

# Diversity of Lepidoptera recorded in a forest nursery of Nordeste county on São Miguel Island (Azores)

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## Abstract

The diversity of moth species (Insecta, Lepidoptera) recorded in the forest nursery of Nordeste county on São Miguel island (Azores) is given. Adults were sampled between March and December 2019 using three methods: (i) light trap to caught Noctuidae species, (ii) open-sided delta trap baited with a synthetic female sex pheromone lure to attract *Epiphyas postvittana* males and (iii) entomological net to identify microlepidopteran moths. A total of 10160 adults belonging to 33 lepidopteran species were recorded and listed by families, including: *Argyresthiidae* 1 (3%), *Crambidae* 4 (12%), *Erebidae* 1 (3%),

Geometridae 5 (15%), Noctuidae 18 (55%), Sphingidae 1 (3%), Tineidae 1 (3%), and Tortricidae 2 (6%). The families Noctuidae, Geometridae and Crambidae were the most diverse. Those with the highest abundance of adults was the Noctuidae family followed by the Crambidae, Tortricidae and Tineidae. The number of caught adults was consistently higher during spring and summer, decreasing sharply in late fall. For 14 species caught in the light trap the adult sex ratio was favorable to females, except for *Xestia c-nigrum* which was favorable to males. An analysis of the colonization status, feeding and primary hosts of these endemic, native or exotic moth species suggests that plants reared in forest nurseries, being attacked by such insects, facilitates our understanding of the diversity of lepidopterans that establish in Laurel Forest environments and to what extent there is a need to monitor and control them mainly with biological control agents.

**Keywords:** Sampling event, Specimen, Lepidoptera, Argresthiidae, Crambidae, Erebidae, Geometridae, Noctuidae, Sphingidae, Tineidae, Tortricidae, Azores Islands

### **Project details**

**Project title:** Diversity of Lepidoptera recorded in a forest nursery of Nordeste county on São Miguel Island (Azores)

**Personnel:** Virgílio Vieira, Luísa Oliveira, António O. Soares, Paulo A. V. Borges, Isabel Borges, João Tavares

**Funding:** Regional Funds, through Official Forestry Services from Regional Government of the Azores, within the research project MoCIL “Monitorização e Controlo Integrado de Lepidópteros em Viveiros Florestais (Nordeste e Furnas) na ilha de São Miguel - Açores” FCT – Fundação para a Ciência e a Tecnologia, I.P., under the project UIDP/05292/2020 and UIDB/05292/2020

AZORESBIOPORTAL–PORBIOTA (ACORES-01-0145-FEDER-000072) (2019-2022)

**Study area descriptions/descriptor:** The current study was performed in São Miguel Island (ca. 750 km<sup>2</sup>), the largest in the archipelago of the Azores, located in the North Atlantic, roughly at 38°43'21"N 27°13'14"W and 38°27'30"N 28°19'22"W respectively. The climate is temperate oceanic, with regular and abundant rainfall, high levels of relative humidity and persistent winds, mainly during the winter and autumn seasons. The study was conducted in the Nordeste Nursery Recreational Forest Reserve located in Nordeste county (37° 49' 45.128" N, -25° 08' 54.289" W) at about 180 meters of altitude.

**Design description:** Samples of adult moths were made between March and December 2019 (i.e. 35 weeks), as generally few lepidopteran species are active during winter. Adults were monitored from dusk (18:00) to dawn (06:00) using omnidirectional light trap, equipped with TLD 18W lightbulb, according to the methodology used by Tavares (1989). Also, *Epiphyas postvittana* population was monitored from April to December 2019 (i.e. 31 weeks), using open-sided delta traps baited with a synthetic female sex pheromone lure (containing: E11-14Ac, E9E11-14Ac) to attract males (see Oliveira et al, 2022). The light trap and open-sided delta trap, spaced 300 m apart, were installed a meter over the ground level at the edge of the nursery for Azorean endemic forest plants, including *Erica azorica*, *Vaccinium*

cylindraceum (both Ericaceae), Ilex azorica (Aquifoliaceae), Juniperus brevifolia (Cupressaceae), Laurus azorica (Lauraceae), Viburnum treleasei (Adoxaceae), Prunus azorica (Rosaceae), Picconia azorica (Oleaceae), Frangula azorica (Rhamnaceae), and one native species, Morella faya (Myricaceae), which are integrated on the IUCN red list (see Rosagro et al, 2019; Vieira et al, 2020). Throughout the study, adults were collected weekly in both trap types and lures changed once a month. In addition, the plants reared in the forest nursery were sampled once a week to catch microlepidopteran moths using a standard entomological net (35 cm diameter, 140 cm handle), which were immediately identified and released on site if the specimens did not need to be observed more carefully in the laboratory. This contribution focuses mainly on the diversity of moths present in one forest nursery of Nordeste county of São Miguel Island (Azores), especially species associated with endemic and native plant species. It also contributes to better plan strategies of integrated protection and conservation measures, since nurseries host a great diversity of plants from the Laurel Forest, which may attract many lepidopteran species

**Data published through GBIF:**

[http://ipt.gbif.pt/ipt/resource?r=lepidoptera\\_nordeste\\_smiguel](http://ipt.gbif.pt/ipt/resource?r=lepidoptera_nordeste_smiguel)

### **Taxonomic coverage**

**General taxonomic coverage description:** The following Classe and Order are covered:  
Insecta: Lepidoptera

#### **Taxonomic ranks**

Order: Lepidoptera

**Common names:** moths

### **Spatial coverage**

**General spatial coverage:** The study was conducted in the Nordeste Nursery Recreational Forest Reserve located in Nordeste county (37° 49' 45.128" N, -25° 08' 54.289" W) at about 180 meters of altitude

**Coordinates:** 37°46'19.2"N and 37°49'55.2"N Latitude; 25°15'3.6"W and 25°8'16.8"W  
Longitude

**Temporal coverage:** March 21, 2019 - December 12, 2019

### **Methods**

**Method step description:** All specimens including those captured with the entomological net were allocated to a taxonomic species by Virgílio Vieira.

**Study extent description:** The study was conducted in the Nordeste Nursery Recreational Forest Reserve (São Miguel island) where thousands of endemic and native Azorean plant species are annually reared, including Erica azorica, Vaccinium cylindraceum (both

Ericaceae), *Ilex azorica* (Aquifoliaceae), *Juniperus brevifolia* (Cupressaceae), *Laurus azorica* (Lauraceae), *Viburnum treleasei* (Adoxaceae), *Prunus azorica* (Rosaceae), *Picconia azorica* (Oleaceae), *Frangula azorica* (Rhamnaceae), and one native species, *Morella faya* (Myricaceae), which are integrated on the IUCN red list (see Rosagro et al, 2019; Vieira et al, 2020). The Official Forestry Services allocate these plants to the restoration of the Laurel Forest and areas with high erosion risk or sensitive from the hydrological point of view, awareness-raising activities and support forestation by private landowners (Rosagro et al, 2019).

**Sampling description:** Adult moths were monitored from dusk to dawn between March and December 2019 (35 weeks) using an omnidirectional light trap, equipped with TLD 18W lightbulb, according to the methodology used by Tavares (1989). *Epiphyas postvittana* population was monitored from April to December 2019 (31 weeks), using open-sided delta trap baited with a synthetic female sex pheromone lure (containing: E11-14Ac, E9E11-14Ac) to attract males (see Oliveira et al, 2022). The light trap and open-sided delta trap, spaced 300 m apart, were installed a meter over the ground level at the edge of the nursery for Azorean endemic and native forest plants. The traps samples were collected every week and lures changed once a month. The plants reared in the forest nursery were sampled once a week to catch microlepidopteran moths using a standard entomological net (35 cm diameter, 140 cm handle), which were immediately identified and released on site if the specimens did not need to be observed more carefully in the laboratory.

**Quality control description:** All individuals caught in the traps were first sorted by Virgílio Vieira, João Tavares or Luisa Oliveira.

## Datasets

### Dataset description

**Object name:** Darwin Core Archive Diversity of Lepidoptera recorded in a forest nursery of Nordeste county on São Miguel Island (Azores)

**Character encoding:** UTF-8

**Format name:** Darwin Core Archive format

**Format version:** 1.0

**Distribution:** [http://ipt.gbif.pt/ipt/archive.do?r=lepidoptera\\_nordeste\\_smiguel](http://ipt.gbif.pt/ipt/archive.do?r=lepidoptera_nordeste_smiguel)

**Publication date of data:** 2022-05-31

**Language:** English

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**Metadata language:** English

**Date of metadata creation:** 2022-05-27

**Hierarchy level:** Dataset

### References

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