Abstract

Factors responsible for species diversity and composition in dry grasslands

In fragmented landscapes, plant species distribution may depend not only on local habitat conditions, but also on landscape structure in the present and habitat conditions and landscape structure in the past. Many recent studies explored effect of these factors on species diversity. There are, however, only few studies dealing with the relative importance of all these factors for both species diversity and composition. Moreover, most of these studies were carried out in forests.

The aim of this thesis was to identify factors responsible for species diversity and composition of dry grasslands patches in forested landscape of Křivoklátsko Biosphere Reserve. Specifically, I examined the effect of (1) current habitat conditions and landscape structure and (2) past landscape structure and continuity of the habitats for species diversity and composition at the study localities. (3) I assessed the relative importance of all these factors for species diversity and distribution in the landscape.

I analyzed information on past and present landscape structure using aerial photographs from 1938, 1973, 1988, 2000 and 2004-6. This information served as a basis for subsequent analyses as well as to describe changes in landscape structure in the studied region. Furthermore, I located accurate geographical position of all current dry grassland localities, recorded all species of vascular plants occurring at each locality, as well as recorded additional information on abiotic conditions of the localities. I used GIS to calculate total area of each locality and its isolation in the present as well as its continuity, isolation and area in the past.

The present distribution of dry grassland species in the study region is significantly affected by current habitat conditions, current landscape structure as well as by past landscape structure. The most important factors are current habitat conditions, especially in terms of proportion of rock, shallow soil, scree and deeper soil. Current landscape structure accounts for relatively little variation in species composition of the patches compared with historical structure, whereas it is almost as important as historical structure for species diversity. The highest diversity and specific species composition was found on large, well connected and continuous localities that were never forested since 1938. The changes in landscape structure in the past can thus have strong effects on current species distribution.

Key words: Dry grasslands, species diversity, species composition, landscape structure, past and present, habitat conditions.