



Conference Abstract

Impact of different habitat parameters on carabid beetle assemblages in selected areas of a forest-field landscape in Poland - 10 years of data

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Abstract

Species diversity in a given landscape depends to a high degree on its habitat diversity. However, the specificity of different environmental factors may play a different role and individual habitats may undergo changes in time (succession). Moreover, some large-scale environmental factors may affect the habitats in the same way but differ from year to year. A long-term study was carried out with the aim to study

1. the impact of selected environmental factors on the carabid assemblages of individual study site over the years and
2. the impact of selected environmental factors on the carabid assemblages of the set of all study sites in selected years.

In order to deal with this task, the carabid beetles assemblages on different study sites in a forest-field landscape in Poland were collected using pitfall traps over a period of ten years (2009-2018). The sites were a planted pine forest (12 years old in 2009), a planted pine forest (31 years old in 2009), a naturally-regenerated pine stand (about 10 years old in 2009), a naturally-regenerated pine forest (about 67 years old in 2009), an naturally regenerated pine forest with a share of oak, beech and birch (about 82 years old in 2009), two irregularly-mown sites without biomass removal, and a regularly-mown site with

biomass removal. With respect to individual study sites the impact of the factors age (year of the study), temperature and rainfall in the year of inventory, and temperature and rainfall in the preceding year was tested. The impact of the factors age (stand age in the respective year), carbon in the organic layer, carbon in the mineral soil and distance from the nearest forest was analyzed for the set of all study sites in the years 2011 and 2015.

Altogether, 9208 individuals belonging to 77 species were collected. Redundancy Analyses (RDA) indicated that on the individual study sites the year of study was generally positively correlated with temperature and negatively with rainfall, indicating increasing temperatures and decreasing amount of rainfall over the years. For study sites in forest stands in most cases the rainfall was a significant factor, especially the rainfall in the year before the inventory. For study sites in open areas both rainfall and temperature showed significant results. Using Canonical Correspondence Analyses (CCA) for analyzing the impact of the factors on carabid assemblages of the full set of study sites in 2011 and 2015, it was shown that age was positively correlated with carbon in the organic layer, but not with carbon in the mineral soil. Significant factors were carbon in the organic layer and distance from the nearest forest.

The results of the study enlarge our knowledge on the impact of different predictable and stochastic environmental factors on the formation of carabid beetle assemblages in rural landscapes.

Keywords

Carabidae, Landscape, Succession, Forest, post-agricultural area

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