

DIFFERENCES IN PLANT SPECIES DIVERSITY BETWEEN MANAGED AND ABANDONED SEMI-NATURAL MEADOWS



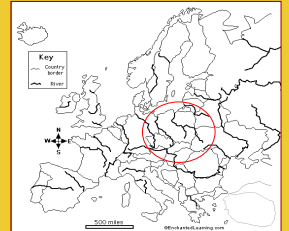
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Introduction

Meadows are very sensitive to changes in ecological conditions and land management practice (Zechmeister et al., 2003). Semi-natural *Molinion* meadows are disappearing because of their low economic significance. The aim of the present study was to examine changes in biodiversity in *Molinion* meadows that were managed differently. Differences between managed and abandoned meadows were identified. Typical and atypical forms of *Molinion* meadows were distinguished on the basis of the Disturbance Index (Z).



Methods

- > 228 samples were randomly collected using the Braun-Blanquet method and were entered into the TURBOVEG database.
- > data recorded included: richness, Shannon-Wiener Index, evenness, Ellenberg indicators, level of mowing tolerance, and disturbance index (Fig. 1).

$$Z = \frac{d}{1+N} + \frac{A+B^2}{C}$$

Fig. 1. Disturbance index

where: **d** represents the sum of the cover of each species characteristic for the order and class to which the community belongs multiplied by the number of these species; **N** the sum of cover of species characteristic for the alliance and association multiplied by the number of these species; **A** the sum of cover of each accompanying species multiplied by the number of these species; **B** the sum of the cover of each species indicative of changes multiplied by the number of these species; and **C** the sum of the cover of each species characteristic for the association, alliance, order and class to which the community belongs multiplied by the number of these species.

Samples of both abandoned and managed meadows with a disturbance index between 0 and 1 are considered to be typical forms, whereas samples with greater values are considered to be atypical.

Results

Managed meadows had a overall higher number of species, and had a higher level of biodiversity (Tab. 1). Species composition differed between managed meadows, recently abandoned meadows, and meadows that had been abandoned for more than ten years (Figs. 2 to 5). Based on the disturbance index, one typical form and six atypical forms could be distinguished: with woody plants; with *Calamagrostis epigejos*; with tall herbs; with *Molinia caerulea*; with *Nardus stricta*; and with *Solidago sp. div.*

	Managed	Abandoned	M vs A		Managed	Abandoned	M vs A
	Mean ± SE	Mean ± SE			Mean ± SE	Mean ± SE	
Number of samples	68	160		Number of samples	68	160	
Disturbance Index (Z)	4.86 ±0.78	34.20 ±5.25	**	Number of species moderately to well tolerant to mowing (4-6)	19.11 ±0.66	16.49 ±0.38	**
Richness	34.29 ±0.93	29.58 ±0.56	**	Number of species well to very tolerant of mowing (7-9)	5.07 ±0.31	3.65 ±0.16	**
Shannon-Wiener Index	2.80 ±0.04	2.57 ±0.04	**	Ellenberg indicators: Light	6.96 ±0.01	6.91 ±0.01	*
Evenness	0.79 ±0.01	0.76 ±0.01	*	Temperature	5.50 ±0.02	5.41 ±0.02	**
Cover of <i>Molinion</i> species	60.97 ±3.12	50.74 ±2.00	**	Soil Reaction	6.38 ±0.07	5.89 ±0.06	**
Cover of <i>Molinio-Arrhenatheretea</i> species	109.59 ±2.56	90.41 ±2.53	**	Moisture	6.26 ±0.07	6.46 ±0.05	*

Table 1. Characteristics of managed and abandoned *Molinion* meadows. Significant differences determined using the U Mann-Whitney test are marked at ** p < 0.01, * p < 0.05

Conclusion

Mowing is the most important factor in conserving *Molinion* meadows. After meadows are abandoned, succession takes place and alien species appear, reducing species diversity.

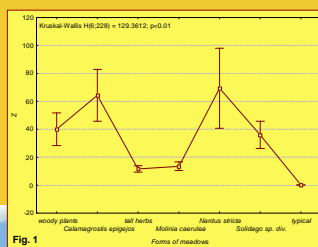


Fig. 1

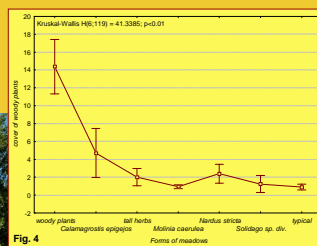


Fig. 4

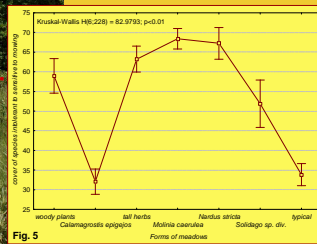


Fig. 5

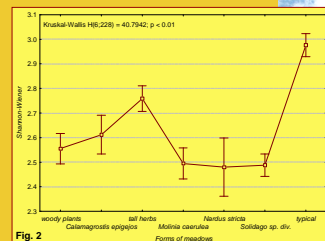


Fig. 2

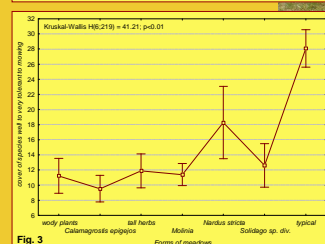
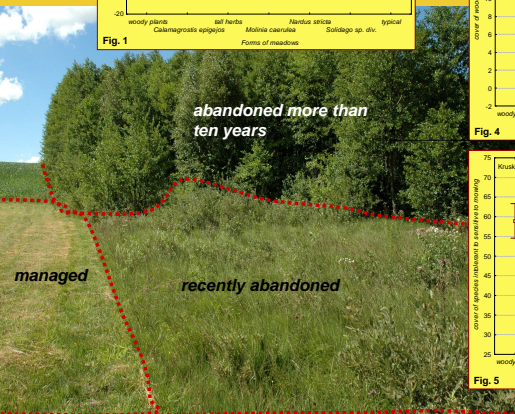


Fig. 3



managed

abandoned more than ten years

recently abandoned



Endangered species characteristic for *Molinion* meadows.

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