

Number 6, December 2021

HI MAISG MEMBERS

Welcome to the third newsletter of 2021.

In this issue, Dinarte Teixeira brings exciting news for the Desertan critically endangered land snails species conservation.

Yeray Monasterio and Martin Wiemers et al. talk about the monitoring program of the butterflies from the Canaries and Madeira Islands.

Dinarte Teixeira signals the start of the Ghost snails species project in Madeira, where Mário Boieiro brings novelties about the importance of exotic forests for the conservation of rare endemic species in the Azores. He also reveals the special issue in preparation about the arthropod diversity and conservation in islands.

Paulo Borges talks about the temporal changes of canopy arthropods in natural forests from the Azorean islands, while António Franquinho Aguiar brings novelties about Hymenoptera and Coccinellidae.

Finally, we reveal the SSC Chair's citation of excellence received by the MAISG.

We hope you enjoy this third newsletter edition of 2021.

Vicky, Paulo and Dinarte

WE DID IT! TWO CRITICALLY ENDANGERED LAND SNAILS SPECIES FROM DESERTAS WERE SUCCESSFULLY BRED IN CAPTIVITY

By Dinarte Teixeira

The MAISG project "*Help Rescuing the Desertas Critically Endangered Land Molluscs from Extinction*" addresses four critically endangered Desertas Island land snails rediscovered in the last 12 years after decades without any live records.

They share similar threats, namely restricted location (under 100 m²), single populations (>50), predation by introduced species (mice), habitat loss and degradation due to the grazing goats; making them at the very brink of extinction! Furthermore, they all occur in a single location on the same island, Deserta Grande, a steep and dry 10 km² island, and the largest of three government-owned uninhabited islands (Desertas islands, Madeira), a Key Biodiversity Area.

Based on this, conservationists from Portugal and UK have launched a dramatic rescue mission to save a group of rare snails from extinction, in a joint collaboration between IUCN SSC MAISG, the Bristol Zoo Gardens (BZG), the Chester Zoo (CZ), the Mossy Earth (ME) and the Institute of Forest and Nature Conservation IP-RAM (Madeira Government, Portugal).

It began with an expedition on May/21 to collect enough individuals to start a breeding programme. The IFCN and Mossy Earth expedition team collected 60 individuals from *Discula lyelliana* and *Geomitra grabhami*, who flew 1,500 miles to the UK, where specialists at Chester Zoo and Bristol Zoological Society are leading the last-ditch attempt to boost numbers and save the species.

A multispecies captive breeding rescue program was implemented in special breeding centres in Chester and Bristol Zoos, which closely replicate the perfect conditions for the snails to reproduce and thrive.



For the first time ever in human care, snail experts at Chester have made significant breakthroughs - successfully breeding both species of snail (*Discula lyelliana* and *Geomitra grabhami*). The zoo now has more than 1,800 of *Discula lyelliana* (figure D) and 900 *Geomitra grabhami* (figure B), whose tiny snails are under the watch of its experts.



In November/21, a new expedition to the Desertas collected 38 specimens of *Atlantica calathoides*, the third target species. In December, they were transported to the UK, being currently quarantined in accomplishment to the health security protocols. Hopefully, the zoo experts will be able to breed this species successfully. A new attempt to collect the founder specimens of *Geomitra coronula* will be made on March/22 to collect the last species targeted by this project.



This project has also successfully implemented a mice control program in the vicinity of the populations. Ongoing is the Best Practice Guidelines elaboration, a vital document for future captive breeding programs addressing these species, which shall be concluded in February 2022. Also, a Species Conservation Strategy is currently being prepared, which shall be discussed in a collaborative workshop in March/22 at Funchal.



Although project phase 1 is concluded, project partner Mossy Earth, through its members, has guaranteed its financial support for the first semester in 2022. In phase two, we shall prepare the population reinforcement actions and habitat recovery. New members will join the project, bringing unique expertise and know-how needed to approach the next conservation steps. Challenging times ahead but with a smile of hope on our faces.

I leave you with a citation of Dr Gerardo Garcia, Chester Zoo's Curator of Lower Vertebrates and Invertebrates:

"These snails had not been seen for decades and were thought to have gone extinct, so urgent action was required when only a handful of these special snails were found clinging on to survival.

"Starting with just 20 of the last known individuals on the planet from each group, there was a lot of pressure to find answers quickly, but with the technical knowledge, scientific underpinning and the skills developed here at the zoo with other highly endangered invertebrates, our team was able to develop the ideal breeding conditions. Now, with more than 1,800 safely in our care, we can say that we have prevented two magnificent species from becoming extinct, which is an incredible achievement.

"This is just the first step in our recovery plan and, looking ahead, the snails here will form a safety-net population and become part of an international breeding programme that provides a sustainable future for the species. We're also hopeful that many of the snails bred here will be reintroduced to some of the surrounding Desertas islands once work is completed to restore habitat and remove the invasive species that have devastated the islands – allowing the snails and other endemic species to flourish."

'This is just the first step in our recovery plan and, looking ahead, the snails here will form a safety-net population and become part of an international breeding programme that provides a sustainable future for the species.'

BUTTERFLY MONITORING PROGRAM IN CANARY ISLANDS STILL GOING ON DESPITE THE VOLCANIC ERUPTION IN LA PALMA

By Yeray Monasterio



The Asociación Española para la Protección de las Mariposas y su Medio, ZERYNTHIA, (the Spanish Association for the Protection of Butterflies and their Environment) continues to develop the butterfly monitoring program in the Canary Islands. This initiative started in 2017 in Tenerife constitutes a pioneering project in Macaronesia. Thanks to the participation of volunteers, who dedicate part of their free time to the study of butterfly populations, data are currently available from 10 transects on the island of La Palma and 21 on

Tenerife. It is expected that it will be possible to expand this study network to other islands in the future. As we all know, the volcanic eruption that began on La Palma on September 19, 2021, has made the daily life of the island's inhabitants extremely difficult. However, even so, the volunteers have continued to report their observations. Therefore, it will be of interest to analyse the impact of this critical geological event on the Lepidopteran community and the effect of the large amount of volcanic ash that has been released on the vegetation of a good part of the island (images).

The information collected is of great interest due to 13 Canarian endemic butterfly species and one endemic species from Macaronesia (*Vanessa vulcania*). In this way, it will be possible to observe and know the trend of their populations and their state of conservation. 'The project will provide the first strategically-planned survey of Ascension's endemic and native terrestrial invertebrates; and fill a major knowledge gaps for the island's globally-threatened biodiversity.'

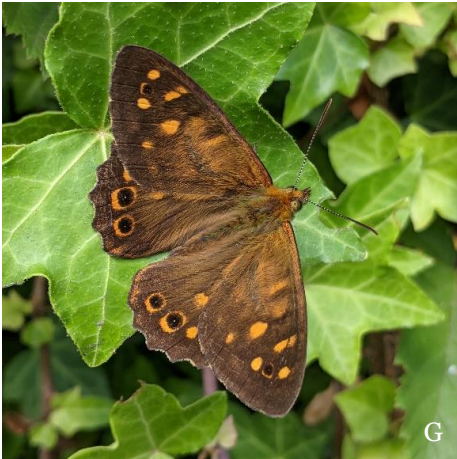
'Thanks to the participation of volunteers, who dedicate part of their free time to the study of butterfly populations, data are currently available from 10 transects on the island of La Palma and 21 on Tenerife.'

CONSERVATION OF MADEIRA'S THREATENED ENDEMIC BUTTERFLIES

By Sam Ellis, Cristina Sevilleja, Sérgio Teixeira & Martin Wiemers



Nearly 60% of Europe's threatened butterflies (22 of 38 species) are endemics, and of these six species are confined to the Macaronesian Islands. The islands are therefore a hotspot of threatened endemic butterfly species in Europe. Madeira is home to three of the most endangered species, *Gonepteryx maderensis* (Madeiran Brimstone; Endangered, Figure F), *Pararge xiphia* (Madeiran Speckled Wood; Endangered; Figure G) and *Pieris wollastoni* (Madeiran Large White; Critically Endangered).



Thanks to the EU's LIFE4BEST funding programme for its Overseas Regions, Butterfly Conservation Europe has been working in partnership with Madeira Flora & Fauna to conserve these three endangered species. Whilst the funded phase only lasts from July 2021 to August 2022 a key output of the project will be the production of Action Plans for each butterfly which will hopefully guide future conservation action on Madeira.



The first phase of the project was to improve our knowledge of the distribution and abundance of the target species. During September and October 2021, the partnership completed 41 days of survey across 49 sites, mainly focussing on the pristine laurel forests in the north of the island (Figure H) but also sampling other habitats such as mixed forest, exotic forest and mountain heathland.



The team undertook 648 15-minute Counts along 534 km of survey route, recording all butterfly species and their abundance (Figure I). Some more inaccessible areas were surveyed using drones and there are plans to increase their use in 2022. Over 10,000 individual butterflies of fourteen species were recorded during the surveys. There were no sightings of *Pieris wollastoni* and as it has not been reliably recorded since 1986, must now be presumed globally extinct - the first European butterfly species in this unenviable category.



Gonepteryx maderensis was only recorded on 33% of survey routes (117 individuals) and more or less confined to laurel forests, but *Pararge xiphia* was both more widely distributed (80% of survey routes) and more abundant (>2,000 individuals) and also encountered in other habitats. *Pararge aegeria* Speckled Wood is a recent colonist of Madeira and there are concerns it may compete with *xiphia*. This species was recorded on 86% of survey routes (>2,600 individuals), including every one where *xiphia* occurred. Another endemic but not considered threatened is *Hipparchia maderensis* (Madeiran Grayling; Figure J), which was seen on 41% of survey routes and was the most abundant species overall (nearly 2,700 individuals). The locations of some larval hostplants were also recorded, in particular *Rhamnus glandulosa* which was quite scarce, probably limiting the distribution of *Gonepteryx maderensis*. These data will enable

key areas of butterfly habitat to be mapped in order to ensure they can be adequately protected and managed in the future.

The project also aims to establish a Madeira Butterfly Monitoring Scheme (mBMS), which will include establishing transects in the pristine laurel forest to be walked by staff of the key local stakeholder, the Institute of Forests and Nature Conservation (IFCN). Their staff will be provided with training, as will other volunteers be recruited through a programme of awareness raising workshops for civil society (including nature guides, students, farmers) and tourists. The mBMS will enable the effectiveness of conservation measures targeted at butterflies to be assessed in the coming decades.

Further news can be found on the website of Butterfly Conservation Europe (BCE) at <https://www.vlinderstichting.nl/butterfly-conservation-europe/projects/butterflies-madeira-life4best>.

'The team undertook 648 15-minute Counts along 534 km of survey route, recording all butterfly species and their abundance. Over 10,000 individual butterflies of fourteen species were recorded during the surveys.'

SEARCHING FOR MADEIRA'S GHOST LAND SNAILS SPECIES

By Dinarte Teixeira & Klaus Groh



The search for the Madeiran ghost endemic land snails species started last October with a visit to the Laurel Forest at Santana, Madeira Island. Since then, the project team of this MBZ funded project has conducted more than 20 surveys at historical and potential species distribution areas. The main objective is to identify the 9 target endemic land snails species without a live record for more than 100 years.

The surveys on coastal regions of Madeira Island, within areas with endemic bushes, valleys and gorges, has identified more than 80 species, although without any records of the target species. In the following months, the work will continue with a scheduled visit of two experts in Clausillidae and Lauridae to help in this endeavour. Starting January 2022, the IFCN will conduct a student awareness campaign addressing Madeira Island's critically endangered (CR) land snails species. First stop, Elementary School of Figueirinhas, at

Canico. Here, fourth graders will contact the fabulous world of snails and learn how to build a terrarium.



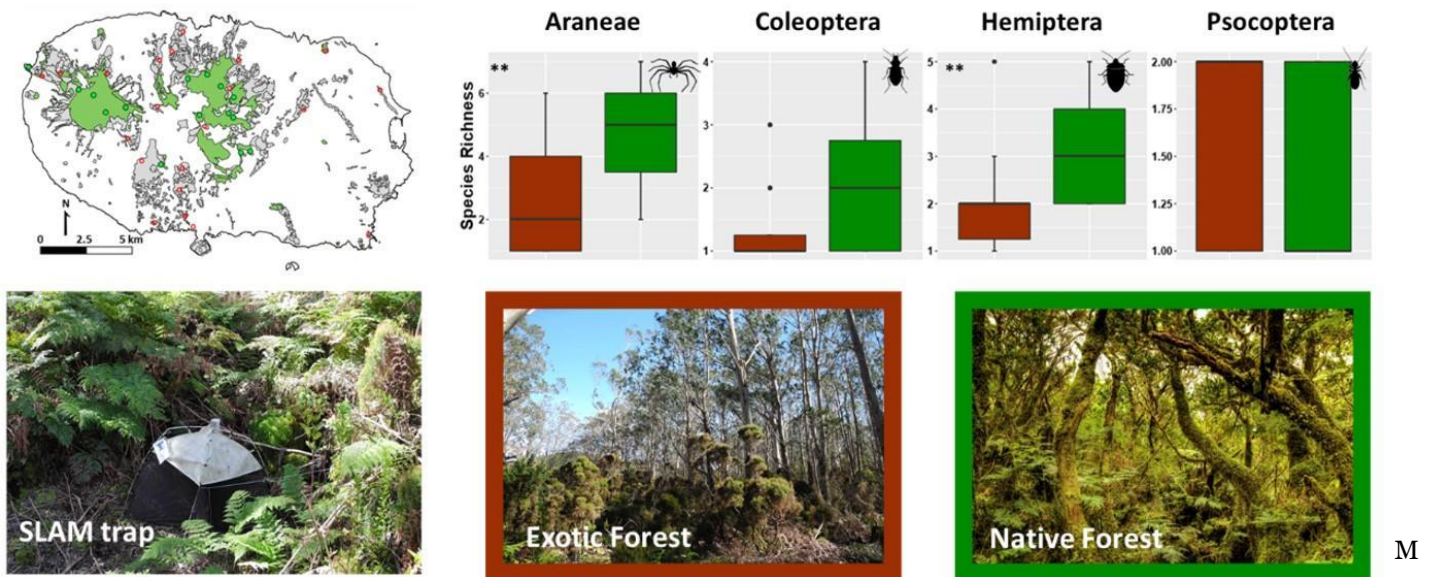
'The surveys on coastal regions of Madeira Island, within areas with endemic bushes, valleys and gorges, has identified more than 80 species, although without any records of the target species.'

SMALL EXOTIC FOREST PATCHES ARE REFUGES FOR SEVERAL RARE ENDEMIC ARTHROPODS IN TERCEIRA ISLAND (AZORES, PORTUGAL)

By Mário Boieiro

Island biodiversity faces many threats due to habitat destruction and fragmentation, invasive species and climate change. In Azores, the native forest cover suffered a drastic reduction since human colonisation and is now restricted to few and isolated fragments. Forest plantations occupy a considerable area of the islands' surface and have expanded following native forest destruction. In a recent study, Noelline Tsafack et al. (2021) assessed the diversity of terrestrial arthropods in native and exotic forests of Terceira island using SLAM traps, during one year-cycle. We "found that native forest remnants are crucial for the maintenance of endemic Azorean arthropod diversity", but some exotic forest fragments were also found to sustain large populations of several native spider and insect species. These small exotic forest patches may act as refuges for native species, including several threatened endemics such as *Athous azoricus*, *Euconnus azoricus*, *Heteroderes azoricus*, *Metophtalmus occidentalis*, *Calacalles subcarinatus* and *Drouetius borgesii borgesii*. These findings reinforce the need to expand biodiversity monitoring and conservation to human disturbed environments, such as forest plantations, that may play a key role in the conservation of Azorean native arthropods, including threatened endemics.

Reference: Tsafack, N.; Fattorini, S.; Boieiro, M.; Rigal, F.; Ros-Prieto, A.; Ferreira, M.T.; Borges, P.A.V. The Role of Small Lowland Patches of Exotic Forests as Refuges of Rare Endemic Azorean Arthropods. *Diversity* **2021**, *13*, 443. <https://doi.org/10.3390/d13090443>



'We "found that native forest remnants are crucial for the maintenance of endemic Azorean arthropod diversity", but some exotic forest fragments were also found to sustain large populations of several native spider and insect species.'

ACTUALISATION OF KPI - TEMPORAL CHANGES OF CANOPY ARTHROPODS IN NATIVE FOREST FRAGMENTS FROM FLORES, TERCEIRA AND PICO

By Paulo Borges

A long-term dataset collected in the Azores islands enabled us to study the temporal changes of arthropods in the insular context: arthropod occurrence and abundance in native forest fragments were recorded in 2000 (BALA 1), 2010 (BALA 2) and 2020 (BALA 3 and LIFE -BEETLES). Using this dataset, we investigated long-term changes in overall diversity and abundance of canopy-dwelling arthropods, the Index of Biotic Integrity (and associated KPIs) of selected habitats and important arthropod groups belonging to different trophic levels (herbivore, predator, saprophagous) and different colonisation origin (native non-endemic, endemic, introduced) in Terceira, Pico and Flores islands. As a result, we identified three trends on different time scales: (1) a decline in overall diversity, native and predator species richness and herbivore abundance between 2000 and 2010, (2) recovering overall diversity, native and predator species richness between 2010 and 2020, and (3) relatively stable overall diversity, abundance, biotic integrity, and community composition of selected sites between 2000 and 2020.

Our findings suggest that the canopies of native forest fragments in the Azores are relatively resilient habitats that do not follow similar patterns of arthropod decline in long-term as recognised in many European and North-American locations. This might be due to the pristine state of investigated sites and the high adaptation of endemic and native non-endemic species to the specialised habitat of forest canopies. Our research supports previous assumptions that the canopies of Azorean native forest fragments might have a relatively high resilience towards environmental changes and the invasion of exotic species.

When evaluating in detail the variation of the Index of Biotic Integrity (KPI) in six LIFE-BEETLES intervention areas using canopy arthropods as indicators, it is possible to take the following observations:

- i. A tendency for a decline in sites from Flores and Pico;
- ii. A particular high decline in FLO3 - Lagoa Funda and PIC1 - Misterio Prainha;
- iii. A general high value of the Index of Biotic Integrity (KPI) and temporal stability of sites from Terceira.

A more detailed evaluation of these tendencies will be performed for all intervention areas with soil data in the following report due in mid-2022.

The present report counted with the participation of the following researchers:

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*This report is part of the Master Thesis of Timea Kocsis by the University of Wagenigen

'Our findings suggest that the canopies of native forest fragments in the Azores are relatively resilient habitats that do not follow similar patterns of arthropod decline in long-term as recognised in many European and North-American locations.'

TWO NEW STUDIES REGARDING THE HYMENOPTERA FROM MACARONESIA AND THE LADYBUGS (COCCINELLIDAE) WITH THE COLLABORATION OF TWO MAIISG MEMBERS

By António Franquinho Aguiar



Professor Dr Anselm Kratochwil (University of Osnabrück, Germany) has been studying the wild bees of Madeira and the Canary Islands since 1995. There is already a very important body of published information gathered from the observations and studies done and multiple visits to the archipelagos. Last November, the latest paper was published online in the journal *Organisms Diversity & Evolution* in open access form.

The first molecular study of Canarian and Madeiran wild bees is presented. The authors used mitochondrial COI sequences together with qualitative morphological and morphometric data of the *Andrena wollastoni* group of the Madeira Archipelago and the Canary Islands to reconstruct their biogeographic history and derive colonisation and speciation scenarios. In doing so, they also tested whether the classification results into different taxa through morphological and morphometric analyses published in Kratochwil (2020) could also be supported by molecular genetic markers.

This paper can be freely downloaded from this link: <https://doi.org/10.1007/s13127-021-00513-z>. All his research can be viewed/obtained through the following link <https://www.anselm-kratochwil.de>

'The first molecular study of Canarian and Madeiran wild bees is presented.'



Last August 2021, the latest and most complete ladybugs (Coccinellidae) checklist was published for Portugal mainland, including Madeira and Azores archipelagos. The author, Dr António Onofre Soares (Azores University), has assembled a team of specialists to review a large amount of dispersed published literature and original, unpublished data. The result is a comprehensive annotated checklist comprising 101 species: 83 from the mainland, 39 from Madeira, and 32 from the Azores. Novelties include *Harmonia axyridis* (Pallas, 1773) from Madeira, *Propylea quatuordecimpunctata* (Linnaeus, 1758) from the Azores, *Delphastus catalinae* (Horn, 1895) from the Azores and Madeira, *Nephus* (*Geminosipho*) *reunioni* (Fürsch, 1974) and *Nephus* (*Nephus*) *voeltzkowi* Weise, 1910 from Madeira and *Microserangium* sp. from the mainland.

The paper was published as Open Access in *Zookeys* journal and can be downloaded from <https://doi.org/10.3897/zookeys.1053.64268>

'The result is a comprehensive annotated checklist comprising 101 species: 83 from the mainland, 39 from Madeira, and 32 from the Azores'

A SPECIAL ISSUE ON "ARTHROPOD DIVERSITY AND CONSERVATION IN ISLANDS" IS UNDER PREPARATION IN INSECTS JOURNAL

By Mário Boieiro



The biodiversity crisis is particularly worrisome in island ecosystems, where many species went extinct, and many others are already on the brink of extinction. Thus, it is urgent to collect, analyse, interpret and use information on island biodiversity to support decision-making and provide guidance to nature conservation initiatives and strategies.

Aiming to value arthropod conservation in islands, we decided to edit a Special Issue for the journal *Insects* addressing a variety of topics including: 1) island biodiversity patterns and their drivers, 2) spatiotemporal dynamics of species diversity, abundance and distribution in islands, 3) changes in species interactions due to common biodiversity erosion drivers, and 4) the effects of conservation-related activities on valuing and protecting island arthropod biodiversity at species and community levels.

The Special Issue is open to receive contributions until 31 december 2022, and more information can be found at https://www.mdpi.com/journal/insects/special_issues/arthropod_islands

'It is urgent to collect, analyse, interpret and use information on island biodiversity to support decision-making and provide guidance to nature conservation initiatives and strategies.'

MAISG RECEIVES A SPECIES SURVIVAL COMMISSION CHAIR'S CITATION OF EXCELLENCE

By Vicky Wilkins and Paulo Borges



We are delighted to celebrate the hard work of the IUCN SSC Mid Atlantic Islands Invertebrate Specialist Group during 2019-2020, namely the contribution to the 2017-2020 Species Strategic Plan, which has received the 2020 *SSC Chair's Citation of Excellence*.

Despite incredibly challenging times during the COVID-19 pandemic, the IUCN SSC, through its Chair Jon Paul Rodriguez, deeply appreciate and value the volunteer efforts and time dedicated to achieving the targets proposed by our

group.

These positive outcomes have contributed to accomplishing the SSC vision of "A just world that values and conserves nature through positive action to both prevent the loss and aid recovery of diversity of life on earth".

We like to thank all the members during this process and hope to continue your outstanding efforts to contribute to species conservation throughout the 2021-2025 quadrennium.

'IUCN SSC Mid Atlantic Islands Invertebrate Specialist Group during 2019-2020 received the 2020 SSC Chair's Citation of Excellence.'

FINAL REMARKS

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

Despite the current pandemic situation, this has been a fruitful year for the invertebrate conservation in the Mid-Atlantic islands. Thank you for yours and your teams hard work.

We take the opportunity to wish you a Happy New Year.

Vicky, Paulo and Dinarte

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- A. Adult specimen of *Geomitra grabhami*. © Dinarte Teixeira
- B. Hatchling of *Geomitra grabhami*. © Gerardo Garcia
- C. Adult specimen of *Discula lyelliana*. © Dinarte Teixeira
- D. Hatchling of *Discula lyelliana*. © Gerardo Garcia
- E. Eruption of the Cumbre Vieja volcano, La Palma. © Maatje Maria Van der Luit
- F. *Gonepteryx maderensis* in the laurel forest of Madeira. © Chris van Swaay
- G. *Pararge xiphia*, endemic to Madeira. © Martin Wiemers
- H. Laurel forest near Seixal on Madeira. © Cristina Sevilleja
- I. Map of Madeira with location of walked transects with data in 2021. Darker colour indicates higher number of records. Data from eBMS (<https://butterfly-monitoring.net/>)
- J. *Hipparchia maderensis*. © Juan Gallego Zamorano
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