

Relationships between the naturalness of the landscape and the nature conservation status of a particular habitat in it



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Introduction:

> two main endangering factors of natural habitats and landscapes are: 1) loss of area and 2) fragmentation landscapes

> conservation efforts often attempt to maintain (semi)natural landscapes as a whole with the biggest possible unfragmented area. This approach seems to be successful on landscape level, but is it suitable for the conservation of particular habitats in the landscape?

Questions:

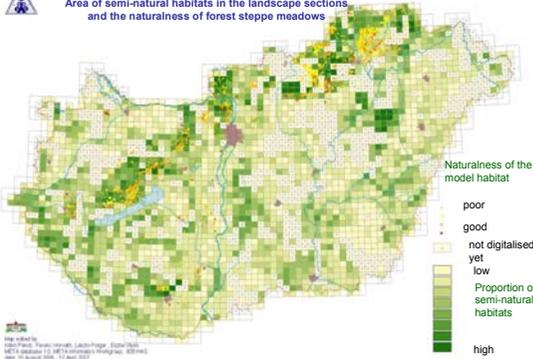
> Is the area of a particular habitat type is bigger in the landscape if there are more natural habitats in the landscape?

> Is the naturalness of a given habitat type is higher if there are more natural habitats in the landscape?

> Is the naturalness of a particular habitat type is higher when it occurs in bigger patches?

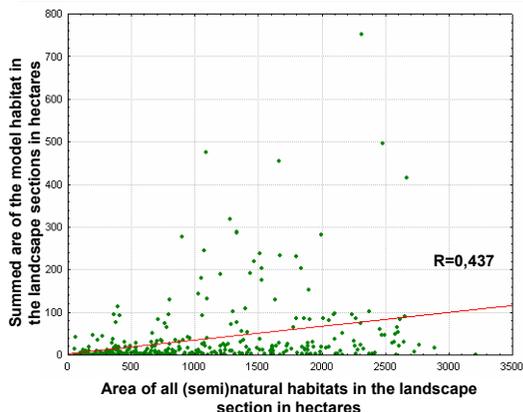


Area of semi-natural habitats in the landscape sections and the naturalness of forest steppe meadows



Results:

	number of objects	Spearman R	p-level	significance
Landscape level (section of 100 hexagons)				
summed area of all (semi)natural habitats × summed area of the model habitat	340	0,436984	0,0000	✓
Local level (in the hexagons of 35 hectares)				
summed area of (semi)natural habitats × area of the model habitat	3644	0,432871	0,0000	✓
summed area of (semi)natural habitats × naturalness of the model habitat	3628	0,20511	0,0000	✓
area of the model habitat × naturalness of the model habitat	3622	0,088276	0,0000	✓



The MÉTA project:

- satellite image supported field survey between 2003-2006 with the contribution of more than 200 mappers

- 35 ha hexagons as basic units covering the whole country (there are 300,000 hexagons)

- list of habitat types in each unit, area of habitat in the units, naturalness and 17 other attributes are documented for each habitat in the unit

The model habitat:

- The studied forest steppe meadows are typical Pannonian semi-dry grasslands with high nature conservation value. They are tall, dense meadows rich in forest, forest fringe and steppe species and mostly dominated by *Brachypodium pinnatum* and *Bromus erectus*.

- Natura 2000 code and name: 6250 Pannonic loess steppic grasslands and partly 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates

- Phytosociological name: *Cirsio-Brachypodium*

Naturalness:

In the MÉTA project we have evaluated the present condition and naturalness, based both on species composition and structure of all habitats on the spot on a 5 grade scale (1-5).

5: the best stands, characterized by the presence of habitat specialist and character species, good vegetation structure, no or low cover of weeds or invasive species and the site conditions are natural.

4: 'good': the stand is close to natural state or have regenerated well, vegetation structure is proper, natural species are dominant, it is also rich in characteristic species, although, rare, particularly valuable species are missing.

3: moderately degraded / moderately regenerated (e.g. in case of oldfields), the dominants are natural species, but hardly any characteristic ones can be found; or several characteristic species occur, but there are numerous disturbance-tolerant ones, even weeds present as well; site conditions are often somewhat deteriorated, the vegetation structure is poor (homogeneous or its patchiness is not natural).

2: the stand is even more degraded, really weedy, heavily grazed and trampled, or the cover of invasive species is high. Characteristic species are hardly present, and even the dominant ones are disturbance-tolerants.

1: no natural vegetation on the site (inbuilt, industrial, road, park)

Methods:

> We assessed the correlation between the overall naturalness of the landscape and the nature conservation status of a particular habitat in it to answer this question.

> We used the data from the database of Landscape Ecological Habitat Mapping Project of Hungary (MÉTA)

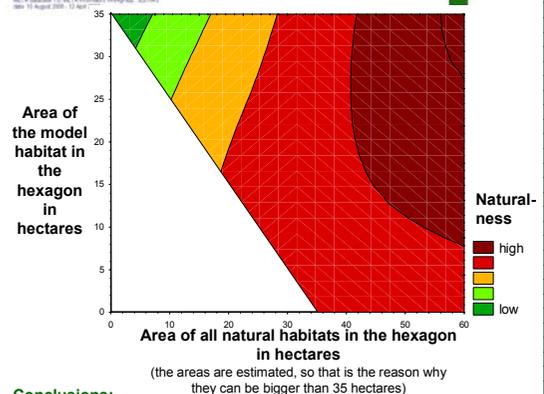
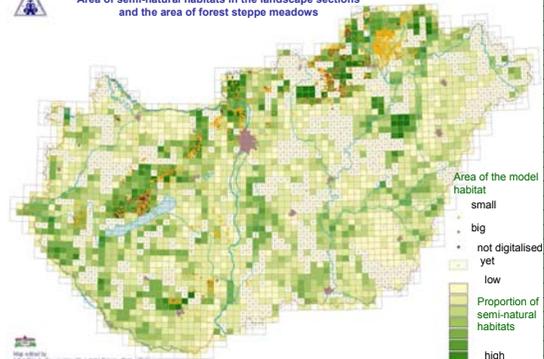
> We choose **forest steppe meadows** as model habitats due to their high nature conservation value - we performed our analysis on the 3969 hexagons where forest steppe meadow occurred

> We defined nature conservation status of the chosen habitat by the area of the habitat in the hexagon and its naturalness based conservation value derived from the database. The naturalness of the landscape was defined in two spatial levels, by the overall area of (semi)natural habitats within the same hexagon and by the overall area of (semi)natural habitats in landscape section containing app. 100 hexagons - we had 340 such sections.

> We used **Spearman's rank correlation** to explore the relationships in these two spatial scales. We worked with the Statistica program package.



Area of semi-natural habitats in the landscape sections and the area of forest steppe meadows



Conclusions:

> there was a significantly positive relationship between the overall area of (semi)-natural vegetation in the landscape and the area of the forest steppe meadows on both spatial scales, although the relationship between them was loose ($r=0,433$ and $r=0,437$).

> The naturalness based conservation status of the habitat was significantly correlated ($p<0,01$) with the overall area of natural and semi-natural vegetation on the finer scale and the area of model habitat, but the relationship was even weaker ($r=0,205$ and $r=0,08$).

> It seems that a more natural landscape somewhat contributes to the higher conservation status of the habitats in it, however this effect is rather weak and can not be driving factor in the future maintenance of the habitats.

Further reading:

> Molnár, Zs., Bartha, S., Serégyéyes, T., Illyés, E., Botta-Dukát, Z., Timár, G., Horváth, F., Révész, A., Kun, A., Bölöni, J., Biró, M., Bodoncz, L., Deák, J.A., Fogarasi, P., Horváth, A., Isépy, I., Karas, L., Kecskés, F., Molnár, Cs., Adrienne Ortmann-né Ajkai, A., Rév, Sz. (2007): A grid based, satellite-image supported, multi-attributed vegetation mapping method (MÉTA). *Folia Geobotanica*. In press.
> <http://www.novenyzetiterkep.hu/metal/en/index.shtml>