Then, we separated and weighed the soft tissue.

Since airborne contamination is a frequent problem in MPs studies, we followed standardized international protocols during the collection, processing, and further analyses to avoid any possible contamination of the samples (Bessa *et al*., 2019; Gago *et al*., 2018). Briefly, these precautions included clean laboratory conditions in an enclosed room, wearing cotton laboratory coats and nitrile gloves, and using laboratory glassware. Additionally, all the laboratory materials were washed with double-filtered water through glass microfiber filters and covered with aluminium foil. Negative controls were included during the digestion step (see below) using 50 mL of 10% KOH without tissue samples, and during the visual inspection, an air control filter was left exposed to account for airborne contamination.

Summary of research activities and preliminary results

Quantification and characterization of microplastic abundance in mussels and water samples

Mussels were treated individually, thawed at room temperature, washed with filtered distilled water, measured, and weighed before and after dissection. An organic matter digestion was performed using a 10% potassium hydroxide (KOH) solution for 48 h at room temperature. Then, each sample was filtered using a glass filtration kit with a vacuum pump (Filtr8) through 1.2 µm cellulose nitrate reticulated filters (Microclar®) to capture possible MPs particles. Digestion efficiencies were determined by calculating the percentage of tissue left after digestion (Dehaut *et al*., 2016). The filters were placed in glass Petri dishes and examined using a stereomicroscope for visual identification (Leica MZ9 5 with a digital camera Swiftcam 25). We recorded the abundance (number of particles), type (e.g., fragment, fiber, film), and colour of the observed particles.

We filtered the totality of mussel samples (n = 30, 10 mussels per site) with a mean digestion efficiency of 98% for all samples. We carried out the visual identification of approximately 60% of all samples and preliminary results revealed that MPs abundance varied from 2 to 23 items per mussel (frequency of occurrence 100%). The observed items from the different sites corresponded to the fibre category, with a similar proportion of colours; transparent was the most abundant, followed by black, blue, and red. The same digestion, filtration, and visual identification protocol is being applied to water samples.

Final results will be expressed as items/individual and items/g wet weight (ww) soft tissue for mussels and items/L for water samples. Once we have analysed the totality of the samples, statistical analyses will be performed in R (R Core Team, 2025) to identify differences between sites in mussel and water samples.

Physiological health status of mussels

Mussels size ranged from 10.41 to 24.53 mm shell length, with significant differences among sites (ANOVA $P < 0.01$). *Post-hoc* Tukey's HSD test revealed a clear size gradient: Beach (19.66 ± 2.23 mm) > Effluent (18.39 ± 1.75 mm) > Port (14.99 ± 2.17 mm) (mean ± SD), where all pairwise comparisons were statistically significant ($P < 0.01$ for all comparisons).

A preliminary Spearman's rank correlation analysis revealed a strong positive relationship between CI and CIL (rho = 0.903, $P < 0.001$), indicating substantial shared variance. However, given their distinct mathematical formulations and biological interpretations, we analyzed both indices separately. For both indices, data violated assumptions of normality (Shapiro-Wilk, $P < 0.05$) and homoscedasticity (Levene's test, $P < 0.05$). We therefore applied Generalized Linear Models (GLMs) with Gamma distribution (link = "log") using the glmmTMB package from R software.

Gamma GLMs showed highly significant site effects for both indices (CI: $\chi^2 = 15.35$, df = 2, $P < 0.001$; CIL: $\chi^2 = 35.36$, df = 2, $P < 0.001$), revealing distinct response patterns among sites (Figure 2). Post-hoc comparisons showed that for CI, mussels from Beach exhibited significantly lower values than those from Effluent and Port, which did not differ from each other (Figure 2A). By contrast, CIL analysis revealed significant differences among all three sites, following a clear gradient of Beach < Effluent < Port (Figure 2B).

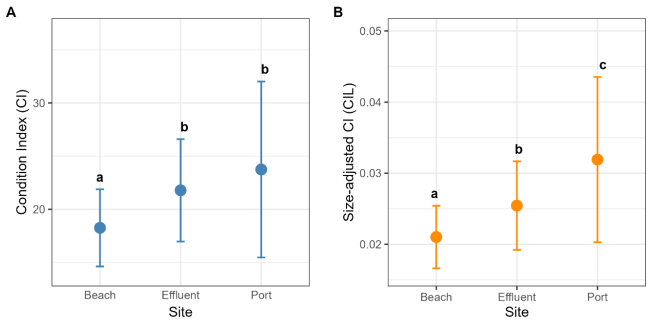

Figure 2. Condition indices of mussels *Brachidontes rodriguezii* from the study sites. A. Condition index (CI). B. Size-adjusted Condition Index (CIL). Values are presented as mean ± standard deviation. Different letters indicate statistically significant differences between sites (Tukey's HSD, $P < 0.01$).

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The divergent patterns between CI and CIL provide nuanced insights into mussel physiological status. While CI indicates that Beach mussels allocate a greater proportion of their total weight to soft tissue compared to both Effluent and Port sites, CIL reveals a graded response in tissue density relative to body size across all three sites. This suggests that environmental conditions at Port not only reduce the relative tissue proportion but also affect tissue or density, aspects captured by the size -adjusted index.

These complementary indices will be further analyzed in relation to biomarker responses to evaluate potential associations with MP abundance.

Future research activities

Microplastic polymer identification in mussels and water samples

To identify the chemical composition of the potential MPs observed under the stereomicroscope, a random subsample of 10% of the filters (mussels and water samples) will be analysed using a confocal Raman microscope (Horiba LabRAM HR Evolution) and the obtained spectra will be compared with open-access reference libraries (Migliarini *et al*., 2025). Subsamples will be analysed once all the samples are processed.

Biochemical biomarkers of effect in mussels

We will perform enzymatic, oxidative damage, and energy metabolism determinations according to Lavarías *et al*. (2023). This will include the measurements the activity of the enzymes SOD, CAT and GST, the levels of LPO using the formation of TBARs, protein oxidation through the concentration of protein carbonyls. Total lipids will be extracted and the amount of lipids and fatty acids will be measured. The remaining mussels will be processed to measure glycogen. Glucose will be quantified using the glucose oxidase method using commercial kits. Lactate will be quantified by measuring the maximum absorbance at 545 nm using lactate as a standard and from commercial kits.

Final considerations

The modifications to the original plan enabled us to conduct feasible research under high-quality standards, contributing to ongoing MPs contamination efforts in Argentina. This study demonstrates the value of integrative monitoring approaches that combine contaminant quantification with physiological health assessments, moving beyond mere accumulation data to evaluate potential biological impacts. Our findings related to the condition indices underscore the need for monitoring programs that include biological effect measurements alongside contaminant quantification, as such integrative data are essential for informed environmental management decisions. These efforts are possible thanks to international grants provided by institutions like the Malacological Society of London.

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Characterization of advantageous traits across heterogenous environments in the intertidal bivalve, *Mytilus californianus*

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Project Description

In marine systems, most organisms reproduce via broadcast spawning where genetic differences depend upon the strength of selection and migration among spatially distant populations. In heterogeneous environments, theory indicates that the balance between selection and migration determines the rate of adaptation and the population genetic structure of traits related to fitness (Leimar *et al*., 2019; Yeaman & Whitlock, 2011). Thus, strong selection associated with spatial environmental heterogeneity could drive local adaptation and lead to divergence and increased structural genetic variation, even with population connectivity (Yeaman, 2022; Yeaman & Otto, 2011). This predicts that spatially homogenous environments lead to the evolution of loosely connected genetic architectures or polygenic traits with many small allelic effects on fitness, or global adaptation. Alternatively, spatially heterogeneous environments lead to the evolution of less polygenic architectures or tightly linked clusters of Structural Variants (SV) in fewer loci with larger allelic effects on fitness, or local adaptation (Yeaman, 2022). Therefore, across heterogenous environments I would expect the population structure of divergent adaptive loci to be tightly linked clusters or large effect loci where Single Nucleotide Polymorphisms (SNPs) and SVs in a few loci have a large effect on fitness as a result of local adaptation. Identifying populations that have more clustered SV or tightly linked genetic architectures in divergent adaptive loci would be expected to have increased fitness in their indigenous environments from local adaptation. However, this genetic basis would result in a decrease in plasticity in native environments and an increase in plasticity to other environments where polygenic traits are favored for selection (Sultan & Spencer, 2002; Velotta & Cheviron, 2018).

I hypothesized that *Mytilus californianus* populations on the outer coast of Washington, USA, who live in an environment that experiences significant decreases in pH during upwelling conditions, will exhibit locally adapted genetic architectures in proteins involved in calcification. This will result in a decrease in plasticity to varying pH environments, but an increase in plasticity to other environmental stressors. Alternatively, *M. californianus* populations on the inner coast of Washington, USA, who live in an environment that experiences significantly hotter sea surface and aerial exposure temperatures, will exhibit locally adapted genetic architectures in proteins involved in heat stress resulting in a decrease in plasticity to varying temperature environments, but an increase in plasticity to other environments. To test these hypotheses, I compared population structure of divergent adaptive loci and the associated phenotypic responses from populations on the outer coast of Washington to the furthest known inner coastal *M. californianus* population extending 180km into the Salish Sea at Cattle Point, San Juan Island Historical Park. This was achieved by collecting 100 mussels from four populations and performing common garden experiments at Friday Harbor Labs to compare metabolic responses across a control group and three environmental treatment groups (decreased pH, increased temperature, increased temperature & decreased pH). An additional 96 individuals across 18 populations were collected for DNA comparison between outer and inner coastal individuals (Fig. 1A).

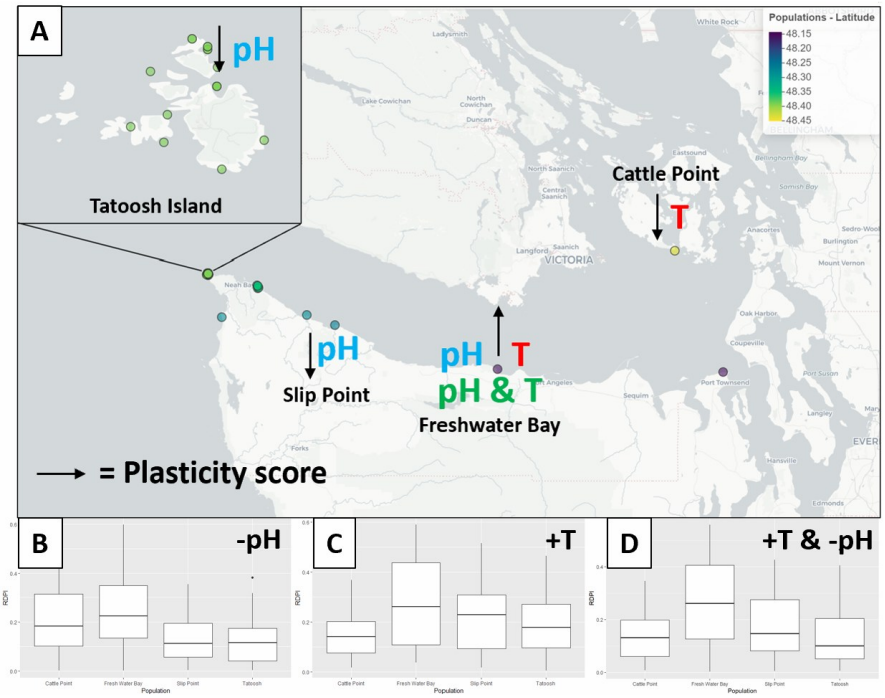

Figure 1: (A) Location of sampling sites of *M. californianus* mussels collected for DNA analysis (colored dots) and summarized Relative Distances Plasticity Index (RDPI) values across four populations used in common garden experiments. RDPI values by treatment group (B) decreased pH, (C) increased temperature, or (D) increased temperature & decreased pH of *M. californianus* metabolic rates from four populations (Cattle Point, Freshwater Bay, Slip Point, Tatoosh Island).

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Results To Date

The Relative Distances Plasticity Index was used to quantify plasticity for each population (Valladares *et al*., 2006) and demonstrates that outer coastal populations expressed decreased plasticity in varying pH environments (Fig. 1A & 1B). Additionally, inner coastal populations expressed decreased plasticity in varying temperature environments supporting the hypothesis that local adaptation leads to a decrease in phenotypic plasticity when in native environments (Fig. 1A & 1C). Interestingly, the middle population from Freshwater Bay, WA had increased plasticity across all treatment groups suggesting increased frequencies of "locally adapted alleles" via tidal driven larval transport from Cattle Point (ebbing tide) and the outer coast (flooding tide) (Fig. 1A, 1B, 1C, & 1D). Further analysis of DNA sequences between individuals will confirm if there are adaptive differences between populations who persist across varying environments.

Conclusions

As the ocean continues to change, molluscs may deploy genetic responses, responses in their phenotype, or a combination of both. My experiments reveal the genetic and plastic responses that underlie physiological stress responses in mussels and relates this to the underlying genetic architecture and the scope for continued adaptation.

Acknowledgments

I thank the Malacological Society of London for providing financial support for this project in addition to the Washington Department of Fisheries & Wildlife, the Makah Tribal Nation, and the Director of Friday Harbor Labs for allowing me to collect mussels in the state of Washington, USA.

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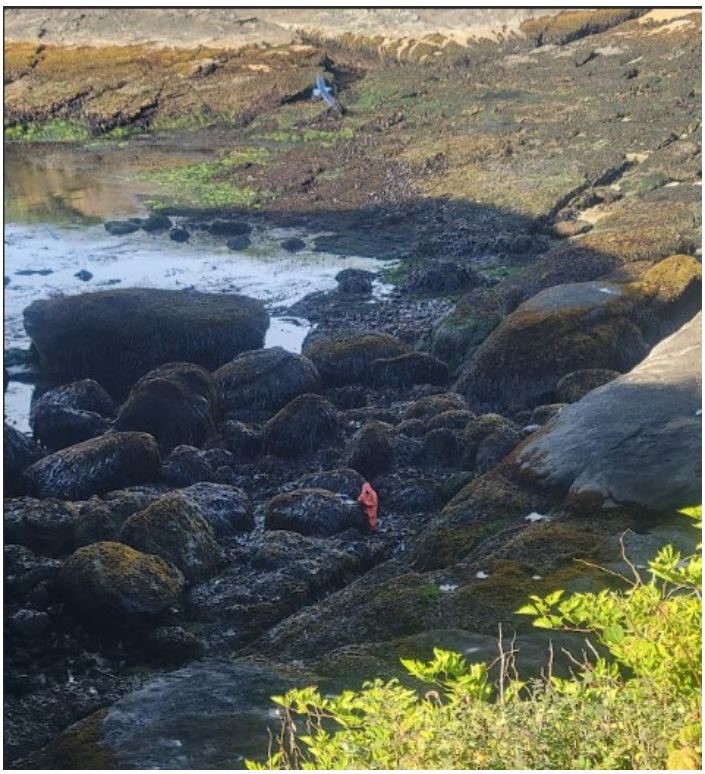
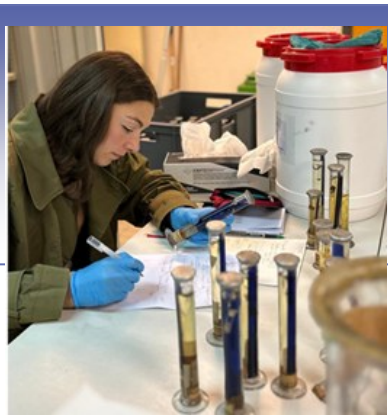


Integrative taxonomy of cold-water *Limacina*: type material and historical collections



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Background and Motivation

Shelled pteropods of the genus *Limacina* are among the most widely cited pelagic molluscs in ocean acidification research. Their thin aragonitic shells are highly sensitive to dissolution, and they are frequently used as bioindicators of environmental change. Despite their broad distribution across all oceans and especially high abundance in vulnerable (sub)polar ecosystems, the taxonomy of cold-water *Limacina* remains unresolved.

Two nominal "bipolar" species complexes (*Limacina helicina* s.l. and *L. retroversa* s.l.) include multiple subspecies and forms were described primarily during the 19th and early 20th centuries. These taxa were distinguished on the basis of subtle shell characters such as radial striation, whorl number and aperture morphology, often relying on drawings and without clearly designated type specimens. As a result, the application of names has been inconsistent. Previous studies have also suggested the presence of unrecognised diversity within these complexes, indicating that current taxonomy may not reflect underlying biological structure.

The aim of this project was therefore to reassess the taxonomy of cold-water *Limacina* using an integrative framework combining morphology (landmark-based geometric morphometrics, linear measurements, microCT scanning) with DNA barcoding (COI, 28S). However, a formal taxonomic revision requires anchoring species concepts to name-bearing type material. Direct examination of historical types was a critical step to stabilise nomenclature, which was made possible through the support of the Malacological Society of London.

Compiling type- and historical- information

Prior to visiting the collections, I compiled an overview of *Limacina* type and historical material housed at the Natural History Museum, London (NHMUK) and the Muséum national d'Histoire naturelle, Paris (MNHN), through consultation of online databases and collection records. This inventory was further refined during and after the visits by incorporating material that had not been previously accessioned. The result is an updated and comprehensive inventory of pteropod holdings at both institutions, including information on type status, preservation condition, and registration gaps.

Working in the NHM Mollusca collections. Overview of historical samples examined.

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Museum work in London (NHMUK)

Examination of Type and Historical Material. I surveyed *Limacina* in both wet and dry holdings. Among the material located in the dry Mollusca collection were syntypes of *Atlanta rangii* (d'Orbigny, 1836) and syntypes of *Atlanta leuseurii* (d'Orbigny, 1835), as well as other historically important material. Syntypes of *Limacina balea* Møller, 1841 which are recorded in the NHM database, were not found.

Access to the NHM Library facilitated consultation of original descriptions and relevant literature (e.g., from Gray, d'Orbigny, Monterosato), which were essential for interpreting type status.

Standardised Imaging. All *Limacina* type specimens were photographed in standardised apertural orientations (apertural, apical, umbilical) using focus-stacking microscopy. These high-resolution images constitute "digital twins" of the physical types and will be deposited in in the NHM public repository. Associated labels, cabinet information and archival notes were recorded to clarify provenance and historical use. These images were integrated into a larger geometric morphometric dataset including recently collected material, allowing comparison between type specimens and the range of morphological variation observed in extant populations.

Byne's Disease and Micro-CT Digital Recovery. A major outcome of the London visit was the condition assessment of the type material of *Atlanta rangii* and *Atlanta lesueurii*. Both showed extensive damage from Byne's disease, with crystalline efflorescence partially obscuring diagnostic shell characters. As this process can cause acidic, irreversible damage, mechanical cleaning posed a significant risk to these fragile aragonitic shells. To avoid further damage, the specimens were microCT scanned. Three-dimensional reconstruction and digital segmentation allowed the crystalline deposits to be virtually separated from the shell surface, revealing diagnostic features without altering the physical specimen. This resulted in both a permanent digital voucher of the type materal and a novel application of microCT as a conservation-safe alternative to treating specimens affected by Byne's disease.

Hooker's Antarctic Drawings. An unexpected and significant discovery occurred in the dry pteropod cabinet: historical illustrations that, based on handwriting and context, appear to have been produced by Joseph Dalton Hooker during Ross Antarctic Expedition (1839-1843) aboard HMS *Erebus*. This finding is relevant to the taxonomy of Antarctic *Limacina*, as *Limacina antarctica* was described by S.P. Woodward (1854) based on drawings from Hooker's material, without a designated holotype specimen. Later authors, including Pelseneer, referred to unpublished Hooker drawings when discussing Antarctic *Limacina*. These illustrations are therefore likely to represent original material associated with the description of this taxon and may be considered important historical reference material that had not been previously been traced. These drawings are also of broader historical interest and contribute to ongoing archival and digitisation initiatives associated with Hooker's correspondence and British natural history collections.

Museum work in Paris (MNHN)

The grant also supported a research visit to MNHN in Paris. Work there followed a similar approach. Additional type material expected to be present was not found, including types attributed to *Limacina bulimoides* collected by d'Orbigny, and material listed by Gray for *Limacina australis* (Eydoux & Souleyet, 1840). Similarly, type material of *Heterofusus retroversus* (Fleming, 1823), reportedly held at MNHN, was not found. These gaps provide direct evidence that certain historical types are either lost or were never formally designated, which is important for nomenclatural assessment.

The pteropod collections were reorganised in consultation with the curators so that all material is now consolidated in both wet and dry holdings. Access to the MNHN Library facilitated consultation and digitisation of rare literature not previously available online (e.g., Rang 1834 for *Cleodora balantium, now* accessible through WoRMS). A notable finding was the rediscovery of the body of the holotype of *Clio chaptali* (Gray 1850 = *Cleodora chaptali* Souleyet 1852) in the wet collection. The shell and soft body were reunited and properly recorded, improving the integrity of the type material.

Broader significance

Accurate species delimitation is essential for interpreting physiological tolerance, biogeographic structure, and environmental response in high-latitude marine systems. Clear species boundaries will make *Limacina* pteropods more reliable indicators of ocean change and provide robust baselines for ecological and evolutionary studies.

This work will be integrated into a revision of cold-water *Limacina* based on integrative taxonomy, with open access to images, morphometric datasets and sequences, and illustrated identification keys: Spagliardi, G., Bakker, H.P.A.J., Donnarumma, L., Orborn, J.K., Peijnenburg, K.T.C.A. Revision of cold-water *Limacina* (Gastropoda, Pteropoda). *Manuscript in preparation for Journal of Molluscan Studies.* Collection work clarified name-bearing types and, where justified, will support proposals of neotypes following ICZN regulations. Given the small size and fragility of these shells, high-resolution "digital twins" are especially valuable for global long-term accessibility.

Acknowledgements

I am sincerely grateful to the Malacological Society of London for supporting this work through the Early Career Research Grant. The award made it possible to visit the Natural History Museum and the Muséum national d'Histoire naturelle, which was crucial for the success of this project. I warmly thank Andreia Salvador at NHMUK and Nicolas Puillandre, Barbara Buge and Virginie Héros at MNHN for their generous assistance and support throughout my visits. The opportunity to work directly with these historical collections was not only scientifically important, but also personally meaningful and inspiring.

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Working in the MNHN collections. Examining historical *pteropod* material in the Mollusca collections at the Muséum national d'Histoire naturelle, Paris.

Imaging of type material at NHM. Example of type material of *Atlanta lesueurii* affected by Byne's disease (above) and microCT-based digital segmentation used to recover shell morphology without physical cleaning (below).

Exploring molluscan biodiversity of a protected pre-alpine landscape in Southern Bavaria (Germany)

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Natura 2000 is a network of nature conservation areas within the EU that serve to protect particularly important habitats and species to ensure the persistence of EU-wide biodiversity (European Environment Agency, 2023). These areas are called Flora-Fauna-Habitat areas (FFH areas) and are designated according to specific types of habitats and presence of certain species. Molluscs are good indicators for environmental changes and thus, monitoring of molluscan biodiversity is fundamental for conservation efforts. However, data about molluscan diversity in pre-alpine FFH areas are sparse even though they are important. Especially data on molluscs in higher altitudes (montane stage or higher) are sorely needed since they allow a clear view of the progression of climate change since they are especially threatened by it (Müller *et al*., 2010).

This project aims to fill the gap of absent data. Within an integrative approach combining traditional taxonomy and molecular barcoding, I conducted a qualitative biodiversity survey of the malacofauna in the pre-alpine protected FFH area Kesselberggebiet (Natura 2000 code 8334-373).

The Kesselberggebiet is an alpine landscape of the Limestone Alps and contains various habitats from herbaceous forests, subalpine and high alpine areas with characteristic krummholz, to lakeshores and moors. Molluscs were sampled at 17 different collection sites in the FFH area, including different habitat types such as gravel fields, moors, ponds, mixed forest, and at 6 additional sites at the shore of Lake Walchen and Lake Kochel. All collected specimens were first identified via morphology using traditional identification keys. Subsequent DNA extraction was done with the DNeasy Blood & Tissue kit from Qiagen according to the handbook. COI barcoding was based on the standard primers (Folmer *et al*., 1994). Molecular sequences that were retrieved (COI) were edited in Geneious Prime ® 2025.0.3, analyzed via BLAST ® (National Center for Biotechnology Information, 2025), and the results were compared with the morphological data. All samples will be deposited at the Bavarian State Collection of Zoology, Munich. Generated DNA barcodes will be uploaded to GenBank.

Overall, 137 samples were collected. In the traditional approach 46 morphospecies were recognized, of which 40 could be identified to species level belonging to 23 families. Of these, 10 are on the Red List of Bavarian Molluscs (Fig. 1) and 10 more are on the Early Warning List. Juveniles could only be identified to genus level. Species composition showed a high amount of forest dwellers like the family Clausiliidae, which was the most abundant family with 7 species found. Other forest dwellers included *Arianta arbustorum* (Linneaus, 1758), *Isognomostoma isognomostomos* (Schröter, 1784) or *Lehmannia marginata* (O.F. Müller, 1774). No FFH species or species endemic to alpine regions was collected.

Families in which species could easily be identified morphologically, often included well documented aperture differentiation, e.g. Clausiliidae, or the genus *Vertigo.* Other well-identifiable species were those that had distinct shell characteristics like *Acanthinula aculeata* (spines on shell) or *Gonyodiscus rotundatus* (checkerboard pattern). In some families, only one or two species can be found in Germany, thereby enabling easier identification, e.g. Helicodontidae with *Helicodonta obvoluta*, or Boettgerillidae with *Boettgerilla pallens*.

Taxa that could not be easily identified by morphological means included families in which species were variable in their identifying characteristics like the Arionidae and Limacidae. In these families, there is a great intraspecific variability in body color (Wiese, 2024). For some families the identifying characteristics are not variable intraspecifically, but are hard to identify without practice, e.g. in the genus *Pisidium* (differences of locking marks) or in Planorbidae (width of whorls). Some families could not be identified by external characteristics at all and would need to be determined by internal characteristics like the reproductive system in Succineidae, or the species of the genus *Lehmannia* (Wiese, 2024). Most samples that could not be identified morphologically were juveniles which were missing identifying features like size, coloration, or aperture characteristics.

Of 117 samples processed, 101 samples yielded a COI sequence which I deemed usable for a BLAST search. Molecular barcoding resulted in 49 IDs matching their morphological identification, 31 cases in which the BLAST search gave a more detailed identification, and 20 cases in which the BLAST search revealed incongruencies with the morphological ID. Approximately 10 of those sequences were contaminated with *Arianta arbustorum*.

My project shows that an integrative approach for species identification of the malacofauna in the FFH area Kesselberggebiet is indispensable. Traditional taxonomy reaches its limits in identifying terrestrial slugs (Arionidae and Limacidae) due to high intraspecific variability, and due to missing identifying traits in juveniles. By contrast, DNA barcoding of the Bavarian Malacofauna is complicated by incomplete or misidentified reference datasets on Genbank.

This project represents the first attempt to comprehensively record the malacofauna in the FFH area Kesselberggebiet. As such, there are still many ways in which knowledge about its biodiversity could be supplemented. Future analyses in this area should use a denser sampling grid, or lay focus on sampling in the yet missing FFH habitat types. Furthermore, only lower elevations, which belong to the colline (hill) level, were searched due to time constraints. None of the sampling locations are located higher than 1013 meters. For further work in this area the assessment of the molluscan biodiversity in higher altitudes is imperative.

Acknowledgments

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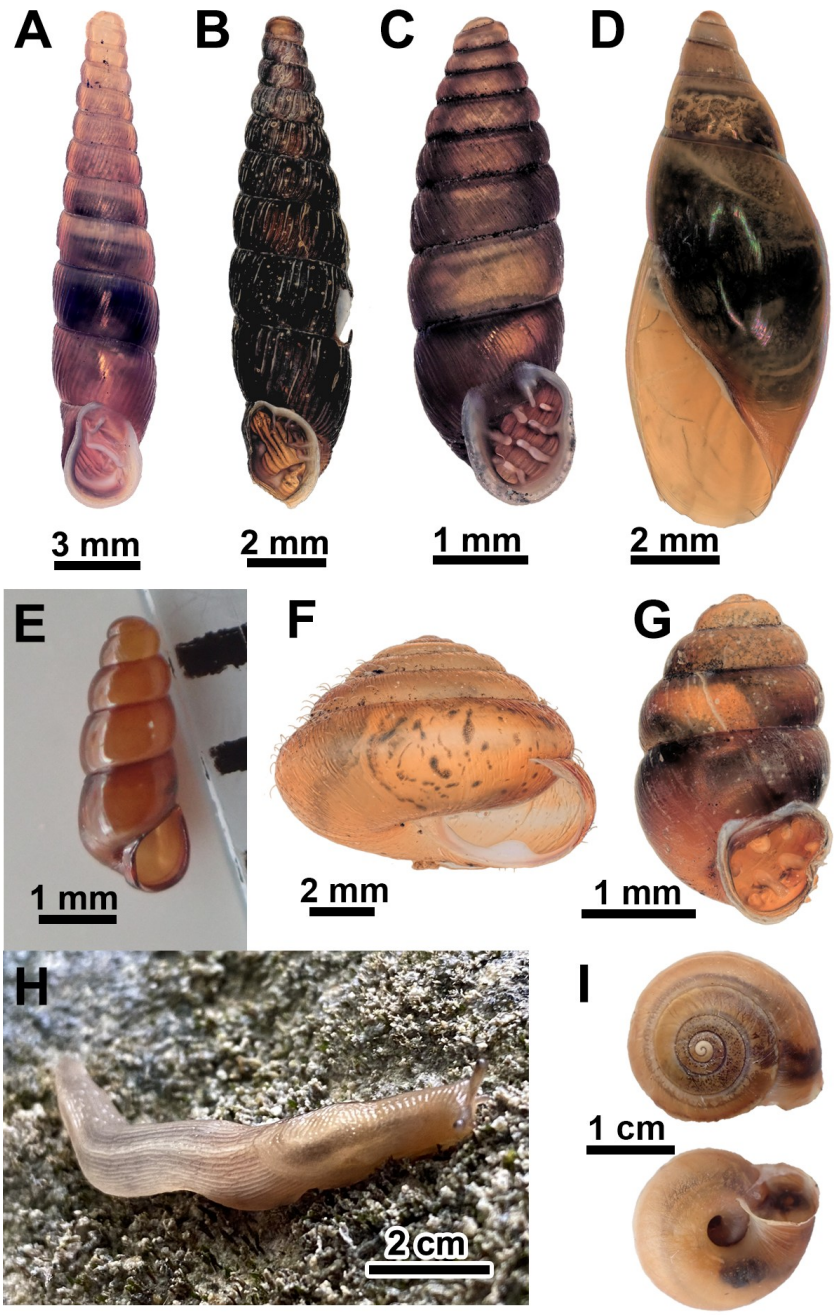

Fig. 1. Nine of the ten molluscs found in the Kesselberggebiet that are on the Red List of Bavarian Molluscs. A *Cochlodina orthostoma*. B *Clausilia cruciata*. C *Abida secale*. D *Aplexa hypnorum*. E *Platyla polita*. F *Petasina unidentata*. G *Vertigo antivertigo*. H *Lehmannia marginata*. I *Urticicola umbrosus*.

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Senior research grant reports

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Aquatic shelled molluscs of Tioman Island, Peninsular Malaysia

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Tioman Island, is more than 12,000 hectares large and is the largest island off the east coast of Peninsular Malaysia. The island was first gazetted as a wildlife reserve in 1972, and later as a marine park (with eight surrounding islands) in 1985 (Abdul, 1999; Department of Marine Parks Malaysia, 2013). The island was sparsely inhabited in the past, with populations concentrated around coastal areas but by the mid-20th century, much of these habitats had been largely cleared (except for mangroves colonising brackish areas around two villages) (Bullock & Medway, 1966). Today, the inland areas are largely forested (albeit some are secondary vegetation), while human settlements remain mostly confined to coastal areas in villages (kampung) (Fig. 1), with some parts continually being developed for tourism (Phang *et al*., 2008; Hyde, 2023).

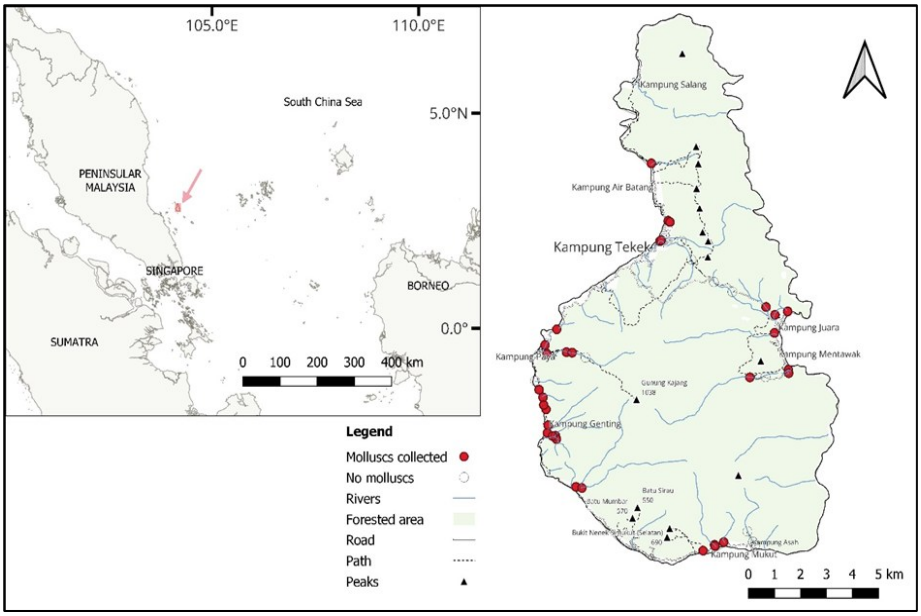

Figure 1. Inset: Location of Tioman Island, off the coast of Peninsular Malaysia, within Southeast Asia; highlighted. Main map: Survey sites on Tioman Island in 2025. Filled circles indicate localities where molluscs were collected while empty circles indicate localities where no molluscs were found. Main peaks on the island are indicated with their elevations indicated in meters.

The island has freshwater streams that are usually permanent only at altitudes of approximately 600 m and below (Yeo *et al*., 1999). Various aquatic fauna have been documented and new species described, particularly for freshwater fish, decapod crustaceans and aquatic insects (e.g., Alfred, 1966; Ng *et al*., 1999; Yang *et al*., 1999; Yeo *et al*., 1999). However, other than brief mentions of marine shells in the coral reef and an unidentified freshwater nerite by Lee *et al*. (1977), and records of giant clams (Tan *et al*., 1998; Phang *et al*. 2008), there have been no other published works on the malacofauna of Tioman. Funding from the Malacological Society of London allowed for an inventory of shelled aquatic molluscs of Tioman Island; baseline data were collected on the molluscan composition across the estuarine-freshwater transition zones. These data would be vital for research and conservation management of the malacofauna of the island.

Aquatic habitats from the mangrove to the freshwater stretches of river systems on Tioman Island were surveyed in April and July 2025 (Figs. 1, 2). All shelled molluscs were collected by hand or using forceps. Environmental variables at each site were recorded using a hand-held multiparameter meter. Voucher specimens were preserved in 70% ethanol on site. Molluscs were collected from brackish habitats to freshwater stretches (defined as lower graded and cascade zones by Alfred, 1966). Besides a few larger rivers that meandered near the coast, e.g., around the village areas of Paya, Tekek, Mentawak and Juara, many of the freshwater streams were short, ephemeral, often flowing into the sea at steep drop offs or disappearing under large boulders inland (Fig. 2C). Access to some river systems beyond the village areas necessitated expensive boat access, which was in turn limited the survey periods because such rivers could only be accessed during high tides.

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While there was a larger diversity of species in the brackish areas of the rivers, from the transition zone into the freshwater stretches of rivers, nerites were the dominant molluscan taxa. Identification of the species collected is currently ongoing at the Universiti Malaysia Sabah. The specimens will be deposited in the BORNEENSIS Collection, Institute for Tropical Biology and Conservation, Universiti Malaysia Sabah and the South China Sea Repository and Reference Centre, Institute of Oceanography and Environment, Universiti Malaysia Terengganu. In accordance with permit requirements, voucher material will also be deposited in the collections of the Pahang Biodiversity Council, the Department of Wildlife and National Parks Peninsular Malaysia and the Department of Fisheries Malaysia.

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Figure 2. Survey of aquatic shelled molluscs at Tioman Island, Malaysia. A: collection of specimens at a brackish habitat;

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Mineral coatings on gastropods at hydrothermal vent sites: implications for fossilization processes

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Hydrothermal vents are extreme environments where hot, acidic fluid is ejected onto seafloor, usually at great depths. These conditions would seem to be inimical to the preservation of organisms, and yet there is fossil record of hydrothermal vent animals that stretches back hundreds of millions of years, and includes tube worms, brachiopods, gastropods, and bivalves (Georgieva *et al*., 2021). In part this record can be explained because vent sites are also places where rapid mineralization occurs, which can lead to exceptional preservation. Indeed, seafloor experiments at hydrothermal vents have shown that mineralization of mollusc shells and worm tubes can take place in under a year (Georgieva *et al*., 2015). This mineralization is by sulphides, particularly pyrite. However, the details of the early stages of this mineralization process are largely unknown, and yet crucial to understanding the preservation of animals at vents, and thus the biases present in the fossil record of vent communities. Over the past few decades, sampling of live gastropods from active hydrothermal vent sites worldwide has revealed that many specimens have shells that are coated by variable thicknesses of reddish or black minerals. These coatings have not been studied, but rather are removed by taxonomists as they obscure shell morphological details. Nevertheless, the mineral coatings are of scientific interest because they probably represent the first stages of a taphonomic (or preservational) pathway to eventual fossilization, with replacement of the original carbonate shell by more recalcitrant oxide or sulphide minerals.

The aim of the project was to investigate mineral coatings on the shells of a variety of living hydrothermal vent gastropods to understand the processes by which carbonate shells can be replaced by more recalcitrant oxide and/or sulphide minerals and thus become preserved in the fossil record. We investigated the mineral coatings of six gastropod specimens (one each of the species *Lepetodrilus nux*, *Cantrainea jamsteci*, *Desbruyeresia armata*, *Desbruyeresia marisindica*, and two specimens of *Alviniconcha marisindica* from separate vent sites) from four different vent localities (Iheya North vent field,

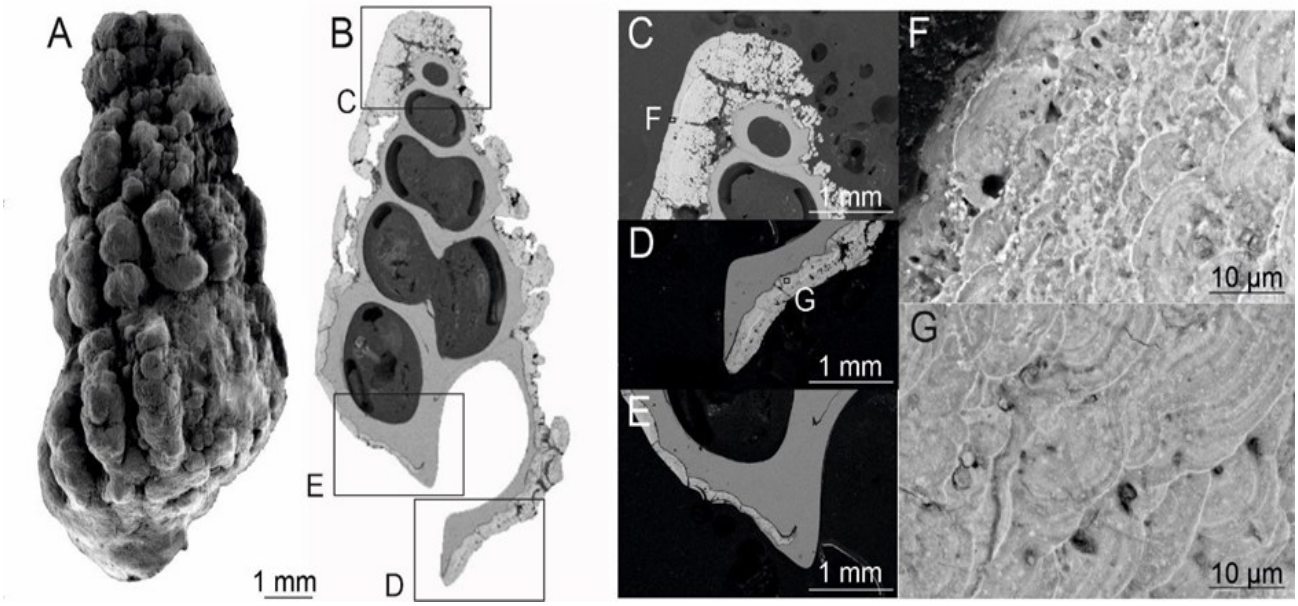

Figure 1. ***Desbruyeresia armata*****, ZPAL Ga.22/3, Myojin-sho Caldera, Izu-Ogasawara Arc, Pacific Ocean; (a) SEM surface view (b) SEM BSE view of the cross-section. Lettered insets in (b) correspond to images (c), (e), and (f). Lettered inset in (c) corresponds to image (f) and lettered inset in (d) corresponds to image (g). The coating on this specimen consists largely of amorphous Mn and Fe oxides. The distinctive colloform texture is frequently observed in hydrogenetic ferromanganese crusts, suggesting a strong hydrogenetic component. The texture with elongated depressions may also have a microbial component, as Fe and Mn oxides often form through microbial processes.**

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Okinawa Trough and Myojin-sho Caldera, Izu-Ogasawara Arc in the Pacific Ocean, and Kairei and Edmond vent fields on the Central Indian Ridge). These specimens were collected during cruises KY14-01, NT11-10 Leg 1, and YK16-E02 and donated for the study by Chong Chen. The gastropod shells were first imaged by SEM with energy dispersive X-ray spectrometry (EDS), then set into resin blocks, cut in cross-section, polished and analysed again with SEM/EDS. This work was done as a Masters study by Agata Bonk at the Institute of Paleobiology, Warsaw, together with Krzysztof Hryniewicz and Paweł Bącal. Subsequently the polished blocks were analysed using Raman spectroscopy at the Institute for Mineralogy, University of Bremen by Daniel Smrzka. The results were somewhat unexpected as a greater range of minerals was found coating the gastropod shells than was first thought based on visual inspection, including, in various amounts, anhydrite, pyrite, chalcopyrite, sphalerite, galena, barite, manganese oxides, iron oxides, silica and iron silicates. Less surprising was that the chemical composition of the mineral coatings on the gastropod shells corresponds with the chemistry of vent fluids at the respective localities and distance from active venting. There was no evidence of mineral replacement of any of the studied shells. In one specimen the coating was partly overgrown by the shell, showing a contemporary growth of the shell and the coating. The texture of the coating on the *Desbruyeresia armata* specimen suggests a possible role of microorganisms in its formation (Figure 1). Gastropod fossils from ancient vent sites are preserved by pyrite, with no remaining carbonate shell. We found pyrite only in coatings of the modern gastropods collected near high-temperature vent sites, indicating that close proximity to active venting may be necessary for successful preservation of vent gastropods in the fossil record. The full results are reported in Bonk *et al*. (2025).

Key references

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Travel award reports

Travel financially supported by the Malacological Society of London

XXII World Congress of Malacology, São Paulo, Brazil

Abril Luján Soria

Supervisory Team: Pablo Rafael Martin[1,2] and Silvana Burela[1,2]
[1]Universidad Nacional del Sur (UNS) (Bahía Blanca, Argentina)
[2]Institute of Biological and Biomedical Sciences of the South (INBIOSUR) (UNS-CONICET) (Bahía Blanca, Argentina).
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In August 2025, I had the privilege of attending to the XXII World Congress of Malacology (São Paulo, Brazil), thanks to the travel grant generously awarded by the Malacological Society of London. At this congress, I presented two contributions derived from my doctoral research, conducted at the Universidad Nacional del Sur (UNS) under a doctoral fellowship granted by the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), entitled "*Current status, threats, and conservation strategies of an endemic gastropod from the Iguazú and Alto Paraná rivers*."

The focal species of my thesis is *Pomacea americanista*, a freshwater apple snail endemic to the Iguazú and Alto Paraná river basins, located in northeastern Argentina and extending into neighboring regions of Paraguay and Brazil. Within Argentina, one of its key habitats is Iguazú National Park (INP), a UNESCO World Heritage Site. A distinctive feature of this species, like other species of the genus *Pomacea*, is its reproductive strategy: females deposit calcareous egg masses above the waterline, on emergent substrates such as rocks and vegetation. While this adaptation protects the eggs from aquatic predators, it also makes them vulnerable to fluctuations in river levels. Artificial hydrological alterations caused by upstream hydroelectric dams may therefore compromise the survival of these aerial clutches, as seen in *P. canaliculata* and *P. paludosa*, where such changes can slow or halt embryonic development, and in some cases completely stop it. *P. americanista* remains poorly studied and appears to be undergoing a contraction of its historical distribution range. The objectives of my doctoral project are to conduct ecological studies on this species, to identify and assess the threats it faces, and to propose effective conservation strategies.

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One of my presentations was delivered as an oral contribution in the symposium on Ecology and Conservation, under the title "*First results of field monitoring of oviposition patterns in the Iguazú snail (Pomacea americanista) at Iguazú National Park (Argentina)*." This study was based on monitoring 101 egg masses of *P. americanista* in the Iguazú National Park over a 15-day period, during which the developmental status of egg masses (freshly laid, advanced development, beginning to hatch, fully hatched) was recorded. Nearly all egg masses documented at the start of the study hatched during the monitoring period, with an average incubation time of 11.55 days. The mean egg mass length was 4.76 cm (± 1.95 cm). Additionally, I conducted a substrate preference analysis comparing basaltic rock, herbaceous vegetation, woody vegetation, and artificial substrates. The results revealed a marked preference for woody substrates, despite their lower availability compared to the abundant basaltic rock in the INP.

My second presentation was in poster format, entitled *"Artificial hydrological patterns and their impact on egg masses of the Iguazú snail (Pomacea americanista) in Iguazú National Park (Argentina)."* This study focused on the effects of artificial water-level fluctuations, caused by upstream hydroelectric dams, on egg masses. Using hourly water level data provided by the Argentine Naval Prefecture, I applied Loess decomposition to detect hydrological patterns. The Iguazú River near Puerto Iguazú showed a recurrent weekly cycle, with maximum levels typically on Thursdays and Fridays and minimum levels on Mondays, with an average amplitude of 1.42 ± 0.21 m. This pattern supports a previously proposed hypothesis suggesting that weekly water-level fluctuations result from increased hydroelectric activity during weekdays due to labor demand, followed by reduced activity on weekends, causing the minimum levels to occur on Mondays with a slight delay. Considering that egg masses are deposited 7.3– 51.5 cm above water level (mean: 22.94 ± 12 cm), it was estimated that only 27% of egg masses laid during a given week would remain unsubmerged. Field monitoring of egg masses confirmed this impact, with eight egg masses becoming partially or completely submerged during the study period.

Beyond my own presentations, I attended several highly enriching symposia, including "*Citizen Science and Mollusks: Bridging Communities and Research," "Diversity, Equity and Inclusion in Malacology," "Perspectives on Conservation of Freshwater Mussels," and "Genetics and Genomics in Malacology,*" among others. These sessions provided valuable perspectives and fostered stimulating discussions that have greatly contributed to my professional development.

Equally importantly, the Congress offered opportunities to establish meaningful professional connections, particularly with specialists working with malacological collections in museums. Thanks to this trip, I also had the opportunity to visit the Zoology Museum of the University of São Paulo, where I examined a total of 65 ampullariid lots from the genera *Pomacea*, *Marisa*, *Asolene*, and *Felipponea*. There, I was warmly received by Dr. Luiz Simone, Curator of Mollusca, who provided me access to the lots and was readily available to assist with my research needs. This is a crucial aspect for my doctoral research, as a key component of conserving *Pomacea americanista* is the verification and analysis of its historical records throughout Argentina and neighboring countries such as Uruguay, Paraguay, and Brazil. The collaborations initiated during this congress will be essential in advancing my work.

I am deeply grateful to the Malacological Society of London for supporting my participation through the Travel Grant, which allowed me to share my research, engage with the international malacological community, and build networks that will strengthen both my doctoral project and my future career in conservation biology.

The Cephalopod International Advisory Council Conference 2025, Okinawa, Japan

Renato Dantas

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Email: renato.biomar@gmail.com

From October 25th until November 1st, I had the opportunity to attend to the Cephalopod International Advisory Council (CIAC) Conference 2025, held at the Okinawa Institute of Science and Technology Graduate University (OIST), in Onna, Okinawa, Japan. As a visiting PhD candidate from Brazil who had just arrived in Spain for a short academic stay, this trip was only possible thanks to the travel grant from The Malacological Society of London.

It was such an amazing event and a unique occasion to do networking with other cephalopod researchers from around the world. The conference had 295 attendees from 32 nations, with 5 keynote speakers, more than 80 oral and 180 poster presentations.

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I was able to participate in the pre-conference workshop on *"Cephalopod fisheries management, underlying triggers and assumptions for data-limited stock"*, which allowed many researchers to share their data and impressions from different contexts. Moreover, we did an interesting exercise trying to identify key sustainability indicators for octopus, cuttlefish and squid fisheries.

On the first day of conference, I presented the work entitled "*Arraial do Cabo, a center of cephalopod aggregation and mixing in southeastern Brazilian coast"* to the audience and, on the second day, during the poster session, I presented some results of two other chapters of my thesis regarding the population ecology of octopus and squid targeted by artisanal fishing. Overall, my work was well received, and I was able to exchange interesting ideas with other experts on the subject, as well as colleagues who are at the same academic stage as me.

Something very special about this conference was the large participation of students, which allowed for better integration of researchers from younger generations, paving the way for future partnerships. Obviously, the participation of leading figures in the field of cephalopod studies was also extremely important in generating productive discussions and guiding the event as whole.

Finally, getting to know some of the beautiful landscapes and rich culture of Okinawa was also a highlight of this conference, which certainly created the perfect environment to share science and strengthen ties between researchers from such different worlds.

Figure 1 - Participants of the pre-conference workshop on *"Cephalopod fisheries management, underlying triggers and assumptions for data-limited stock".*

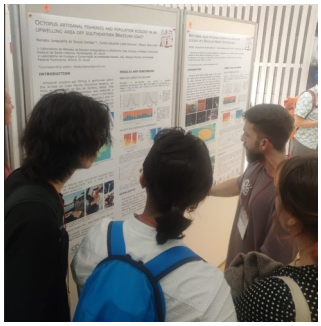

Figure 3 - Poster presentations entitled *"Octopus artisanal fisheries and population ecology in an upwelling area off southeastern Brazilian coast*" and *"Nocturnal squid artisanal fisheries and population ecology in a Brazilian Marine Protected Area"* (photos by Tatiana

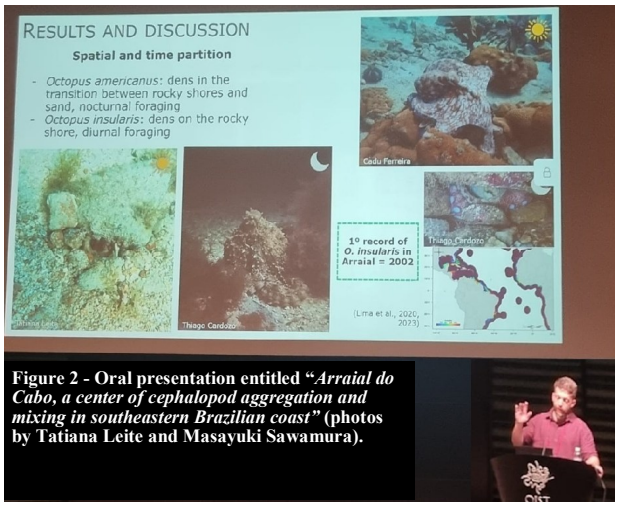

Figure 2 - Oral presentation entitled *"Arraial do Cabo, a center of cephalopod aggregation and mixing in southeastern Brazilian coast"* (photos by Tatiana Leite and Masayuki Sawamura).

Figure 4 - Cephalopod International Advisory Council Conference 2025 official photo (by Masayuki Sawamura).

Membership Notices

THE MALACOLOGICAL SOCIETY OF LONDON

Registered Charity No. 275980

Hon. Secretary - Dr Philip Hollyman

NOTICE OF ANNUAL GENERAL MEETING

The 2026 AGM will take place in person and on-line on 7th April 2026 at 1300h during a meeting of the British Society for Parasitology in Glasgow. Nominations for Council of the Society are presented below. For further details about joining the AGM, please contact the President of the Society, Dr Fiona Allan f.allan@nhm.ac.uk

Administrative year	2024-2025	2025-2026	2026-2027
Years since foundation	131	132	133
President	Fiona Allan (1)	Fiona Allan (2)	Fiona Allan (3)
Vice Presidents	Phillip Hollyman (3)	Victoria Sleight (1)	Victoria Sleight (2)
	Aidan Emery (1)	Aidan Emery (2)	Aidan Emery (3)
Ex officio	Jon Ablett (1)		
Councillors (6)	Rowan Whittle (3)	Katrin Linse (1)	Katrin Linse (2)
	John Grahame (3)		Phil Fenburg (3)
	Phil Fenburg (1)	Phil Fenburg (2)	Crispin Little (3)
	Crispin Little (1)	Crispin Little (2)	Katie Collins (3)
	Katie Collins (1)	Katie Collins (2)	James Witts (3)
	James Witts (1)	James Witts (2)	Lauren Sumner-Rooney (1)
EC-Rep	Giada Spagliardi (1)	Giada Spagliardi (2)	Giada Spagliardi (3)
Co-opted (4)	Victoria Sleight (1)	Lauren Sumner-Rooney (2)	Rowan Whittle (2)
	Katrin Linse (1)	John Grahame (1)	Jon Ablett (2)
	Lauren Sumner-Rooney (1)	Rowan Whittle (1)	
		Jon Ablett (1)	
Journal Editor	Dinazarde Raheem	Dinazarde Raheem	Dinazarde Raheem
Bulletin Editor	Georges Dussart	Georges Dussart	Georges Dussart
Hon.Treasurer	Tom White (1)	Tom White (2)	Tom White (3)
Membership Secretary	Harriet Wood	Harriet Wood	Harriet Wood
Hon. Secretary	TBC	Philip Hollyman	Philip Hollyman
Social media managers	John Grahame (web)/ Victoria Sleight (Facebook)	John Grahame (web)/ Victoria Sleight (Facebook)	John Grahame (web)/ Victoria Sleight (Facebook)
Awards Officer	Alan Hodgson (1)	Alan Hodgson (2)	Alan Hodgson (3)
Archivist	Andreia Salvador	Andreia Salvador	Andreia Salvador

(Numbers in brackets indicate years in office)

Grants and Awards

Research Grants

The Research Grants scheme was established to commemorate The Society's Centenary in 1993. Under this scheme The Society currently anticipates awarding at least five Early Career Research Grants per year, and up to five Senior Research Grants per year, each with a value of up to **£1,800**, 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 for monies should reflect the research that is proposed.

You are urged to read the **Terms & Conditions** for Research Grants before making an application for an award.

Early Career Research Grants are conferred on students, postdoctoral researchers and researchers without professional positions, but without regard to nationality or membership of the Society. Senior Research Awards are aimed at established researchers in professional positions, but without regard to nationality. These awards are also open to researchers who have retired from such positions but are still active in research. Postdoctoral fellows/researchers should apply for an Early Career grant. Applicants for Senior Research Awards must be members of The Society.

Preference for both award types is given to discrete research projects that fall within the subject areas covered by The Society's journal, *Journal of Molluscan Studies*. Applicants should bear in mind these criteria when submitting an application. In addition applications will be assessed in terms of scientific merit, significance and justification of budget requested, and the degree to which the proposed research will benefit the scientific aspirations of the applicant.

Applications for **Early Career Research Grants** open in September and close on **December 15th** in the year that precedes the year of the award. The closing date for the **Senior Research Grant** scheme is **15th June**. Applications should be made by email sent to MSL_awards@nhm.ac.uk. Please include your surname and the award proposed in the subject line of the email. Applicants will be notified of the outcome of their application after the subsequent Annual General Meeting. The Society's preferred method of payment is PayPal.

Early Career Research Grants will be reviewed by MSL council members and Senior Research Grants will be reviewed by a Reviewers Panel including both council and non-council members invited for that purpose.

Application forms can be downloaded from the MLS website at
https://malacsoc.org.uk/awards-and-grants/research-grants/

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. The award is to support attendance at 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.

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, The deadlines are **1st March,** for travel scheduled between 1st June and 30th November, and **1st September** for travel scheduled between 1st December and 31st May.

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 December**. 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,
Professor Alan Hodgson MSL_awards@nhm.ac.uk,

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

Financial Support for Malacological Meetings, Symposia and Workshops

The Malacological Society of London (MSL) welcomes applications for grants up to £2000 from the organisers of scientific meetings or symposia, workshops and short courses that lie within its charitable purpose: to promote education and research in malacology. There are no specific deadline dates for applications, but **an application must be received at least 6 months in advance of the event** so that the Council of the society has time consider the application (Council only meets 3 times a year).

Applications should be emailed to the Honorary Awards Secretary at MSL_awards@nhm.ac.uk, with "Symposium support" or "Workshop support" in the subject title.

There is no application form and applications should not exceed two sides of A4 (minimum font of 11 pt). Applicants should provide the following information:-

- Title of meeting/symposium/workshop/short course.
- Date and Place proposed.
- Name, position, and affiliation of the organiser(s).
- Whether the event is stand-alone or part of a larger event.
- Brief description (not more than 200 words) of the rationale behind the meeting/symposium/workshop/short course.
- Anticipated number of attendees.
- Amount requested.
- Other sources of funding applied for – applications must detail how the remaining costs of the event will be funded.
- Specific use to which requested funds will be put – applications must include the detailed planned allocation of funds.
- Information on previous funding received from the MSL by the organiser(s).
- If you have applied for, or received, other support for the meeting/symposium/workshop/short course, list the source of the funds and give the amount secured or requested.

NOTE

Normally, funding from the same organiser(s) or society will only be considered once every 3 years.

Funding may be used for one or more of the following: the cost of venue hire & facilities; travel or registration costs of invited speakers, students and Early Career Researchers (ECRs). However, the MSL may prioritise applications that support students and ECRs (e.g., for conference attendance, speaking, or training) above other meeting/workshop organisational aspects. Costs not supported include the purchase of refreshments and organiser travel and accommodation costs.

If funds are requested to support keynote speakers, then full details of their names, affiliations and titles of presentations must be included. Note that the MSL will not typically award funding to support the attendance of a single keynote speaker, particularly where this requires long-haul, high-cost flights. This is due to value-for-money, ensuring the MSL can support as many people as possible, and the inherent environmental impact.

Any monies granted must be used for the purposes specified in the application. Should circumstances change and the monies cannot be used then it is expected that all unspent amount is returned to the MSL.

Applications will be strengthened if there is the potential for possible publication (or publications) in malacology resulting from conference/symposium presentations or workshop output.

If the application is successful, support of the MSL should be acknowledged, preferably including reproduction of the society's logo, in the meeting/workshop/short course literature and other media. In addition, the organiser(s) should also provide an article suitable for publication in the society's newsletter (*The Malacologist*) after the event.

Malacological Society of London – Subscription and Membership

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 website is at:
http://www.malacsoc.org.uk

Publications

The Society has a continuous record of publishing important scientific papers on molluscs in the *Proceedings*, which evolved with Volume 42 into the *Journal of Molluscan Studies*. The *Journal* is published in annual volumes consisting of four parts which are available on -line by members and student members. The Society no longer produces paper copies of the Journal. Members also receive access to *The Malacologist*, which is the bulletin of the Society, issued twice a year, in February and August. *The Malacologist* is published online on the website of the Society.

Meetings and articles

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

Subscriptions

Ordinary membership subscriptions are valid from 1st January for a single calendar year.
Membership fee structure
Ordinary Members: Journal on-line only £50
Student Members: Journal on-line only £29

Methods of Payment

New Members:
To join the Society for the first time please fill in the Membership Form on the MSL website and make your payment using a Credit or Debit Card (Mastercard, Visa, American Express):
https://malacsoc.org.uk/membership-form/

Existing Members:
If you already have an account on the MSL website please login to renew your membership and make your payment using a Credit or Debit Card Mastercard, Visa, American Express).

There is now also an option to pay by subscription.

OR

If you have already set up a standing order you may continue to pay in this way. We do not encourage members who have a MSL account on the website, or any new members, to set up a standing order.

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

For any membership queries please contact the Membership Secretary: membership@malacsoc.org.uk

Broadening Access Membership Scheme

This initiative helps support postgraduate students from countries listed as developing economies in their malacological studies.
Each year, we offer to **10 postgraduate students free membership** to *The Malacological Society of London* for a period of 3 years under the new Broadening Access Membership Scheme (BAMS). Students who are studying a postgraduate malacology-related course in countries designated 'developing economies' are invited to apply for this award with the support of their supervisor. Applications open each autumn and will close when all 10 memberships have been allocated.

Successful candidates benefit from:

- online access to entire archive of *Journal of Molluscan Studies* (back to 1893)
- electronic delivery of Society's bulletin, *The Malacologist*
- access to a higher rate of travel grant
- regular communication from MSL about the Society's themed meetings and the annual Molluscan Forum

Application procedure:
To find out more about the scheme, who is eligible and how to apply, please go to the following page on our website: https://malacsoc.org.uk/developing-economies-membership-scheme