

The distribution of plant functional types in Estonian agricultural landscapes



GREENVEINS

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Introduction

The expansion of fields, mechanisation, intensive use of different chemicals and fertilisers have become serious factors affecting the biodiversity of agricultural landscapes through fragmentation and decreasing quality of habitats. However, it is presumed that the biodiversity of agricultural areas might still persist due to the network of field margins and natural-vegetation patches, lately being referred to as green veining. To develop efficient protection strategies we need thorough knowledge how species with different ecological characteristics respond to agricultural disturbance and changes in landscape structure.

Methods

We studied the vegetation of 6 Estonian agricultural landscapes with an area of 4x4 km. Landscape test sites differed in regard to landscape structure and land use intensity.

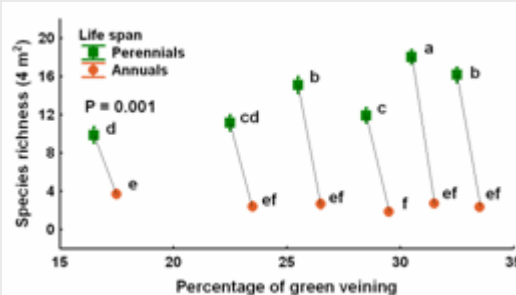
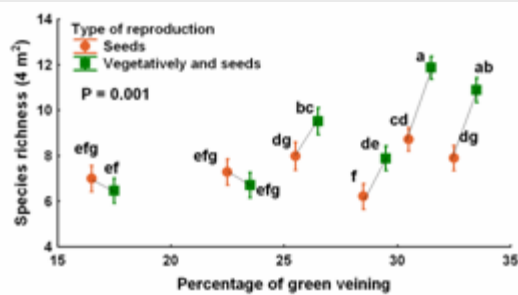
Vegetation relevés of the field margins were recorded on plots with the size of 2x2 m. All plant species described in vegetation sample plots were later provided with data about reproductive and life span characteristics on the basis of BioFlor database.

Local and large-scale landscape structural properties were characterised using digitized maps. A group of land-users from each landscape was interviewed to assess the land use intensity.



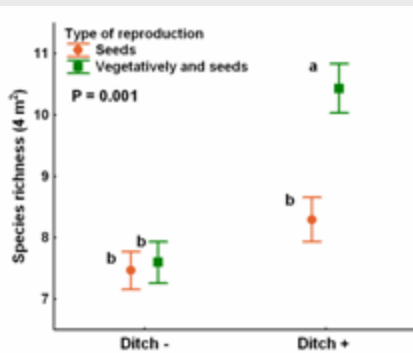
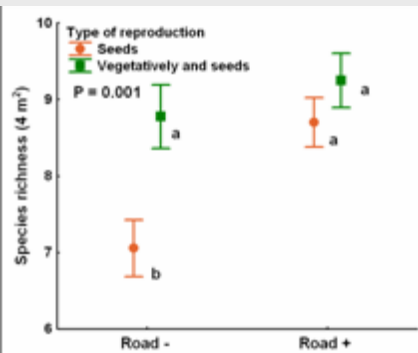
The location of study sites

Results



The proportion of annuals and species reproducing with seeds is higher in landscapes with lower green veining percentage and higher land use intensity. The diversity of perennials and species that use both reproduction strategies (i.e. seeds and vegetative) is enhanced in landscapes with higher availability of green veining elements.

Conclusions



The species richness of plants reproducing with seeds was significantly higher in the field margins adjacent to roads, while the diversity of species reproducing vegetatively, or both vegetatively and with seeds, was enhanced in the vicinity of ditch banks.

The results of the present study suggest that lower availability of natural and semi-natural habitats and higher land use intensity may cause significant changes in the distribution and proportion of plants with different ecological characteristics. Annuals and species reproducing with seeds are more prevalent in the field margins of high-intensity landscapes with lower green veining proportion.

Habitats characterised by higher disturbance at local scale, e.g. road verges, enhance the diversity of species reproducing with seeds, while ditch banks facilitate the formation of vegetation composed of species which reproduce vegetatively or both with seeds and vegetatively.

