RESEARCHES ON THE INFLUENCE OF PERENNIAL LEGUMES IN INCREASING THE EFFICIENCY OF TEMPORARY MEADOW

CERCETĂRI PRIVIND INFLUENȚA LEGUMINOASELOR PERENE ÎN SPORIREA RANDAMENTULUI PAJIȘTILOR TEMPORARE

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Abstract. *At the Experimental Center for Meadow Culture, Preajba, Gorj County, was located a bi factorial experience of 4 x 4 type, in 3 repetition (4 mixes and 4 doses of nitrogen). In the mixture formed only from 3 grasses (in equal parts), productions were 1,69-5,57 D.M. t/ha. In the mixture composed of grasses (60%) and Trifolium pratense (40%) were made 6,63 2.65d.s. If with grasses (60%) has been added Lotus corniculatus (40%) the production was 2.57-6,16 t/ ha D.M. When in the mixture has occurred Trifolium repens (40%) with grasses (60%) were observed productions of 3.20- 6,30 t/ha D.M.*
Key words: cocksfoot, birds foot, fertilization, fescue, white and red clover, timothy.

Rezumat. *La Centrul Experimental pentru Cultura Pajiștilor, Preajba, județul Gorj, s-a amplasat o experiență bifactorială de tipul 4x4, în 3 repetiții (4 amestecuri și 4 doze de azot). În amestecul format numai din 3 graminee (în părți egale), producțiile au fost de 1,69-5,57 t/ha s.u. În amestecul alcătuit din graminee (60%) și Trifolium pratense (40%) s-au realizat 2,65-6,63 t/ha s.u. Dacă alături de graminee (60 %) s-a adăugat Lotus corniculatus (40%) producția a fost de 2,57-6,16 t/ha s.u. Când în amestec a intervenit Trifolium repens (40 %) alături de graminee (60 %) s-au înregistrat producții de 3,06-6,30 t/ha s.u.*
Cuvinte cheie: golomăț, ghizdei, fertilizare, păiuș, trifoi alb și roșu, timoftică.

INTRODUCTION

In Dolj county the permanent grasslands have an large extension, as being one of the most important categories of agricultural land use. Large areas of permanent grassland are in a advanced stage of degradation, realizing low yields and mediocre or poor quality.

One of the most important steps in the process of improvement the degraded permanent grasslands in northern Oltenia is the establishment of temporary grasslands (Ionescu, 2003).

The research has revealed high productive potential of temporary grassland compared to permanent grassland improved by surface methods. The laws and

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regulations in normal years in terms of rainfall, the temporary meadows can easily realized 6-8 t/ha D.M. (Osiceanu and Ionescu, 2009; Motca et al., 1994).

In terms of phasing the annual production, temporary meadows performs much better, giving, under the grassland system, 2-3 scythe a year and used by grazing, 3-4 cycles. The floristic composition of temporary grassland is superior to permanent grassland. The temporary grassland legumes may have consistent participation, while in the permanent participation these species have sometimes a symbiotic participation (Pavel and Lulea, 1976).

The feed obtained from temporary grassland is superior in terms of quality, characterized by a high content of protein, minerals and vitamins and lower cellulose. Considering all these aspects is necessary for areas occupied by temporary grass to grow, replacing permanent grassland, heavily degraded area where surface measures prove ineffective.

MATERIAL AND METHODS

The research were conducted at the Experimental Center for Meadows Culture Preajba, the Gorj county, where was placed a bi factorial experience, by the method of subdivided parcels in three repetitions (Iancu S., 2009).

Experimental factors were as follows:

The A factor – the mixture of species: a_1 - *Dactylis glomerata* 33% + *Festuca pratensis* 33% + *Phleum pratense* 34%; a_2 - *Dactylis glomerata* 20% + *Festuca pratensis* 20% + *Phleum pratense* 20% + *Trifolium pratense* 40%; a_3 - *Dactylis glomerata* 20% + *Festuca pratensis* 20% + *Phleum pratense* 20% + *Lotus corniculatus* 40%; a4 - *Dactylis glomerata* 20% + *Festuca pratensis* 20% + *Phleum pratense* 20% + *Trifolium repens* 40%.

The B factor – the nitrogen dose: b_1= 0; b_2= 50 kg/ha; b_3= 100kg/ha; b_4= 150 kg/ha

The quantities referred to graduations b2 and b3 were managed entirely in the spring. The dose of 150 kg / ha was applied in two fractions: 100 kg / ha in the spring and another 50 kg / ha after the first mowing. Together with nitrogen, in spring, were applied 50 kg / ha P_2O_5 and 50 kg / ha K_2O.

Complex 15-15-15 and ammonium nitrate were used as fertilizer, making the calculations required to meet experimental protocol. Was harvested under a system of grassland at earing grasses and legumes flowering.

The statistical processing was done using ANOVA program and the interpretation with DL 5 %, DL 1% și DL 0,1 %.

RESULTS AND DISCUSSION

On average in the two years of experimentation (2010-2011), were obtained the following important experimental results:

- The unilateral influence of legume species in the mixture on the production of temporary meadows.

Depending on the mixture composition, the yields ranged from 3,98 t/ha D.M.(*Dactylis glomertata* 33 % + *Festuca pratensis* 33 % + *Phleum pratense* 34 %) and 5,02 t/ha D.M. (same grass, but in proportion of 20% each + *Trifolium pratense* 40 %).

The percentage increases were between 18-26% and the production between 0.71 and 1.04 t / ha D.M., all were statistic uninsured (table 1).

Table 1

The influence of legumes species separate from the mixture on the production of temporary pastures

Nr. crt.	The mixture	The production t/ha s.u.	%	The Dife-rence	The signifi-cance
1	a_1 D.g. 33% + F.p. 33% + Ph.p. 34%	3,98	100	-	Control
2	a_2 D.g. 20% + F.p. 20% + Ph.p. 20% + *Trifolium pratense* 40%	5,02	126	1,04	___
3	a_3 D.g. 20% + F.p. 20% + Ph.p. 20% + *Lotus corniculatus* 40%	4,69	118	0,71	___
4	a_4 D.g. 20% + F.p. 20% + Ph.p. 20% + *Trifolium repens* 40 %	4,84	122	4,86	___

DL 5% = 1,19 t/ha D.M.; DL 1 % = 1,81 t/ha D.M.; DL 0,1 % = 2,91 t/ha D.M.

- The unilateral influence of nitrogen dose on the production of temporary pastures.

At the unfertilized witness, the production was 2.49 t / ha D.M. By increasing the nitrogen dose from 50 to 150 kg / ha, production gradually increased from 4.43 to 6.17 t / ha D.M. The percentage increases ranged from 78% and 148% (table 2).

Table 2

The unilateral influence of nitrogen dose on the production of temporary meadows.

Nr. crt.	The N dose (kg/ha) on a 50 P_2O_5, 50 K_2O background	The production t/ha s.u.	%	The diference	The segnification
1	b_1 0	2,49	100	-	Control
2	b_2 50	4,43	178	1,94	* * *
3	b_3 100	5,44	218	2,95	* * *
4	b_4 150	6,17	248	3,68	* * *

DL 5 % = 0,54 t/ha D.M.; DL 1 % = 0,74 t/ha D.M.; DL 0,1 % = 0,99 t/ha D.M.

Production increases ranged between 1.94 and 3.68 t / ha DM, all highly significant.

- The interaction influence of the grasses and legumes mixture with nitrogen dose on production.

The special influence of the nitrogen doses and especially the higher doses of 100-150 kg / ha, is due to the specific rain falls in spring, in the growing season, characterized both by significant rain quantity and the uniform distribution. During a drought years or with unevenly distributed rainfall, such doses are not indicated, because fertilizers cannot be exploited by plants.

The combined influence of two experimented factors (the mixture and nitrogen dose), have differentiated the production from 1.69 t / ha D.U. up to 6.63 t / ha D.M. and the lowest production was obtained from the mixture consisting only of grasses, fertilization, and the highest of grass mixture with *Trifolium pratense*, fertilized with 150 kg / ha nitrogen.

All three nitrogen doses tested (N50, N100 and N150) have very significant production increases, except for the a4b2 combination.

Close to maximum yields were obtained using mixtures of grasses with *Trifolium repens*, all after fertilization with 150 kg / ha N (6.30 t/ha D.M.). Mixture consisting on grasses species only gave this variant of fertilization, a slightly smaller quantity (5.57 t/ha D.M.). This production increase was significant. The mineral fertilization led to production increases ranging from 1.34 t/ha to 3.98 t/ha. The application of chemical fertilizers made percentage gains between 43.8% to 150.2%, to the unfertilized witness (table 3).

In all four mixtures, increasing the nitrogen dose caused progressive increases in dry matter from unfertilized witness.

Note that the highest relative yields and hence, the greatest differences between fertilized and control variants were obtained from the mixture of grasses only. This mixture gave the lowest production at the no fertilizer conditions, but has very well capitalized the nitrogen applied, demonstrating the need for strict use of chemical fertilizers in such mixtures.

In conclusion, averaged over the two years of research, the mixtures of grasses with legumes gave higher production from the mixture of grasses only. The quantitative differences between the mixtures were low, the first priority being to one based on *Trifolium pratense.*

Between the doses of nitrogen used were noted the 100 and 150 kg / ha, which resulted in all cases in very significant quantitative increases.

Table 3

The combined influence of the legume from the mixture with the nitrogen dose on the temporary grassland production

Nr. crt.	The mixture	The N dose (kg/ha)	The production t/ha D.M.	%	The dife-rence	The signification
1	Graminee 100 % a_1	b_1 0	1,69	100	-	Martor
2		b_2 50	3,86	228	2,17	* * *
3		b_3 100	4,82	285	3,13	* * *
4		b_4 150	5,57	330	3,88	* * *
5	Graminee 60% + *Trifolium pratense* 40% a_2	b_1 0	2,65	100	-	Martor
6		b_2 50	4,79	181	2,14	* * *
7		b_3 100	6,02	227	3,37	* * *
8		b_4 150	6,63	250	3,98	* * *
9	Graminee 60% + *Lotus corniculatus* 40% a_3	b_1 0	2,57	100	-	Martor
10		b_2 50	4,68	182	2,11	* * *
11		b_3 100	5,33	207	2,76	* * *
12		b_4 150	6,16	240	3,59	* * *
13	Graminee 60% + *Trifolium repens* 40 % a_4	b_1 0	3,06	100	-	Martor
14		b_2 50	4,40	144	1,34	*
15		b_3 100	5,59	183	2,53	* * *
16		b_4 150	6,30	206	3,24	* * *

DL 5 % = 1,08 t/ha D.M.; DL 1 % = 1,47 t/ha D.M.; DL 0,1 % = 1,97 t/ha D.M.

CONCLUSIONS

1. The best mixture for temporary meadows from the Subcarpathian area of Oltenia was composed of *Dactylis glomerata* (20%), *Festuca pratensis* (20%), *Phleum pratense* (20%) and *Trifolium pratense* (40%), with an average production of 5 , 41 t / ha D.M.

2. Compared to the mixture composed only of grasses, he realized a production increase of 26%.

The mineral fertilization with N_{50}, N_{100} and N_{150} brought production increases of 1.94 to 3.68 t / ha D.M., very significant.

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