

Monitoring grassland's arthropods in a in situ climate change experimentation (Terceira, Azores, Portugal)

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Abstract

The data presented are part of the project PASTURCLIM (Impact of climate change on pasture's productivity and nutritional composition in the Azores). The project aims to assess consequences of climate change (in this case, increasing temperature) on the grass production and quality for cattle forage. The project also aims to assess changes in the arthropod's community associated to the grassland. An in situ experimentation was set up using Open Top Chambers (OTC's), in order to simulate an increasing of temperature (average of +1.5°C) on grassland. In this paper, we present data relative to the arthropods collection. Overall, we collected 41,351 specimens belonging to four classes, 15 orders, 60 families and 171 morphospecies (including 34 taxa identified only at order, family or genus level). Therefore, for only 137 taxa we have a scientific name associated (n = 38918).

Keywords: Samplingevent; Arthropods, climate change, grasses, OTC's, pasture, pitfall traps.

Project details

Project title: PASTURCLIM - Impact of climate change on pasture's productivity and nutritional composition in the Azores

Personnel: Sophie Wallon, Rui B. Elias, Catarina Melo, Paulo A. V. Borges

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Study area descriptions/descriptor: The study was conducted on the Archipelago of the Azores (North Atlantic), on Terceira island (38.712925, -27.234912) which is the third largest island of the archipelago with 400.2 km² and a maximum altitude above sea level of 1021 m (Figure 1: MAP OF THE AZORES AND TERCEIRA). The Azores are of volcanic origin and benefit from a temperate oceanic climate relatively wet with mild temperature at low altitude all year long.

Design description: In each field, twenty (1x1m) plots were set up on a grid pattern with 1.5m space between each plot (Figure 2). Among those twenty plots, ten were randomly chosen as control plots and the other ten were surrounded by an OTC's. Data loggers (Easy Log: EL-USB-2) were set up to collect the temperature data inside the OTC's as well as in the control plots. The temperature inside the OTC's was on average 1-1.4 °C higher than in the control plots. OTC's were set up in order to include the 1x1m plot as well as a margin of 25 cm all around the plot. This allowed scientists to circulate around the plot without damaging it, as well as to set up the pitfall traps on each outside corner of the plot but still inside the OTC's. The OTC's were also slightly lifted up from the floor from few centimeters (around 5 cm) in order to let crawling arthropods move around. For both seasons, the sampling was done before mowing the grasses. No cattle were allowed inside the sampling area. It is important to note that the experimental set up (control and OTCs) was mounted the whole year around. Thus, the OTCs and control plots were not moved between the two sampling seasons

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

Taxonomic coverage

General taxonomic coverage description: The following classes and orders of arthropods are covered:

Arachnida: Araneae, Opiliones, Pseudoscorpiones; Chilopoda: Lithobiomorpha, Scutigleromorpha; Diplopoda: Julida, Polydesmida; and Insecta: Coleoptera, Dermaptera, Hemiptera, Hymenoptera, Neuroptera, Orthoptera, Psocodea

Taxonomic ranks

Class: Arthropoda

Common names: Arthropods

Spatial coverage

General spatial coverage: The study was conducted on the Archipelago of the Azores (North Atlantic), on Terceira island (38.712925, -27.234912) which is the third largest island of the archipelago with 400.2 km² and a maximum altitude above sea level of 1021 m.

Coordinates: 38°38'2.53"N and 38°48'42.81"N Latitude; 27°23'49.76"W and 27°1'34.92"W Longitude

Temporal coverage: February 20, 2020 - September 10, 2020

Natural collections description

Collection name: Entomoteca Dalberto Teixeira Pombo (DTP)

Collection identifier: DTP

Specimen preservation method: Alcohol

Methods

Method step description: Specimens were identified based on the Azorean arthropods collection "Dalberto Teixeira Pombo Insect Collection (DTP), University of Azores" created and maintained by Professor Paulo A.V. Borges. A new collection reference was created, in the frame of the project PASTURCLIM, referencing each species occurring on the present dataset. If the specimen observed was not corresponding to any specimen already recorded in the Azorean arthropods collection or if identification was not possible, then the specimen was attributed to a new morphospecies number (identificationRemarks in Occurrence table)

Study extent description: The study was conducted in three intensive pastures on the island of Terceira (Azores). On each field, 20 plots (1x1m) were set up in an area of 100m² where cattle were not allowed. Among those 20 plots, 10 were randomly chosen to be delimited by an OTC's (in order to simulate an increase of +1.5°C average), while the other 10 were considered as control plots (Picture 1). OTC's were built including a 1m² plot and a margin of 25cm all around. The aim of this margin was to allow the same setting up of the pitfall as in the control plots (e.g. 1 pitfall trap at each corner); it also let free space for scientists to enter inside the OTC's without stepping the plot. Temperature and relative humidity were recorded through data loggers in control plots and inside OTC's

Sampling description: The focus of the study were the arthropods associated to pasture for foraging production. Because OTC's represent a physical barrier for flying insects, our focus was made on crawling arthropods. OTC's were lifted up about 5cm above the ground and allowed any arthropod dislocations around the experimental area. Pitfall traps were then used for the sampling.

Grasses inside each plot were seasonally and manually harvested to evaluate the biomass. Therefore, pitfall traps were set up and collected before harvesting grasses.

Pitfall traps consisted in a 330 ml plastic cups, about 12 cm deep and 8 cm of diameter at the

top (Picture 2). Traps were filled with ethylene glycol. We used car's cooling liquid at 20% ethylene glycol at which we added few drops of soap to break the water tension. Specimen collected were then store into ethanol (96%).

For each season (Winter and Summer), four pitfall traps were set up on each corner of each plot resulting in 4 traps per plot (Picture 3). All traps were set up for 14 days apart during the summer in the field B where the traps were set up for 13 days

Quality control description: After collection, specimens were store into alcohol (96%) before sorting. Specimens, adults and juveniles, were identified in a laboratory by trained parataxonomist (Sophie Wallon) and organized following a system of morphospecies. Final identification was done by Paulo A.V. Borges.

Datasets

Dataset description

Object name: Darwin Core Archive Monitoring grassland's arthropods in a in situ climate change experimentation (Terceira, Azores, Portugal)

Character encoding: UTF-8

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Format version: 1.0

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

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