MAIISG NEWSLETTER

Number 8, August 2022

MAIISG
IUCN SSC
Mid-Atlantic Islands
Invertebrates Specialist Group
www.maiisg.com

HI MAIISG MEMBERS

We share with you the second newsletter of 2022.

In this issue, Vicky Wilkins brings us news about the restoration and protection of the cloud forests of St. Helena (UK) and its impact on the island invertebrate endemics. In addition, Vicky shares news about the re-exploration of the endemic subterranean fauna at Ascension Island (UK), its methods and challenges.

In this number, we dedicate special attention to the work presented by group members at the World Congress of Malacology, which took place in Munich in August.

Martina Panisi talked about the discovery and preservation of the endemic-rich malacofauna of the Gulf of Guinea oceanic islands (central Africa). Next, Marco Neiber spoke about the origin, radiation and diversification of *Hemicycla* land snails in the Canary Islands, while Klaus Groh talked about the Pomatiidae of the Central Canary Islands. Finally, Dinarte Teixeira spoke about the conservation of the land snails in Oceanic islands.

We hope you enjoy this second newsletter edition of 2022.

Vicky, Paulo and Dinarte

SAMPLING SUBTERRANEAN FAUNA ON ASCENSION ISLAND

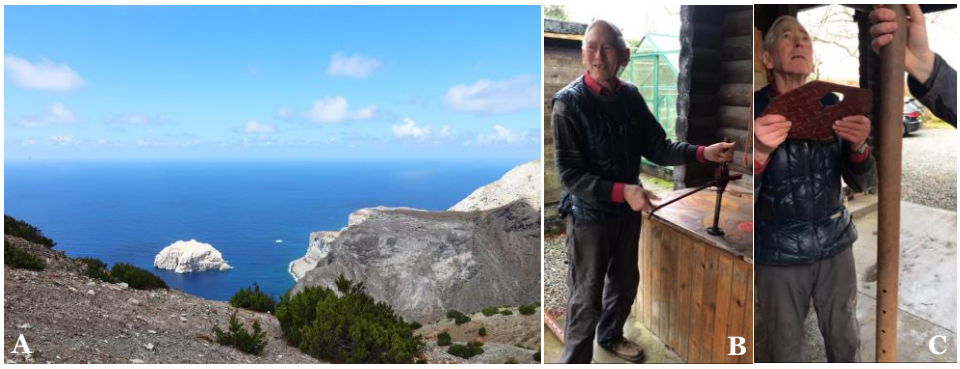
By Vicky Wilkins

Ascension Island is a very young volcanic island that is extremely isolated, as a result an important component of the island's invertebrate fauna is adapted to life in a barren volcanic terrain, including troglomorphic species that live in underground tephra as well as in caves.

The sampling of underground habitats on Ascension is challenging and was first explored by Philip and Myrtle Ashmoles in 1990s. They invented a 2m long steel pipe trap with a 48mm diameter, with four equally spaced lines of 9mm holes, 50mm apart starting from 20cm above a pointed tip at the bottom end and finishing halfway above the pipe – with a metal cap on the top. The pipes are to be driven vertically into the ground using a sledgehammer. Three baited plastic vials (using strong smelling baits) are placed into the pipe, on a metal ladder-like strip. Invertebrates then entered the pipes through the holes and either fell or were attracted to the vials. The pipes were eventually removed (after days/weeks) using a small car jack. These pipe traps were successful in collecting a range of Pseudoscorpiones, Collembola, Psocoptera, Coleoptera and Phoridae (Diptera).

The recent project on Ascension Island wanted to re-explore the subterranean fauna, but despite extensive research a better sampling method could not be found and so 3 of the original pipe traps were located as still with the Ashmoles in the UK.

Working with the Ashmoles and Ascension Island Government, the Species Recovery Trust parcelled up the pipe traps, which were amazingly still in full working order and shipped them from Scotland to Ascension Island earlier this year, arriving in June. The Ascension Island Invertebrate Project Officer Dr Adam Sharp is now using the traps to resurrect this innovative sampling method to explore the island's unique and important subterranean invertebrate fauna.

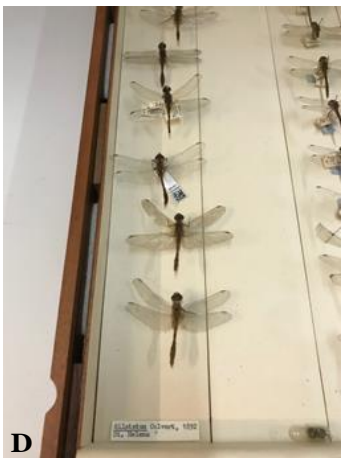


'Invertebrates are an essential component of the project, with large-scale monitoring surveys being undertaken by St Helena National Trust's Invertebrate Specialist.'

MUSEUM SPECIMENS AND REFERENCE COLLECTIONS SUPPORTING THE CONSERVATION OF ST HELENA'S CLOUD FOREST ENDEMICS

By Vicky Wilkins

There is a project currently running on St Helena focused on the Cloud Forests of the island and funded by the Foreign and Commonwealth Development Office. This large partnership project between on-island together with international partners is restoring and protecting the cloud forests where a prominent amount of the island invertebrate endemism is found.



Invertebrates are an essential component of the project, with large-scale monitoring surveys being undertaken by St Helena National Trust's Invertebrate Specialist.

As well as collecting new data, the project recognises the importance of mobilising existing knowledge and information to develop baseline information and tools to support invertebrate conservation in the cloud forest long-term.

As a result, the project is currently collating and adding to the UK's Natural History Museum specimen collection for the island and genome skimming cloud forest specimens to provide DNA profiles for endemic invertebrate species. These same specimens are having taxonomic work done on them when necessary and are being used to develop a series of easy-to-use keys for important endemic groups, including Hemiptera and Arachnids.

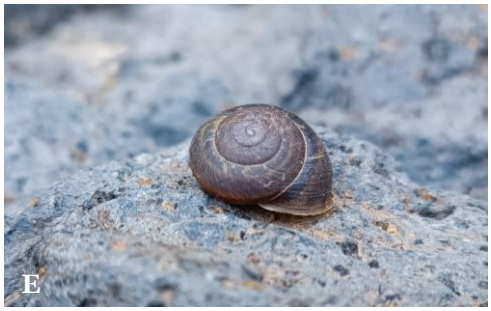
Moreover, they are looking at developing and maintaining skills to curate the on-island reference collection. This will allow conservationists and others working in the cloud forest to be able to understand endemic species conservation needs, as well as better be able to identify species to understand restoration and conservation efforts during future projects.

It is essential to integrate existing reference collections into projects to ensure that these critical resources that sit behind practical conservation work are maintained and so they can provide a long-lasting evidence base.

'Invertebrates are an essential component of the project, with large-scale monitoring surveys being undertaken by St Helena National Trust's Invertebrate Specialist.'

HOW MANY GOODLY CREATURES ARE THERE HERE! ORIGIN, RADIATION AND DIVERSIFICATION OF HEMICYCLA LAND SNAILS IN THE CANARY ISLANDS (GASTROPODA: STYLOMMATOPHORA: HELICIDAE)

By Marco Neiber and collaborators



The genus *Hemicycla* represents with over 40 (sub-)species the second largest radiation of land snails in the Canary Islands. In a first step, we carried out phylogenetic analyses and palaeogeography-informed time-stratified ancestral range estimation based on mitochondrial and nuclear sequence data to confirm the monophyly and to elucidate the biogeographic history of the tribe Allognathini (Helicidae). The six genera in Allognathini (*Cepaea*, *Iberus*, *Allognathus*, *Hemicycla*, *Idiomela* and *Lampadia*) originated in Western to South-western Europe according to our ancestral area estimation. The disjunct distribution of the Balearic Islands (*Allognathus*) and Macaronesian (*Hemicycla* + *Idiomela* + *Lampadia*) sister clades and the mainly Iberian Iberus clade can be explained by the separation of the Betic-Rif System from the Iberian Peninsula during the late Oligocene to early Miocene, along with independent Miocene dispersals to the Balearic Islands and Macaronesia from the Iberian Peninsula, where the ancestral lineage leading to the Macaronesian–Balearic clade became extinct.

Preliminary analyses of mitochondrial sequences data of nearly all extant *Hemicycla* species suggest a complex pattern of inter-island colonisations and intra-island diversification but reveal also cases where morphology-based classifications are in conflict with the mitochondrial phylogeny. In a first case study, we investigated the case of *Hemicycla mascaensis* and H. *diegoi*, two short-range endemic taxa that occur allopatrically in western Tenerife, and which were not recovered as two reciprocally monophyletic clades in the mitochondrial tree. Using multilocus AFLP and double-digest restriction site-associated sequencing data, as well as data on distribution and morphology in an integrative approach, we assessed the status of these two taxa. Our analyses suggest that although multilocus data support the monophyly of the two taxa, species delimitation methods tend to recognise all investigated populations as distinct species, albeit neither lending unambiguous support to any of the species hypotheses. This highlights the need for a balanced weighting of arguments from different lines of evidence to determine species status and calls for cautious interpretations of the results of molecular species delimitation analyses, especially in organisms with low active dispersal capacities and expected distinct population structuring such as land snails.

References:

Neiber, M. T., Bober, S., Caro, A., Chueca, L. J., Glaubrecht, M., Gómez-Moliner, B. J., Korábek, O., Schlegel, K. A., Teixeira, D., Walther, F. & Hausdorf, B. 2022. How many goodly creatures are there here! Origin, radiation and diversification of Hemicycla land snails in the Canary Islands (Gastropoda: Stylommatophora: Helicidae) In: Bergmeier, F. S., Brenzinger, B., Neusser, T. P. (eds). Spixiana Supplement 30 A, Munich, p. 256, doi 10.23788/SPX-Suppl30A.

' Our analyses suggest that although multilocus data support the monophyly of the two taxa, species delimitation methods tend to recognise all investigated populations as distinct species.. '

SHELLED TREASURES: DISCOVERING AND PRESERVING THE ENDEMIC-RICH MALACOFAUNA OF THE GULF OF GUINEA OCEANIC ISLANDS (CENTRAL AFRICA)

By Martina Panisi and collaborators

The malacofauna of the oceanic islands of the Gulf of Guinea is rich in endemic species but has long remained understudied.

Since 2016, the number of the terrestrial mollusc species for the islands has increased, and it is now at 96. These include 62 endemic species, 92 % of which are single island endemics, and 14 endemic genera. Land-use change and biological invasions are key threats to the native malacofauna, but not knowing the exact consequences of human activities makes it hard to establish conservation priorities for this group. On the largest island, São Tomé, forest degradation is creating novel niches that favour biological invasion, while the native mollusc assemblage prefers wetter and cooler forests with intermediate levels of forest degradation. The presence of introduced plants might facilitate the invasiveness of introduced malacofauna, which tend to be more abundant in anthropogenic habitats.

The West African giant land snail *Archachatina marginata* is an introduced species that is distinctly relevant for its nutritional and economical value, highlighting the critical need to integrate the perspective of human populations in the management of exotic species for conservation. At the same time, its endemic congener, the threatened and culturally important Obô giant snail *Archachatina bicarinata*, has suffered a rapid decline in the last decade and has become a flagship for the conservation of the endemic-rich malacofauna and native ecosystems.

References:

Panisi, M., Sinclair, F., Tavares, L., Pereira, A. R., Lima, J. C., Santos, Y., Palmeirim, J. M., Holyoak, D. T., Nuno, A., de Lima, R. F. 2022. Shelled treasures: discovering and preserving the endemic-rich malacofauna of the Gulf of Guinea oceanic islands (central Africa) In: Bergmeier, F. S., Brenzinger, B., Neusser, T. P. (eds). Spixiana Supplement 30 A, Munich, p. 258, doi 10.23788/SPX-Suppl30A.

' Land-use change and biological invasions are key threats to the native malacofauna, but not knowing the exact consequences of human activities makes it hard to establish conservation priorities for this group.'

THE POMATIIDAE OF THE CENTRAL CANARY ISLANDS – JUST CONCHOLOGICAL VARIABILITY OR MISJUDGED BIODIVERSITY?

By Klaus Groh & Marco Neiber

The family Pomatiidae (Gastropoda: Littorinimorpha) is represented in the Canary Islands on each of the major islands by endemic representatives of the genus *Pomatias* Studer, 1798. The Canarian species are sometimes placed in the subgenus *Canaripoma* Starobogatov & Anistratenko, 1991, but this has not been tested by phylogenetic analyses so far. The Central Canary Islands – Tenerife and Gran Canaria – are home to three out of five currently accepted species from the archipelago, namely *P. laevigatus* (Webb & Berthelot, 1833), *P. canariensis* (d'Orbigny, 1840) and *P. raricosta* (Wollaston, 1878).

The study of type material housed in the collections of several museums in Europe and North America, as well as the examination of more than 100 documented series of *Pomatias* from both islands in the private collections of the authors and the museums of Santa Cruz de Tenerife, Frankfurt and Hamburg suggests that we have to deal with more than these three species, especially if also shells from Pleistocene deposits are included in the study. Type material of *Cyclostomus adjunctus* Mousson, 1872, *Cyclostoma laevigatum*, *C. canariense*, C. c. var. γ *inaequalis* Wollaston, 1878 and *C. c*. var. *praecursor* Boettger, 1908 is documented and lectotypes, if necessary, will be selected. No type material of *C. canariense* var. β *raricosta* Wollaston, 1878 could be found, consequently a neotype ought to be selected from topotypical material.

Preliminary investigations of *Pomatias* specimens from both islands by conchological and morphometric methods suggest that we have to deal on Tenerife and Gran Canaria with at least three extant species each and that none of these species is present on both islands.

Additionally, forms from the Pleistocene might be recognised as chrono-subspecies. Furthermore, it becomes apparent that the names *P. laevigatum* and *P. canariensis* cannot be applied to any population of the eastern (Fuerteventura and Lanzarote) or western (La Gomera, El Hierro and La Palma) Canary Islands, and the former, as already recognised, is a younger homonym anyway.

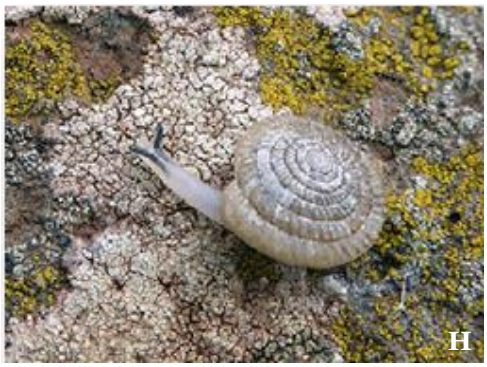
References:

Groh, K. & Neiber, M. T. 2022. The Pomatiidae of the Central Canary Islands – just conchological variability or misjudged biodiversity? In: Bergmeier, F. S., Brenzinger, B., Neusser, T. P. (eds). Spixiana Supplement 30 A, Munich, p. 62, doi 10.23788/SPX-Suppl30A.

'Preliminary investigations of Pomatias specimens from both islands by conchological and morphometric methods suggest that we have to deal on Tenerife and Gran Canaria with at least three extant species each and that none of these species is present on both islands.'

LAND MOLLUSCS CONSERVATION: WHAT ATLANTIC ISLANDS ARE TEACHING US

By Dinarte Teixeira and collaborators



Oceanic islands are renowned for their high proportions of endemic fauna and flora resulting from isolation and associated accelerated speciation and adaptive radiation. Unfortunately, these biotas have also suffered most from direct human-induced extinction, a product of habitat destruction and introduced competitors and predators, or even a fast-changing climate. Among these faunas and floras, land molluscs show the highest levels of endemism and extinction rates. Of all known molluscan extinctions, 70 % have occurred on oceanic islands, and in particular cases, extinction rates may be greater than 75 %.

Moreover, the scale of species listed by the International Union for Conservation of Nature as endangered, extirpated or extinct is undoubtedly underestimated due to incomplete coverage. In addition, most island endemics species have small geographic ranges, some under 100 square meters, making them highly vulnerable to rapid change and disturbance. Therefore, the continuing human-induced activities introduce a high level of disruption and constitute a significant extinction vector, adding substantial pressure to the species' survival.

The current conservation state of the endangered land mollusc faunas from oceanic islands calls for immediate action to halt the species' loss. As a direct answer to this, a number of multistakeholder's conservation projects addressing threatened endemic land molluscs and their habitats in oceanic islands were implemented in the last decade.

Case studies from the archipelagos of Madeira, Canaries, Azores, São Tomé e Príncipe and Bermuda were presented, covering four fundamental steps for an effective species conservation program: 1) elaboration of reliable baseline information on species distribution and ecology; 2) managing threats, mainly through eradication and elimination of the key alien invasive species as a vital step; 3) restoring island ecosystems, conservation translocations and managing recovery process, including monitoring success; 4) engaging island communities in conservation efforts through social marketing and information sharing.

References:

Teixeira, D., Cameron, R.A.D., Martins, A.F., Silva, I., Garcia, G., Outerbridge, M., Ovaska, K., Panisi, M., Almunia, J., Bushell, M., de Zoeten, T., Neiber, M.T., Renker, C., & Groh, K. 2022. Land molluscs conservation: what Atlantic islands are teaching us In: Bergmeier, F. S., Brenzinger, B., Neusser, T. P. (eds). Spixiana Supplement 30 A, Munich, p. 120, doi 10.23788/SPX-Suppl30A.

'The current conservation state of the endangered land mollusc faunas from oceanic islands calls for immediate action to halt the species loss. As a direct answer to this, a number of multistakeholder's conservation projects addressing threatened endemic land molluscs and their habitats in oceanic islands were implemented in the last decade.'

FINAL REMARKS

We wish to thank the members who contributed to August's 2022 newsletter.

There are many ongoing projects in different latitudes addressing distinct groups of invertebrates. We encourage you to let us know what you are doing, and we look forward to hearing news from those in the following newsletters issues.

Until next time.

Vicky, Paulo and Dinarte

Image credits:

A. Volcanic terrain for Ascension Island (Photo by Vicky Knight).

B. Philip Ashmoles demonstrating use and extraction of pipe traps (Photo by Vicky Knight).

C. Philip Ashmoles demonstrating use and extraction of pipe traps (Photo by Vicky Knight).

D. St Helena darter *Sympterum dilatatum* now extinct but with specimens in the Natural History Museum collection.

E. *Hemycicla mascaensis,* endemic to the western Teno mountains, Tenerife island (Photo by Dinarte Teixeira).

F. Ôbo snail, the endemic *Archachatina bicarinata* from São Tomé and Principe archipelago (Photo by Vasco Pissarra).

G. *Pomatias laevigatus* from Chinamada, Anaga Mountains, Tenerife, Canary Islands (Photo by Wikipedia).

H. *Atlantica calathoides*, endemic land snail from Deserta Grande (Desertas Islands, Madeira archipelago).(Photo by Dinarte Teixeira).