THE EFFECT OF TECHNOLOGICAL INPUTS ON A GRASSLAND FROM APUSENI MOUNTAINS

Anca BOGDAN[1], Ioan ROTAR[1], Florin PACURAR[1],Laura DALE[1]
E-mail: ancadorinabogdan@yahoo.com

Abstract

High grassland biodiversity is generally associated with low-input livestock systems that support less than 1 LU per ha. A climatic change, world population growth and uncertainties concerning suplies of fossil energy and water are reserch challenges. In this conditions, mountains farming with traditional management present a promising alternative to survive. The objective of our study is to evaluate the effect of technological inputs (mowing and grazing) on a grassland from boreal floor, Apuseni Mountains.

Key words:boreal floor, technological inputs, Apuseni Mountains

Over a long period of time no elementary management measures were aplied to permanent meadows in Romania, and it was assumed that they could provide efficient yields without technological inputs even if grazing began early in sping and continued to late in autumn (Samuil et. al., 2011). Grassland's management by low-input might be a viable method for maintaining the high conservative value grassland (Pacurar et all., 2010). Most traditional management tehniques in Romania, used organic fertilization with manure, combined with the mixed uses -mowing and grazing (Morea, 2008 cited by Pacurar, 2011). The efect of management intensity (two, three, four cuts per year and adapted fertilisation) was tested in Austria for coverage of most frequent species, where the significant changes in coverage were recorded after two cuts.

MATERIAL AND METHOD

Experimental field is located in the Poienile Ursului, Gârda de Sus village, Alba County, Apuseni Mountains at 1380 m elevation, with southern exhibition on a slope of 5 % and a type of soil districambosol. The experience has 5 experimental variants in 5 repetitions, placed according to random blocks method. The size of experimental parcel is 6 m^2. The experimental variants are the following: : V1 = abandon; V2 = traditional mown; V3 = yearly mown; V4 = mown twice per year; V5 = grazing. Technological inputs were applied differently. The floristic studies have been performed according to Braun-Blanquet method. For floristic data, the mean abundance-dominance (ADm) and constancy (K) were calculated.

RESULTS AND DISCUSSIONS

The grassland type is *Agrostis capillaris* L.-*Festuca rubra* L. and is present in all variants. In this year of experiment we can observe a variation of Poaceae' s number. In the last two variants (V4 and V5) the percentage of Poaceae' s is lower and is increasing in the other variants. Of Poaceae species that has the highest mean abundance-dominance (ADm) is *Agrostis capillaris,* with 29.5 % with most frequent coverage of 27.5 %, followed by *Festuca rubra* with an ADm of 17.5 % and the most frequent value of coverage 17.5 % cover.

The Fabaceaes family are increasing from abandon to other variants. In variant which was traditional mown the percent of Fabaceaes achieve the highest percentage (16.9 %). Edifying species are *Trifolium pratense* and *Trifolium repens* (K=V) and their cover is variating from one variant to other.

In terms of other botanical families, highest percentage is found in abandonated variant (72.04 %) followed by grazing variant. The lowest average cover of species is met in variant which is traditional mown. From other botanical families stand species like: *Arnica montana, Hieracium aurantiacum,Centaurea mollis,* which present a large cover. These species are present in all variants are their cover increase from abandonated variant to mowing variant or used by grazing. The only edifying species is *Pimpinela major* who's constantly is V (K=V) in all variants. Species like *Agrimonia eupatoria, Antenaria dioica, Cirsium erisithales, Gymnadenia conopsea, Gnafalium sylvaticum* are absent from canopy in abandonated variant and in variant which is traditional mown and are present only in the others variants.

[1] University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca

Table 1

The influence of technological inputs upon the floristic composition in 2011

	V1		V2		V3		V4		V5	
Species	ADm	K	ADm	K	ADm	K	ADm	K	ADm	K
Poaceae	49		42,8		50,1		35,4		34,5	
Agrostis capillaris	29.5	V	22.5	V	22.3	V	20.3	V	21.0	V
Anthoxanthum odoratum	2.0	III	2.8	V	1.0	V	2.8	V	1.0	V
Festuca rubra	17.5	V	17.5	V	15.0	V	11.3	V	12.5	V
Nardus stricta					11.3	I	0.5	I		
Phleum montanum	1.6	II			0.5	II	0.5	I		
Cyperacae&Juncaceae	0,5		0,5		1		1		1	
Carex pallescens					0.5	II	0.5	IV	0.5	III
Luzula campestris	0.5	III	0.5	I	0.5	V	0.5	III	0.5	III
Fabaceae	5,7		16,9		9,2		6,9		9	
Anthylis vulneraria	0.5	II	0.5	II			0.5	II	0.5	I
Lotus corniculatus	2.8	IV	3.9	II	2.8	IV	1.4	V	1.3	III
Trifolium pratense	1.0	V	8.6	V	4.5	V	1.0	V	3.6	V
Trifolium repens	1.4	V	3.9	V	1.9	V	4.0	V	3.6	V
Other botanical families	72,04		48,05		46,43		56,27		67,37	
Achillea distans							2.8	I	2.8	I
Alchemilla vulgaris	2.8	III	1.3	IV	0.5	II	0.5	I	2.8	II
Agrimonia eupatoria					0.5	I			0.5	I
Antenaria dioica					0.5	I	0.5	II	0.5	I
Aposeris foetida					0.5	I	2.8	I	0.5	I
Arnica montana	4.8	V	7.3	V	3.2	IV	9.8	III	9.0	II
Astrantia major	0.5	IV	0.5	III						
Campanula abietina	0.5	I			0.5	V	0.5	IV	1.1	IV
Cardaminopsis haleri					0.5	III	0.5	I	0.5	I
Centaurea mollis	6.6	IV	2.8	II	2.2	IV	2.0	III	1.1	IV
Centaurea pseudophrygia	2.0	III	2.8	II	1.6	IV	2.8	IV	1.3	III
Cerastium holosteoides			0.5	I						
Cirsium erisithales			0.5	I	0.5	I	0.5	I	0.5	I
Colchicum autumnale	0.5	I								
Euphrasia rostkoviana			0.5	IV	0.5	II				
Galium mollugo	2.8	I	0.5	II	0.5	I	0.5	III	0.5	I
Gentianella lutescens	0.5	I	0.5	II						
Gymnadenia conopsea							0.5	II	0.5	I
Gnafalium sylvaticum					0.5	II	0.5	IV	0.5	I
Hieracium aurantiacum	3.5	III	2.8	V	4.5	V	3.2	V	4.3	III
Hieracium pilosella	2.8	I					0.5		0.5	I
Hypericum maculatum	13.3	III	6.4	IV	2.2	IV	2.0	III	3.3	IV
Knautia dipsacifolia	1.4	V	2.8	IV	0.5	I	0.5	III	0.5	III
Leontodon autumnalis					0.5	II	0.5	III		
Leucanthemum vulgare	0.5	IV	0.5	III	0.5	V	0.5	III	0.5	V
Linum catharticum	0.5	I	0.5	II	0.5	V	0.5	II	0.5	I
Pimpinella major	4.1	V	4.3	V	6.2	V	5.7	V	4.9	V
Plantago lanceolata	1.3	III	1.3	IV	0.5	III	0.5	IV	1.0	V
Plantago media					0.5	III	0.5	I	0.5	II
Polygala comosa	0.5	II	0.5	II	0.5	IV	0.5	III	0.5	II
Polygala vulgaris	0.5	III			1.3	III	2.0	III	3.8	IV
Potentilla erecta					0.5	I	0.5	I		
Primula veris	0.5	III	0.5	II	0.5	II	0.5	I	0.5	I
Prunella vulgaris					0.5	I	0.5	I	5.0	I
Ranunculus bulbosus	2.0	III	1.6	II	0.5	IV	1.6	IV	0.5	IV
Rhinanthus minor	1.2	III	1.6	V	1.1	IV	0.5	IV	0.5	V
Rumex acetosa	0.5	III		I	0.5	II	0.5	I	0.5	II
Scabiosa columbaria							0.5	II	0.5	I
Silene nutans	0.5	II			0.5	III	0.5	II	0.5	I
Scorzonera rosea									0.5	I
Stellaria graminea	0.5	V	0.5	IV	0.5	V	0.5	V	0.5	V
Thymus dacicus	2.8	IV	2.8	III	5.8	V	2.3	V	7.0	IV
Trollius europaeus	8.1	IV	2.2	V	2.8	V	4.8	V	1.6	IV
Vaccinium myrtillus	0.5	I								
Veratrum album	0.5	III	0.5	IV	1.0	V	1.9	V	3.8	IV
Veronica chamaedrys	4.3	IV	2.0	IV	2.2	IV	0.5	III	3.1	V
Viola tricolor	0.5	IV	0.5	V	1.0	V	0.5	V	1.1	IV
TOTAL	127,24		108,25		106,73		99,57		111,87	

CONCLUSIONS

The witness phytocenosis is the *Agrostis capillaris* L.-*Festuca rubra* L. type and the application of tehnological inputs keep the same type of lawn.

Both, mowing and grazin have'nt caused major changes in floristic composition of canopy in this year.

BIBLIOGRAPHY

Pacurar, F., Rotar, I., Bogdan, A., Garda, N., 2010 - *The low-input effect upon oligotrophic grasslands in Apuseni Mountains*, Symposion of USAMV Iasi, Durable Agriculture-present and perspective, Iasi, 2010, ISSN:1454-7414.

Pacurar, F., Rotar, I., Bogdan, A, Vidican, R., Sima N., 2011 - *Effect of organic fertilisation on level on botanical composition os a Festuca rubra L. meadow in the boreal floor in Romania,* Grassland Farming and Land Management Systems in Mountains Regions, Raumberg-Gumpenstein, Austria, European Grasslan Federation, vol. 16, ISBN 978-3-902559-65-4, pp 565.

Rotar, I., Păcurar, F., Nicoleta, Gârda, Adriana, Morea, 2010 - *The management of oligotrophic grasslands and the approach of new improvement methods*, în Romanian Journal of Grassland and Forage Crops, No. 1/2010, www.ropaj.org/journal.html, Printat la Editura Academic Press, Cluj Napoca, ISSN 2068-3065, pp. 57-69.

Samuil, C., Vintu, V., Sirbu, C., Saghin, G., Muntianu, I., Ciobanu C., 2011 - *Low input management of Agrostis capillaris + Festuca rubra grasslands in Romania*, Grassland Farming and Land Management Systems in Mountains Regions, Raumberg-Gumpenstein, Austria, European Grasslan Federation, vol. 16, ISBN 978-3-902559-65-4, pp 335.