

Long-term monitoring of Azorean forest arthropods

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Abstract

Since 2012 we are conducting in Azorean Islands (Portugal) native and exotic forests a long-term monitoring study named SLAM - Long Term Ecological Study of the Impacts of Climate Change in the natural forest of Azores. This long-term monitoring study is monitoring arthropods (Arthropoda), aiming to understand the impact of biodiversity erosion drivers in Azorean native forests arthropod distribution, abundance and diversity. The current dataset represents arthropods that were recorded using a total of 42 passive SLAM traps (Sea, Land and Air Malaise) deployed inside native and exotic forest fragments in seven Azorean Islands (Flores, Faial, Pico, Graciosa, Terceira São Miguel and Santa Maria). This manuscript is the fifth data-paper contribution based on data from this long-term project.

We provide data of terrestrial arthropods belonging to Arachnida (excluding Acari), Diplopoda, Chilopoda and Insecta classes (excluding Collembola, Diptera, Hymenoptera and Lepidoptera) from seven Azorean Islands during the 2012-2021 period. Data from spiders (Araneae) from the Pico and Terceira Islands is not included in this publication since this data was already published elsewhere (Costa and Borges 2021; Lhoumeau et al. 2022). We collected a total of 178 972 specimens, of which 171 530 (95.8%) were identified at species or subspecies level. Among these identified specimens, 106 350 (62%) were adults. For Araneae and some Hemiptera species, juveniles are also included in the data presented in this paper, since the low diversity in the Azores allows a relatively precise species-level

identification of this life-stage. We recorded a total of 316 species and subspecies, belonging to 25 orders, 106 families and 260 genera. The ten most abundant species are composed mostly of endemic or native non-endemic species and only one exotic species (*Ommatoiulus moreleti* (Lucas, 1860)). They include 107 330 individuals (60%) of all sampled specimens and can be considered as the dominant species in the Azorean native forests for the target studied taxa. The Hemiptera order was the most abundant taxa, with 90 127 (50,4%) specimens. The Coleoptera order was the most diverse taxa with 30 (28,3%) family sampled. We registered 72 new species records (two for Flores, eight for Faial, 24 for Graciosa, 23 for Pico, eight for Terceira, three for São Miguel and four for Santa-Maria). None of them are new for the Azores archipelago. Most of the new records are introduced species, however abundance of such species is still low on the studied islands. This publication contributes to increase the baseline information for future long-term comparisons of the arthropods of the studied sites and the knowledge of the arthropod fauna of the native forests of the Azores, in terms of species abundance, distribution and diversity throughout seasons and years

Keywords: Arthropoda, Azores, Laurisilva forest, Long-term sampling, SLAM Trap, Sampling event

Project details

Project title: SLAM - Long Term Ecological Study of the Impacts of Climate Change in the natural forest of Azores

Personnel: Paulo A. V. Borges, Sébastien Lhoumeau

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The Natural Parks of all islands provided the necessary authorization for sampling

Study area descriptions/descriptor: The Azores are an isolated archipelago (38°43'49"N, 27°19'10"W), situated in the mid-Atlantic Ocean comprising nine volcanic Islands spread over 500 km in a W/NW–E/SE direction. During this project, seven Islands (Flores, Faial, Graciosa, Pico Terceira, São Miguel and Santa Maria) were surveyed within the SLAM Project. The sampling plots are mostly dominated by endemic vegetation like *Juniperus brevifolia*, *Erica azorica*, *Laurus azorica* and *Ilex azorica*, but with some evidence of invasive species like *Pittosporum undulatum*, *Hedychium gardnerianum*. For all islands, the dominant vegetation in higher elevations is the most preserved.

Design description: We sampled in the Azorean Islands of Flores, Faial, Pico, Graciosa, Terceira São Miguel and Santa Maria, four times per year (around the 15th March (winter sample), 15th June (spring sample), 15th September (summer sample) and 15th December (autumn sample))

Data published through GBIF: http://ipt.gbif.pt/ipt/resource?r=arthropods_slam_azores

Taxonomic coverage

General taxonomic coverage description: Arachnida (excluding Acari), Diplopoda, Chilopoda and Insecta classes (excluding Collembola, Diptera, Hymenoptera and Lepidoptera)

Taxonomic ranks

Phylum: Arthropoda

Common names: Arthropods

Spatial coverage

General spatial coverage: Flores, Faial, Pico, Graciosa, Terceira São Miguel and Santa Maria (Azores)

Coordinates: 36°50'40.06"N and 39°41'25.01"N Latitude; 31°19'58.83"W and 24°47'6.56"W Longitude

Temporal coverage: June 13, 2012 - June 16, 2022

Natural collections description

Collection name: Entomoteca Dalberto Teixeira Pombo (DTP)

Collection identifier: DTP

Specimen preservation method: Alcohol

Methods

Method step description: The data has been published as a Darwin Core Archive (DwC-A), which is a standardised format for sharing biodiversity data as a set of one or more data tables. The core data table (events) contains 893 records and one data table extension also exists (occurrence), with 14924 records. The extension supplies extra information about the core record.

Study extent description: A total of forty-two 50m x 50m plots were sampled in seven of the islands from the archipelago (Flores, Faial, Pico, Graciosa, Terceira São Miguel and Santa Maria). The areas where these plots were set constitute some of the most well-preserved wet forests in these islands, having small human disturbance (Borges et al, 2017). The native forest is dominated by endemic vegetation such as *Juniperus brevifolia*, *Erica azorica*, *Laurus azorica* and *Ilex azorica* (see Borges et al, 2017 for more details). Some plots are located in mixed forest, with some exotic trees.

Sampling description: Passive flight interception SLAM traps (Sea, Land and Air Malaise trap) were used to sample the plots in both islands, with one trap being setup at each plot, each one being 110 x 110 x 110 cm. In this type of trap the trapped arthropods crawl up the mesh and then fall inside the sampling recipient (Borges et al, 2017). Each one is filled with propylene glycol (pure 1,2-PROPANODIOL) to kill the captured arthropods and conserve the sample between collections, enabling also the preservation of DNA for future genetic analysis. Although this protocol was developed to sample flying arthropods, by working as an extension of the tree, non-flying species such as spiders can also crawl into the trap (Borges et al, 2017), enhancing the range of groups that can be sampled by this technique. Because of this, previous studies have used these traps to analyse diversity and abundance changes in the arthropod communities in Azores pristine forest sites (Matthews et al, 2019, Borges et al, 2020). The traps samples were collected every 3 months in the studeid sites.

Quality control description: All sorted specimens were identified by a taxonomical expert.

Datasets

Dataset description

Object name: Darwin Core Archive Long-term monitoring of Azorean forest arthropods

Character encoding: UTF-8

Format name: Darwin Core Archive format

Format version: 1.0

Distribution: http://ipt.gbif.pt/ipt/archive.do?r=arthropods_slam_azores

Publication date of data: 2022-11-11

Language: English

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Metadata language: English

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Hierarchy level: Dataset

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