Landscape structure, land use and habitat management intensity as factors of biodiversity

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Introduction

To establish vulnerability of biodiversity in agricultural landscapes.

Land use intensity: applied fertilisers and pesticides, are expected to have negative effect on biodiversity of natural communities within an agricultural landscape.

The effect of land use intensity might be decreased in more structured landscapes, giving options for living organisms to find habitat and to move from patch to patch through so called green corridors.
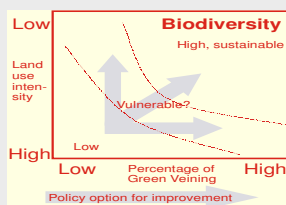
Which indicators are informative in nature quality assessment of forests and their biodiversity?

For that should be clear:

Which structural parameters of forest do affect biodiversity?

How those indicators depend on management?

How to estimate a 'nature quality' rate of the forest site?
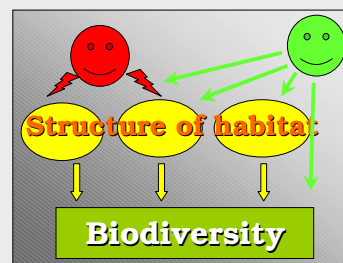
Causal relationship: Management → Structure & Biodiversity
Recognition: Structure → Management & Biodiversity

Data

Project Objects: 25 Landscape Test Sites in 7 countries in North-Western Europe according to land use intensity and Green Veining ranges

Method: flora sampling at random locations

In Estonia: 1046 flora relevees in 4 LTS (cropfields, field-edges, road-verges, semi-natural grasslands, forests).
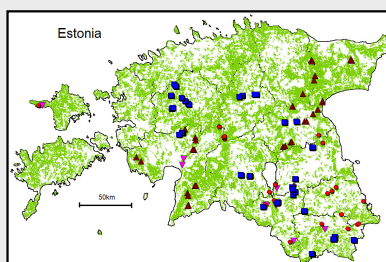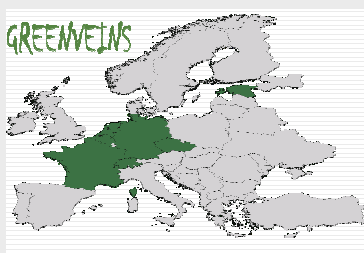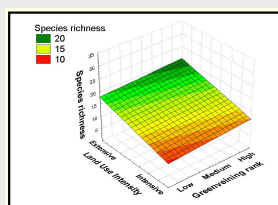

Pairs of stands from 6 forest site types scattered over the Estonian forestland
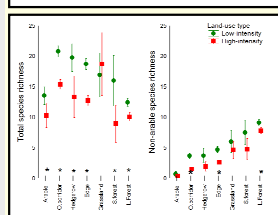
Age > 80yr
Area > 1 ha

Selected results

The species richness of herb layer (2x2m) is …
… higher in a landscape with low agricultural intensity;
… slightly higher in the landscape with higher green elements.

In the agricultural landscape, the species richness (2x2m) of herb layer is the highest in linear elements and semi-natural grassland patches. However, the diversity of non-ruderal plants is supported mostly by patches of forest and grassland. Share of native flora: 13-76%
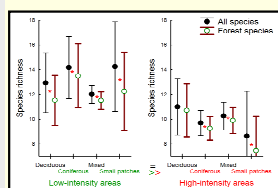

95% of species in forest patches present the 'true' forest species flora. The agricultural land-use intensity affects forest herb layer richness mostly in coniferous forest areas, and particularly, in small patches of forest.

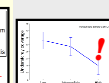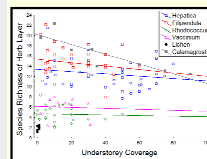| Factor in linear elements	Quantitative effect on herb species richness	P
Intensive Land Use	-5.3	0.001
Ditch verge	1.2	0.033
Tree-line, hedgerow	-1.7	0.002
Road-verge	2.2	0.001
Greenveining	0.5	N.S.

GLM analysis on factors of herb layer biodiversity.
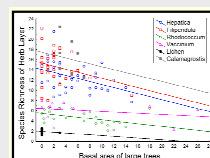
Forest age affects
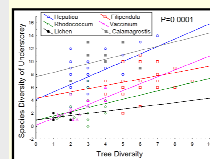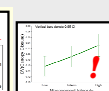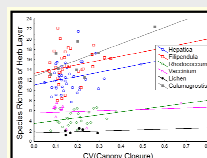
Forest age affects

Artificial Neural Networks analysis on indicators to recognise high nature value forests.

Indicator-model for boreal forest:
Log(DeadWood)
Woodpecker
age classes
Basal area
DCA1
Canopy closure

	%
Correct	
Intensive	93.5%
Natural	85.2%