

INFLUENCE OF EXTENSIVE MANAGEMENT ON BOTANICAL COMPOSITION OF PERMANENT MEADOW SWARD

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Abstract

The aim of undertaken investigations was to find the possibilities of grassland management with special respect to the biodiversity and the landscape conservation. Changes in botanical composition of the meadow sward against a background of different mowing utilization were examined on the semi-natural meadows situated on the peat-mursh soil in Masurian Landscape Park (north-east Poland). The areas mown with biennial pause and completely turned off from uses followed gradual simplifying of species composition and increasing of bog species participation. Results show on advisability of passing one harvest each year or with one-year pauses.

Keywords: Meadow uses, extensification, botanical composition, protective landscape

Introduction

Permanent grassland occur in the Masurian Lakeland (north-east Poland) constitute 32% of arable lands. Most of them are situated on peat soils. This region is characterized by

great variety of flora and fauna, large forests, numerous lakes and peatlands. Masurian Landscape Park was established on that area in 1977. This is one of the largest landscape parks in Poland; it covers 70 000 ha. Grassland occupies some 12% of the area (Polakowski, 1985). Due to their botanical diversity, they influence the specific character of the region and give the impression of natural landscape (Olkowski and Olesiński, 1976). Most of them are completely turned off from uses. Traditionally, extensification have supported a wide diversity of grassland species and plant associations (Fisher and Rahmann, 1997). Thus, the aim of this study was to find out the possibilities of extensive grassland utilization with special respect to the biodiversity of protective landscape.

Material and Methods

The investigations were conducted in the years 1994-1999 on semi-natural grasslands in the central area of the Masurian Landscape Park (north-east Poland), 118 m above sea level, 53°45' N. Previous management of this grasslands (until 1986) involved yearly mineral fertilization on the average level 300 kg NPK/ha. Hay was cut in early-mid June and early September each year. After 1986, no fertilizers were used and the meadows were cut for hay once only in late June or in early July. The investigative objects were situated in two places: Leleki (meadow A) and Warnowo (meadow B). Dealt out areas were used with three manners: traditionally (gathering one swath every year), with one-year pauses in use and at intervals biennial. For comparative aims one part of the meadow was completely turned off from uses. Each year the botanical composition of the sward and the total number of species were estimated.

Results

The documental materials of undertaken work show the high differentiation in botanical composition in every site (Table 1 and 2). In the beginning of the investigations (1994) meadow sward contained some valuable plant species. For instance *Alopecurus pratensis*, *Phleum pratense*, *Trifolium repens*, *Vicia angustifolia* (meadow A) and *Festuca pratensis*, *Lathyrus pratensis*, *Lotus uliginosus* (meadow B). Many of the most attractive species such as, *Achillea millefolium*, *Campanula patula*, *Carex stellulata*, *Cirsium oleraceum*, *Dactylorhiza incarnata*, *Filipendula ulmaria*, *Lychnis flos-cuculi* and *Veronica chamaedrys* were recovered. The results showed that the areas mown with biennial pauses and completely turned off from uses followed gradual increasing of bog aggressive species such as, *Phragmites australis*, *Phalaris arundinacea* and decline of *Festuca pratensis*, *Holcus lanatus* and several legumes. The number of species decreased in both methods of utilization. As can be seen there was no distinct differences in the number of species found at traditional management and with one-year pauses.

The landscape perspectives in Masurian Lakeland are becoming increasingly important functions of permanent meadows situated on peat soils. The effects of our work show on advisability of passing one harvest each year or with one-year pauses.

References

Fisher, G.E.J., Rahmann G. (1997). Extensification – benefits and disadvantages to grassland biodiversity. *Grassland Science in Europe* **2**: 115-123.

Olkowski, M. and Olesiński L. (1976). Changes of peat bogs environment of northeastern Poland as a result of human intervention. *Proc. 5th. Int. Peat Cong.*, Poznań, Poland, pp. 183-190.

Polakowski, B. (1985). In: *Masurian Landscape Park*. L.S.W., Warszawa, (in Polish), pp. 29-75.

Table 1. Changes in botanical composition – meadow A (% of DM)

Main species and plant groups	Methods of utilization							
	a		b		c		d	
	1994	1999	1994	1999	1994	1999	1994	1999
<i>Phalaris arundinacea</i>	6.2	5.7	7.5	6.3	6.0	8.0	8.3	11.3
Other grasses	16.4	20.4	17.9	21.0	15.7	18.1	18.6	20.6
Legumes	4.2	2.6	5.3	3.3	5.0	2.6	3.9	0.5
Reeds	37.8	39.1	40.1	42.0	38.1	40.7	44.4	47.1
Herbs and weeds	35.4	32.2	29.2	27.4	35.2	30.6	24.8	20.5
(Number of species)	30	31	33	33	29	26	28	25

a – areas utilized traditionally, b – areas utilized with one-year pauses,
c – areas utilized with biennial pauses, d – areas completely turned off from uses.

Table 2. Changes in botanical composition – meadow B (% of DM)

Main species and plant groups	Methods of utilization							
	a		b		c		d	
	1994	1999	1994	1999	1994	1999	1994	1999
<i>Festuca pratensis</i>	18.2	13.1	16.6	8.0	15.2	-	19.3	-
<i>Holcus lanatus</i>	20.7	23.7	21.5	12.7	19.3	8.1	22.8	2.5
<i>Phragmites australis</i>	-	0.7	-	6.0	0.8	11.5	-	24.2
Other grasses	12.3	13.6	11.7	15.1	14.3	19.2	10.7	1.7
Legumes	2.6	5.2	3.2	1.7	3.0	4.1	2.1	8.8
Reeds	6.0	8.0	5.7	4.2	5.8	8.3	6.4	8.6
Herbs and weeds	40.2	35.7	41.3	52.3	41.6	48.8	38.7	50.6
Shrubs (<i>Salix cinerea</i>)	-	-	-	-	-	-	-	3.6
(Number of species)	35	34	36	37	34	30	37	32

Explanations as in Table 1.