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CONTRIBUTIONS REGARDING THE PASTORAL VALUE OF THE GRASSLANDS IN THE MIERSIGULUI PLAIN (Bihor County)

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Abstract

Grasslands are an essential element of sustainable agriculture systems represented by: ensuring fodder, animal welfare, soil quality and optimal use of poorly productive land, especially for biomass production, renewable energy source.

This study aims to analyze the floristic composition and the pastoral value of a permanent pasture, dominated by phytocoenosis Anthoxantho-Agrostietum capillaris, located in the Miersigului Plain (Bihor County), trying to identify measures to improve.

The assessment of the participation of the component species and the floristic composition was based on the floristic surveys, after which the pastoral value was evaluated.

Key words: phytocoenoses, pastoral value indicator, grasslands, fodder quality index.

INTRODUCTION

Keeping the grassy lawn of the grasslands in balance is an art that the manager of the pastoral fund must master thoroughly, starting with the knowledge of the plants, the needs of fertilizers and their humidity, appropriate methods of use by grazing or mowing and other measures (Maruşca, 2006).

The process of photosynthesis in the ecosystems of the grasslands is intensified by the fodder plants and a greater amount of organic matter is introduced into the soil, maintaining an active biological life in the soil. Through the roots of meadow fodder plants, which act as a binder in the presence of organic matter, the process of destroying the granular structure of the soils is stopped, in most cases leading to their improvement (Mocanu, Hermenean, 2013; Simtea et al., 1990).

In the studied area, the floristic composition of the *Anthoxantho-Agrostietum capillaris* phytocoenosis is rich and varied, in which the edifying species *Agrostis capillaris* and *Anthoxanthum odoratum*, in a codominant relationship, are quantitatively affirmed.

It occupies slightly to moderately sloping terrain, with damp-wet soils, with the soil reaction being slightly acidic to neutral, fitting into the habitat

R3804 daco-getic grasslands of *Agrostis capillaris* and *Anthoxanthum odoratum* (Doniță et al., 2006, Gafta et al., 2008).

MATERIAL AND METHODS

The pastoral value (V. P.) is a synthetic index of characterization for the quality of a grassland that includes the main elements related to the floristic composition, the percentage of coverage for each species, as well as the nutritional value of the component species.

The floristic composition of a grassland and the appreciation of the participation of the component species is done by one of the classical methods named after the initiators:

- phytosociological method, Braun-Blanquet
- pratological method, Klapp-Ellenberg
- double meter method, Daget-Poissonet
- gravimetric method

The evaluation of the participation of the component species and the floristic composition was made by combining the phytosociological method with the pratological method.

The phytosociological method appeals to the appreciation of the abundance and dominance (ADm) of the species in the grassy area on 25-100 m^2, in representative key points, being noted on a 6-step scale, which correspond to the participation percentages: 5 with a coverage average of 87.5%, 4 with a coverage average of 62.5%, 3 with a coverage average of 37.5%, 2 with a coverage average of 17.5%, 1 with a coverage average of 5%, + with a coverage average of 0.5% (Ivan, Doniţă, 1975; Cristea et al., 2004).

The taxa identified in the field have been recognized by specialty catalogues "Romania's Illustrated Flora" (Ciocârlan, 2009), in conjunction with the information provided by the "International Code of Botanical Nomenclature" (Code de Tokyo, 1993). The pratological method emphasizes the assessment of the percentage share in biomass of botanical components by economic groups: *Poaceae*, *Fabaceae* and species from other botanical families. For the determination of the pastoral value the following formula was used (Maruşca et al., 2014):

$$P.\ V. = \Sigma PC\ (\%) \times \frac{IC}{5}$$

where: P. V. – pastoral value indicator (0-100);
P. C. – participation in the grassy area (%),
I. C. – fodder quality index.

Having at disposal the floristic surveys from the field, with the percentage participation of species, the fodder quality index (I. C.) is passed next to each one, namely: 5 excellent nutritional value, 4 very good nutritional value, 3 good nutritional value, 2 average nutritional value, 1 poor nutritional value (Maruşca, 2012; Rotar et al., 2009).

After determining the pastoral value indicator by dividing by 5 the score obtained from the multiplication of P.C. x I.C., it is assessed as follows: 0-5 (degraded grassland), 5-15 (very weak), 15-25 (weak), 25-50 (medium), 50- 75 (good), 75-100 (very good) (Maruşca et al., 2014).

RESULT AND DISCUSSION

In most cases, *Agrostis capillaris* meadows, with medium productivity, are characterized by the presence in the floristic composition of the xero-mesophile and xerophile species, which imposes on the meadows a specific character, together with the dominant-edifying species, *Agrostis capillaris*.

Among the species of grasses (*Poaceae*), which accompany *Agrostis capillaris*, becoming even codominant species, we mention: *Anthoxanthum odoratum* (as in our case), *Festuca valesiaca*, *F. rupicola*, *F. pseudovina*, *Briza media* - species that have poor nutritional value, or *Bothriochloa ischaemum* - species without nutritional value.

The vegetation of these grasslands is mainly occupied by grass species and some shrubs, the floristic composition being rich and varied (Table 1). The species belonging to the *Poaceae* family occupy the highest percentage of the floristic composition (71%), where dominant is *Agrostis capillaris* (32%), followed by *Anthoxanthum odoratum* (18%), *Cynodon dactylon* (9%), *Festuca pratensis* (3%) and *Lolium perenne*, *Holcus lanatus*, *Cynosurus cristatus* with 2% each. The *Fabaceae* family is well represented by *Trifolium pratense* (4%), *Trifolium repens* (3%), *Trifolium campestre* (2%) and *Lotus corniculatus* (2%). Among the species from other botanical families, a higher share has *Achillea millefolium* (3%) and *Plantago lanceolata* (3%).

Species from other botanical families, which are of interest from a nutritional value point of view, are relatively few in number. Among them we mention: *Achillea millefolium*, *A. collina*, *Plantago lanceolata*, *P. major*, *Carum carvi*. Also, in these meadows, unconsumed or harmful species are usually found - *Eryngium campestre*, *Euphorbia cyparissias*, *Symphytum officinale*, *Rumex acetosella* - the sedge being poorly represented - *Juncus effusus*, *Juncus inflexus*.

Agrostis capillaris meadows, with medium productivity, naturally have a yield of 5 - 7.5 t/ha of green mass and a grazing capacity of 0.5 - 0.8 units of large cattle/ha. *Agrostis capillaris*, with a good nutritional value (3), is a valuable grass forage, with a high degree of consumability.

Table 1

Species Inventory and Pastoral Value Indicator

Species	% P.C.	I.C.	P.C. x I.C.
Poaceae	**(71)**		
Agrostis capillaris	32	3	96
Anthoxanthum odoratum	18	1	18
Alopecurus pratensis	1	4	4
Briza media	+	1	1
Cynodon dactylon	9	1	9
Cynosurus cristatus	2	3	6
Dactylis glomerata	1	5	5
Festuca pratensis	3	5	15
Festuca rupicola	+	1	0
Holcus lanatus	2	2	4
Lolium perenne	2	5	10
Phleum pratense	1	5	5
Fabaceae	**(12)**		
Lotus corniculatus	2	4	8
Melilotus alba	+	2	0
Trifolium campestre	2	2	4
Trifolium dubium	1	2	2
Trifolium hybridum	+	4	0
Trifolium pratense	4	4	16
Trifolium repens	3	4	12
Vicia angustifolia	+	3	0
Vicia cracca	+	3	0
Species from other botanical families	**(17)**		
Achillea collina	+	2	0
Achillea millefolium	3	2	6
Carum carvi	+	2	0
Filipendula vulgaris	+	1	0
Fragaria vesca	+	1	0
Galium verum	1	1	1
Leontodon hispidus	+	1	0
Leucanthemum vulgare	+	1	0

Plantago lanceolata	3	2	6
Plantago major	1	2	2
Eryngium campestre	+	0	0
Lysimachia nummularia	+	0	0
Agrimonia eupatoria	1	0	0
Bellis perennis	1	0	0
Centaurea jacea	1	0	0
Crataegus monogyna	+	0	0
Euphorbia cyparissias	+	0	0
Galium mollugo	1	0	0
Juncus effusus	2	0	0
Juncus inflexus	+	0	0
Lychnis flos-cuculi	+	0	0
Ononis arvensis	+	0	0
Symphytum officinale	+	0	0
Potentilla reptans	1	0	0
Prunella vulgaris	1	0	0
Prunus spinosa	+	0	0
Rosa canina	1	0	0
Rumex acetosella	+	0	0
Stachys germanica	+	0	0
Tanacetum vulgare	+	0	0
TOTAL	**100**	–	**230**
Pastoral Value	–	–	**46**
Appreciation P. V.	**Medium**		

CONCLUSIONS

According to the floristic composition, the *Agrostis capillaris* meadows, in which the xero-mesophile and xerophile species abound, make the transition from the steppe meadows in the plain and low hills, to the mesophilous ones in the hill and mountain regions.

The pastoral value of the permanent grassland dominated by phytocoenosis *Anthoxantho-Agrostietum capillaris* is 46 which indicates a medium value. It is recommended to stimulate the development and appearance in the grassy carpet of forage species that regenerate faster, improving the floristic composition, over-seeding of the meadow with valuable forage species, combating woody vegetation and heaps.

Organizing rational grazing and eliminating irrational grazing - the diversity of plant species and the pastoral value of the meadows decrease with the increase of the grazing intensity; overgrazed grasslands are dominated by species with low palatability.

The most important action that should be taken is the development of a long-term pastoral arrangement, thus leading to the restoration of the habitats that form the pastures.

REFERENCES

1. Braun–Blanquet J., 1951, Pflanzensoziologie, Grundzüge der Vegetationskunde, 2nd edition, Springer Verlag, Wien.
2. Braun-Blanquet J., 1964, Pflanzensoziologie, Ed. III. Springer-Verlag, Wien-NY.
3. Ciocârlan V., 2009, Flora ilustrată a României. Pteridophyta et Spermatophyta, Edit. Ceres, Bucureşti, 1138 p.
4. Doniță, N., A. Popescu, M. Paucă-Comănescu, S. Mihăilescu, I. A. Biriș, 2006 – Habitatele din România. Modificări conform amendamentelor propuse de România și Bulgaria la Directiva Habitate 92/43 EEC. Edit. Tehnică Silvică, București, 496 p.
5. Ellenberg H., 1974, Zeigerwerte der Gefässpflanzen Mitteleuropas - Scripta Geobotanica, Göttingen, 9:1-97.
6. Ellenberg H., 1979, Zeigerwerte der Gefässpflanzen Mitteleuropas, 2nd edition – Scripta Geobotanica, Göttingen, 9:1–122.
7. Gafta, D., J. O. Mountford, V. Alexiu, P. Anastasiu, M. Bărbos, P. Burescu, G. Coldea, C. Drăgulescu, M. Făgăraș, I. Goia, G. Groza, D., Micu, S. Mihăilescu, O. Moldovan, L. A. Nicolin, M. Niculescu, A. Oprea, S. Oroian, M. Paucă-Comănescu, I. Sârbu, A. Șuteu, 2008, Manual de interpretare a habitatelor Natura 2000 din România. Editura Risoprint, Cluj-Napoca, 101p.
8. Cristea V., D. Gafta, F. Pedrotti, 2004, Fitosociologie. Edit. Presa Universitară Clujeană, Cluj-Napoca, 233p.
9. Ivan D., N. Doniță, 1975, Metode practice pentru studiul ecologic şi geografic al vegetaţiei, Editura Universității București, 301 p.
10. Maruşca, T., 2006, Îndrumar metodologic de gospodărire ecologică a pajiștilor în ariile protejate. Academia de Ştiinţe Agricole şi Silvice ″Gheorghe Ionescu Şişeşti″, Bucureşti. Institutul de Cercetare–Dezvoltare pentru pajişti Braşov.
11. Maruşca T., A. Blaj, M. Rusa, 2012, Tehnologii de creştere a valorii pastorale pentru pajiştile montane. Academia de Ştiinţe Agricole şi Silvice Gheorghe Ionescu Şişeşti, 50p.
12. Maruşca T., V. Mocanu, C. Haş, A. Tod, C. Andreoiu, M. Dragoş, A. Blaj, A. Ene, D. Silistru, E. Ichim, M. Zevedei, S. Constantinescu, V. Tod, 2014, Ghid de întocmire a amenajamentelor pastorale. Editura Capolavoro, Braşov, 248p.
13. Mocanu V., I. Hermenean, 2013, Mecanizarea lucrărilor agricole pe pajişti. Tehnologii, maşini şi echipamente, Ed. Universităţii ″Transilvania″ din Braşov.
14. Simtea N., V. Cardaşol, Şt. Crăciun, Gh. Boldea, 1990, Reînsămânţarea şi supraînsămânţarea pajiştilor, Întreprinderea Poligrafică, Deva.
15. Rotar, I., R. Vidican, N. Sima, 2009, Cultura pajiștilor și a plantelor furajere. Lucrări Practice. Edit. Risoprint, Cluj–Napoca, 251 p.
16. *** Code of Botanical Nomenclature, Tokyo, 1993, Boissiera, 49, Geneve, 1995: 1-85.