

Arthropod Diversity in the Letea and Caraorman Forests, the Danube Delta (Romania)

TEODORESCU I. & COGĂLNICEANU D.

University of Bucharest

Summary: Arthropod diversity was investigated in six types of habitats, with different vegetation cover, ranging from mature old-growth forests, to grass-covered areas and sand dunes in the Letea and Caraorman forests (Danube Delta, Romania) during 1983-1984. Each investigated habitat type supports a distinct and characteristic arthropod community. The highest species richness was recorded from forests and grass-covered areas and the lowest on sand dunes. Insects were the dominant group considering both species (94.5 %) and family (91.2 %) richness. We suggest that conservation measures should focus not only on limiting the human impact in the area, but also on actively maintaining the habitat diversity.

Keywords: arthropod, species diversity, habitat diversity, forests, sand dunes

Introduction

Despite its recent formation of less than 2,500 years (GHENEA and MIHAILESCU, 1991) the Danube Delta has a high habitat and species diversity. More than 6,000 species and 32 ecosystem types were inventoried in the Romanian part of the delta alone since 1991 (OȚEL et al. 2000). The marine sandbars of Letea and Caraorman represent the vegetation unit L12A (psammophylic steppes with oak forests). They are partly covered by old-growth, natural forests, with trees (*Quercus robur*, *Q. pedunculiflora*, *Populus alba*, *Populus nigra*, *Fraxinus angustifolia*, *F. pallisae*, *Pirus piraster* etc.), shrubs (*Crataegus monogyna*, *Ligustrum vulgare*, *Evonymus europaea*, *Cornus mas*, *Cornus sanguinea* etc), the wines *Periploca graeca* and *Vitis silvestris*, different weeds (DONIȚĂ, N. et al., 1992). The high relief of the sand dunes (which reach up to 13 m - an unusual phenomenon in the delta), and the dense network of shallow lakes and channels generates a variety of habitats with different temperatures and humidity, patchly distributed. Thus sand dunes and grasslands alternate with forest stands, either mature, old-growth forests and plantations. This high vegetation diversity supports in turn a high invertebrate diversity.

The comparative inventory of arthropods inhabiting several major habitat types was done during 1983-84 and is reported here for the first time.

Materials and methods

Six different habitat types were investigated, of which five in Letea forest and one in Caraorman forest. In Letea, mature forest stands of hard-wood (*Quercus* spp.) and soft-wood (*Populus*, *Salix* and *Fraxinus*), sand dunes covered either with *Artemisia* or *Euphorbia*, and grass-covered areas (pastures).

To establish the species characteristic for different types of habitats, several sampling devices and/or methods were used: pitfall traps, hand collecting, entomological net mowing, fixed area searching etc. Collecting was done during four sampling trips totalizing 11 days, in 1983-1984. Data analysis was done using MVSP 3.1 and Biodiversity Pro softwares.

Results and discussion

A high diversity of arthropods belonging to four classes (Crustacea, Arachnida, Myriapoda and Insecta), 14 orders and 125 families were identified (Figure 1). Identification was not always done to species level, nevertheless at least 296 species were recognized in the samples. Insects were the dominant group at both family (91.2 %) and species levels (94.5 %).

The number of individuals captured in each of the six investigated types of habitats varied from 4 to 130 (Figure 2). Since the samples size varied largely among habitats, we used rarefaction to compare taxa richness (Figure 3). It appears that pastures (grasslands) have the highest rate of species accumulation, followed by forests, while dunes show the lowest species richness. The similarity tree shows an overall low degree of similarity between the different habitat types, with pastures being the most dissimilar (Figure 4). Sand dunes had low species richness, dominated by Myrmicidae and Formicidae, and their specific predators Myrmeleonidae larvae, with an extremely high density in the area (NEACȘU, P., TEODORESCU, IRINA, 1985).

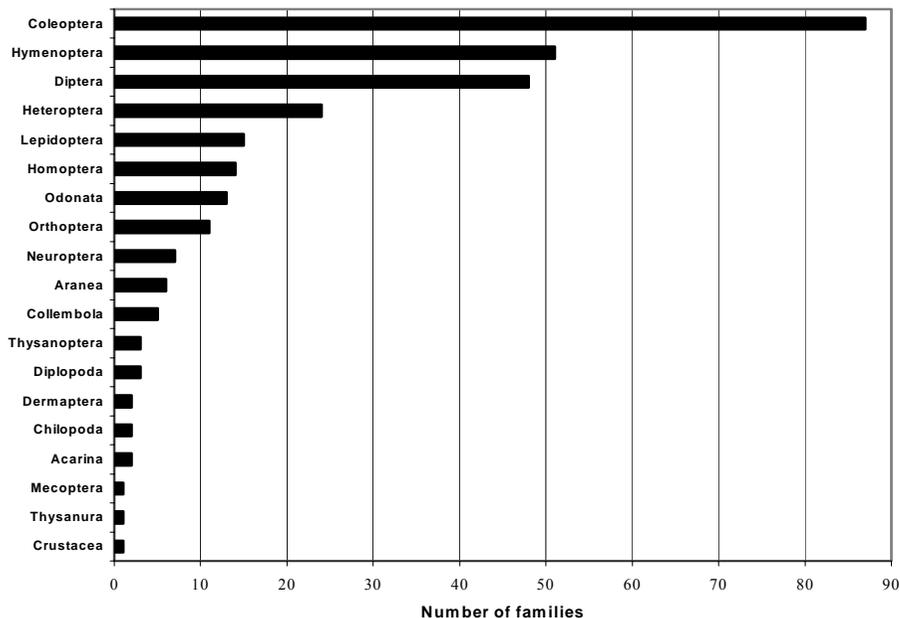


Figure 1. Arthropod family richness in higher taxa.

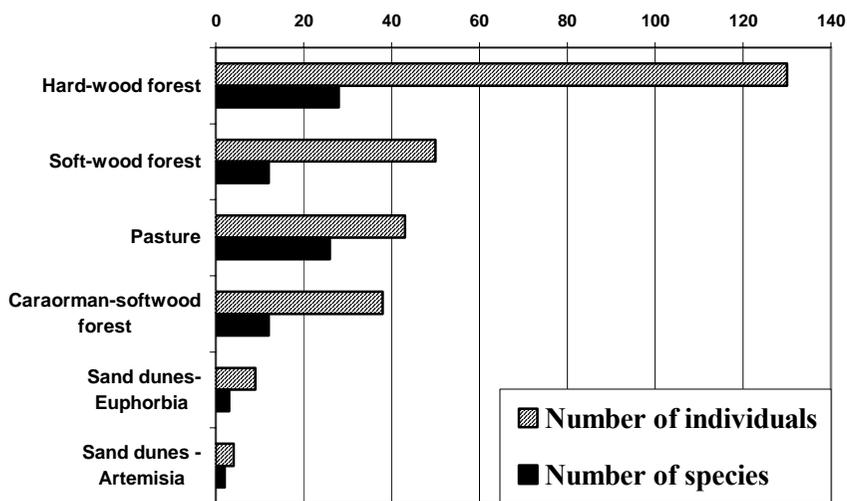


Figure 2. The number of arthropod individuals and species from six habitat types, five in Letea forest and one in Caraorman forest (Danube Delta, Romania).

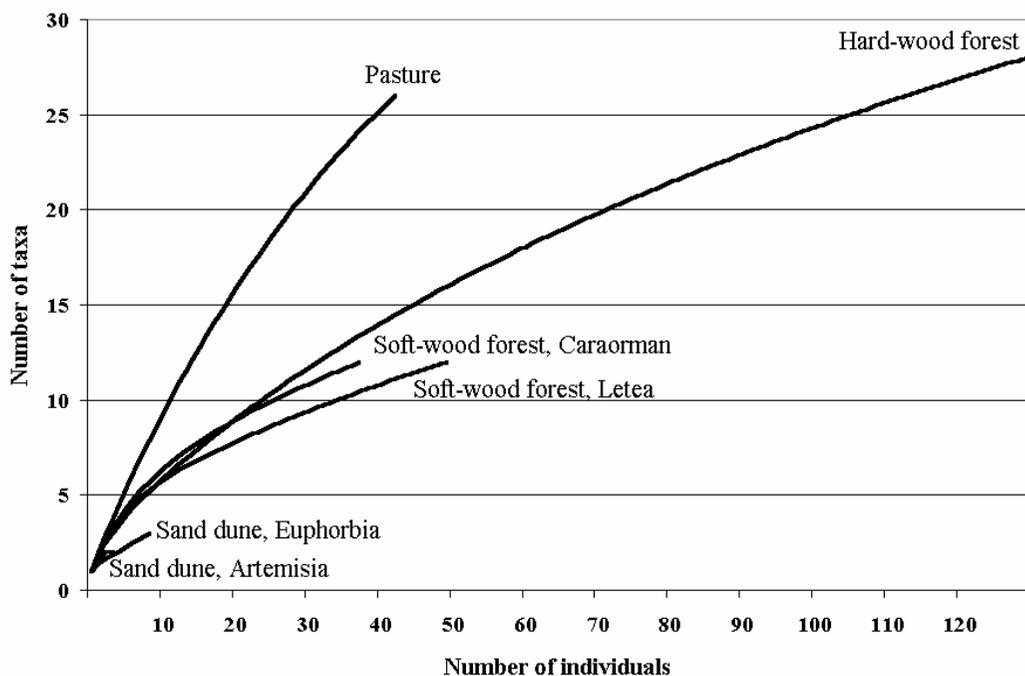


Figure 3. The rarefaction curves for the six habitat types investigated.

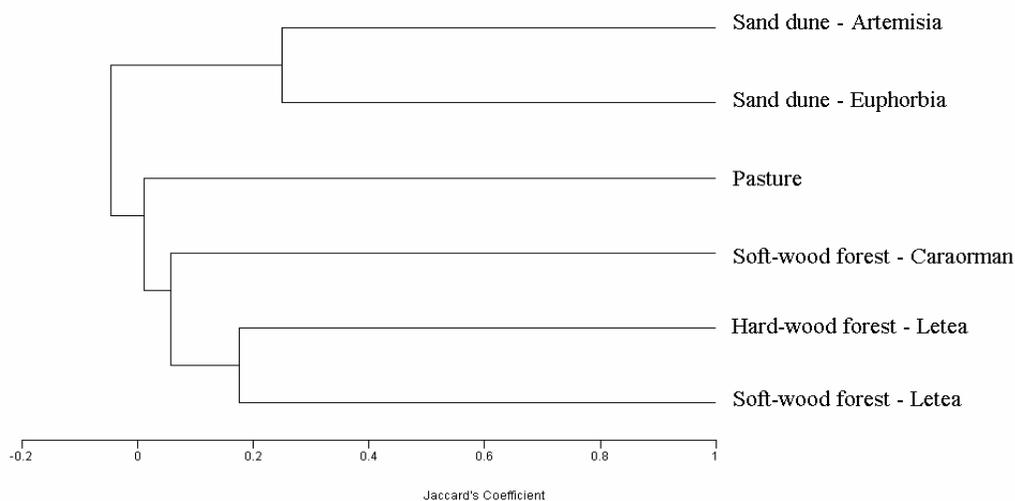


Figure 4. The degree of similarity between habitat types. Clustering was done using the unweighed centroid method from the symmetric similarity matrix computed using Jaccard index.

The high habitat diversity on the Letea and Caraorman sandbars supports distinct, diverse communities. Conservation measures must focus not only on limiting the human impact in the area, but also on actively maintaining this habitat diversity.

References

- DONIȚĂ, N. et al. (1992): *Vegetația României*. Editura Tehnică Agricolă. Bucharest.
- GHEEA, C., MIHAILESCU, N. (1991): Palaeogeography of the Lower Danube Valley and the Danube Delta during the last 15,000 years. p. 343-364. In: *Temperate Palaeohydrology*. STARKEL, K.J., THORNES, G., THORNES, J.B. Eds. John Wiley and Sons.
- NEACȘU, P., TEODORESCU, IRINA (1985): Distribuția în habitat a larvelor de mirmeleonidae din Delta Dunării. *Natura* 36: 42-44.
- OȚEL, V. et al. (2000): *The Red List of plant and animal species from the Danube Delta Biosphere Reserve. Romania*: 1-132. Fundația Aves.

Authors' Address:

University of Bucharest
Faculty of Biology, Department of Systems Ecology
Splaiul Independenței 91-95, 76201- Bucharest, Romania
Telephone +40-1-411.52.07
e-mail: danco@bio.bio.unibuc.ro