

UNVEILING THE EFFECTS OF SOIL RESTORATION MEASURES ON ARTHROPOD ABUNDANCE IN A PORTUGUESE NORTHEASTERN FOREST

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Introduction

Forestry disturbances like wildfires may decrease soil health and increase erosion risk, contributing to desertification^{1,2}. Recovery measures as organic fertilizers and physical barriers are frequently used to increase nutrient content and foster vegetation growth^{3,4}. Soil arthropod groups were used as bioindicators to understand the efficiency of different treatments on ecosystem recovery.

Aim

Promote the ecological recovery of an area occupied by eucalyptus on the Natura 2000 Network Special Conservation Zone and Special Protection Area Rivers Sabor and Maças.

Study Area and Methodology



ALGOSO (VIMIOSO), NE PORTUGAL.

- Natura 2000 Network.
- Biosphere Reserve Iberian Meseta.
- Semiarid soil with over 25% slope.

ARTHROPODS AS BIOINDICATORS OF SOIL HEALTH

- Three soil **treatments**: compost, donkey manure, and wood chips
- Seasonal monitorisations (2023-2024).

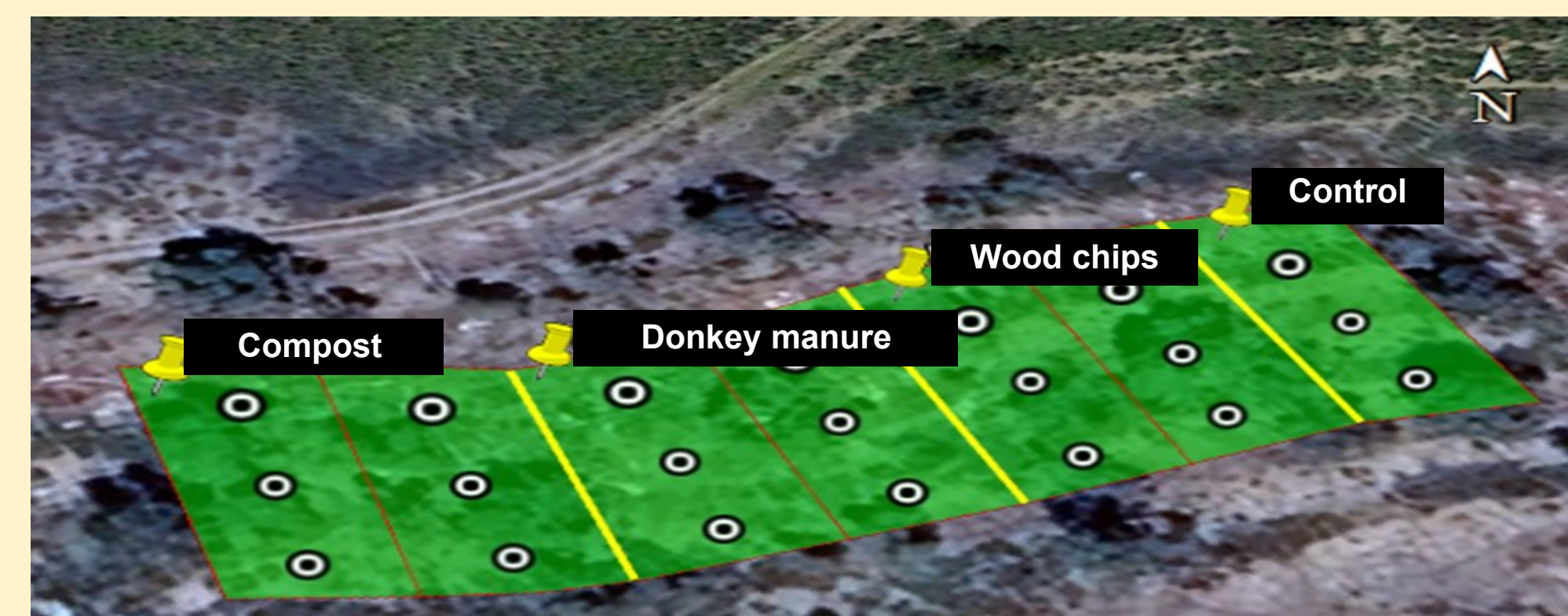


Figure 1. Map of the study area with the discrimination of the treatments applied (compost, donkey manure, wood chips and control).

- Six pitfall traps per treatment.
- Six samplings were performed, and arthropods were collected from the pitfall traps.
- Taxonomic identification: Formicidae, Diptera, Coleoptera and Arachnida.

Results and Discussion

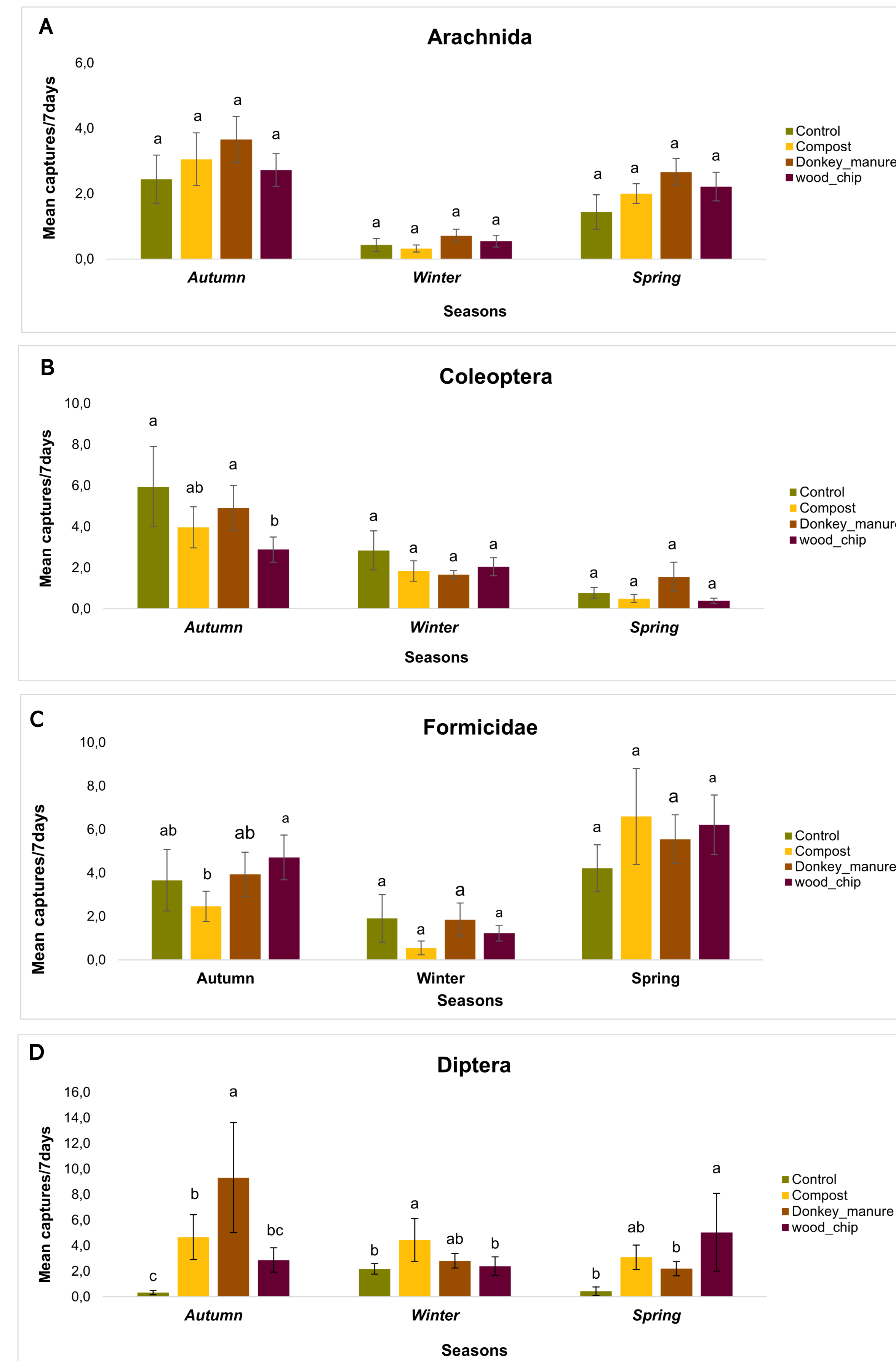


Figure 2. Arachnida abundance (mean ± standard error) (A), Coleoptera abundance (mean ± standard error) (B), Formicidae abundance (mean ± standard error) (C) and Diptera abundance (mean ± standard error) (D) in plots treated with Compost, Dunkey-Manure, Wood-chip, and Control (no treatment) during the autumn, winter, and spring periods. Different letters indicate significant differences between treatments within each period ($P < 0.05$).

- Diversity and Abundance rates are driven by **seasonal fluctuations**.
- **Species-specific response** to treatments.

Autumn:
 Donkey manure: ↘ Arachnida and Diptera
 Wood chips: ↘ Formicidae

Winter:
 Donkey manure: ↘ Formicidae and Arachnida
 Compost: ↘ Diptera

Spring:
 Donkey manure: ↘ Arachnida
 Compost: ↘ Formicidae
 Wood chip: ↘ Diptera

Final Remarks

According to these results the applied **treatments** significantly **affect arthropod abundance**, with **seasonal variations** playing an important role. Wood chips and compost showed diverging results in abundance depending on the arthropod group and the season. **Donkey manure** registered increased abundance for most arthropod groups, especially in Autumn and Winter, highlighting its potential as an **effective soil conditioner** when it comes to promoting arthropod abundance. Further research is needed to assess the long-term impacts and relate to other soil health indicators.

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