

THE COMPARATIVE STUDY OF SOME MIXTURES OF PERENNIAL FORAGE GRASSES AND LEGUMES FOR THE ESTABLISHMENT OF TEMPORARY MEADOWS IN THE CENTRAL ZONE OF OLTENIA

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Abstract

The establishment of temporary meadows is not a new problem, but it has been the subject of long researches. When achieving this objective, a mixture of perennial species must be taken into account that corresponds from the point of view of the pedo-climatic zone, the technical and economic possibilities, the purpose and the duration designed. (Vidican Roxana and al. 2002)

Our research shows that complex mixtures of perennial species (grasses and legumes) are the most suitable for establishing temporary meadows.

For the S.C.D.A. experimentation area Șimnic Craiova the mixture consisting of *Medicago sativa* 40% + *Dactylis glomerata* 20% + *Festuca arundinacea* 20% + *Lolium perenne* 20%, achieved substantial harvest productions, namely 8,7-9 t/ha s.u.

Key words: temporary meadows, production, type of mixture, fertilization

INTRODUCTION

When establishing a temporary meadow, special attention must be paid to the choice judicious of the species and varieties of perennial herbs that form the mixture in depending on their biological and technological particularities. (Burcea and al. 1981). Persistence depends on the correct setting of the seeding material to it, the possibility of producing staggered green mass from early spring and until autumn at the latest (Vasiu and al. 1971; Varga 1993).

The grouping of grass and leguminous species in different types of mixtures depends on fitting into the following criteria: adaptation to culture conditions, the capacity for consistency, adaptability to the way of use, vivacity, the productive potential, the reaction to fertilizers (Pavel C.1970; Cotigă C. 2002)

MATERIALS AND METHODS

The experiences were placed on the luvosol from S.C.D.A. Șimnic-Craiova, in spring 2019.

The studied factors were:

Factor "A" - type of mixture, with 3 graduations:

$a_1 = Dactylis\ glomerata\ 40\% + Festuca\ arundinacea\ 30\% + Lolium\ perenne\ 30\%$;

$a_2 = Dactylis\ glomerata\ 20\% + Festuca\ arundinacea\ 20\% + Lolium\ perenne\ 20\% + Medicago\ sativa\ 40\%$;

$a_3 = Dactylis\ glomerata\ 20\% + Festuca\ arundinacea\ 20\% + Lolium\ perenne\ 20\% + Lotus\ corniculatus\ 40\%$.

Factor "B" - nitrogen doses, with 4 graduations:

- $b_1 = N_0$
- $b_2 = N_{60}$
- $b_3 = N_{120}$
- $b_4 = N_{180}$

The agrofund used was $P_{70}K_{50}$, with ground. Nitrogen was administered in fractions, for each individual scythe.

The harvesting was carried out mechanically and the exploitation was done in the hay regime.

RESULTS AND DISCUSSIONS

If we analyze the results obtained and presented in table 1 regarding the influence of the type of mixture of perennial species and the doses of nitrogen fertilization, on the production of s.u. on average over three years of experimentation, it is found next:

-depending on the type of mixture and the nitrogen doses taken into the study, the production of dry matter oscillated from 2.6 t/ha s.u. to the mixture made up of *Dactylis glomerata* 40% + *Festuca arundinacea* 30% + *Lolium perenne* 30% respectively 9.0 t/ha s.u. in the case of the mixture of: *Dactylis glomerata* 20% + *Festuca arundinacea* 20%+*Lolium perenne* 20%+*Medicago sativa* 40%, when the

maximum yield increase was 6.4 t/ha s.u., very significant compared to the control studied and at the level of fertilization of N₁₈₀.

- high fodder productions whose increases were also very significant from a statistical point of view were obtained from *Dactylis glomerata* 20%+*Festuca arundinacea* 20%+*Lolium perenne* 20%+*Lotus corniculatus* 40% fertilized with doses of N₁₂₀ (7.8 t/ha s.u. with an increase of 5.2 t/ha s.u.) and N₁₈₀ (8.4 t/ha s.u. with an increase of 5.8 t/ha s.u.).

-a production level, also high, namely 8.7 t/ha s.u. and fertilized with the dose of N₁₂₀, in which the yield increase was 6.1 t/ha s.u., very significant from a statistical point of view was obtained with the mixture that included perennial grasses 60% and *Medicago sativa* 40% (Figure 1).

Table 1. The influence of the type of mixture of grasses x perennial forage legumes and of nitrogen on s.u. production, average 2020-2022 t/ha s.u.

Type of mixture	Doses of nitrogen	Production absolute	Production relative %	Difference	Significance
<i>Dactylis glomerata</i> 40% <i>Festuca arundinacea</i> 30% <i>Lolium perenne</i> 30%	N ₀	2,6	100	Mt	-
	N ₆₀	4,2	162	1,6	*
	N ₁₂₀	6,7	258	4,1	**
	N ₁₈₀	7,9	304	5,3	***
<i>Dactylis glomerata</i> 20% <i>Festuca arundinacea</i> 20% <i>Lolium perenne</i> 20% <i>Medicago sativa</i> 40%	N ₀	4,2	162	1,6	-
	N ₆₀	6,8	262	4,2	**
	N ₁₂₀	8,7	335	6,1	***
	N ₁₈₀	9,0	346	6,4	***
<i>Dactylis glomerata</i> 20% <i>Festuca arundinacea</i> 20% <i>Lolium perenne</i> 20% <i>Lotus corniculatus</i> 40%	N ₀	4,1	158	1,5	-
	N ₆₀	6,3	242	3,7	**
	N ₁₂₀	7,8	300	5,2	***
	N ₁₈₀	8,4	323	5,8	***

DI 5%

1,7 t/ha s.u.

DI 1%

3,3 t/ha s.u.

DI 0,1%

5,0 t/ha s.u.

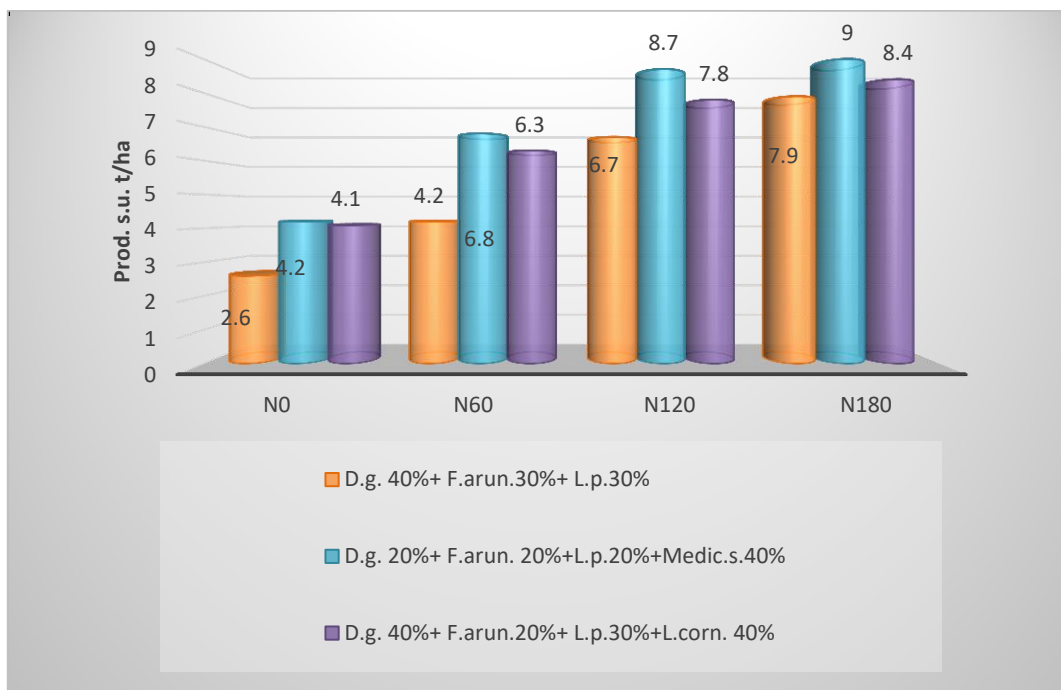


Figure 1. The effect of the type of mixture of grasses and perennial legumes on the production of s.u., average 2020-2022

From the data obtained and presented in table 2, which includes the separate influence of the type of mixture studied on

biomass production, the following can be found:

Table 2. The influence of the type of mixture of grasses and perennial legumes on the production of s.u., average 2020-2022 t/ha s.u.

Type of mixture	Production absolute	Production relative %	Difference	Significance
<i>Dactylis glomerata</i> 40% <i>Festuca arundinacea</i> 30% <i>Lolium perenne</i> 30%	5,4	100	Mt	-
<i>Dactylis glomerata</i> 20% <i>Festuca arundinacea</i> 20% <i>Lolium perenne</i> 20% <i>Medicago sativa</i> 40%	7,2	133	1,8	***
<i>Dactylis glomerata</i> 20% <i>Festuca arundinacea</i> 20% <i>Lolium perenne</i> 20% <i>Lotus corniculatus</i> 40%	6,7	124	1,3	**

DI 5%
DI 1%
DI 0,1%

0,6 t/ha s.u.
1,2 t/ha s.u.
1,7 t/ha s.u.

-dry matter production had values between 5.4 t/ha s.u. in the case of the mixture of only perennial grasses (*Dactylis glomerata* 40% + *Festuca arundinacea* 30% + *Lolium perenne* 30%) respectively 7.2 t/ha s.u. in the case of the mixture *Dactylis glomerata* 20%+*Festuca arundinacea* 20%+*Lolium perenne* 20%+*Medicago sativa* 40%, where the maximum increase achieved was 1.8 t/ha s.u. very statistically significant.

- in the mixture consisting of *Dactylis glomerata* 20%+*Festuca arundinacea*

20%+*Lolium perenne* 20%+*Lotus corniculatus* 40%, the production obtained was 6.7 t/ha s.u. with an increase of 1.3 t/ha s.u. distinctly statistically significant (Figure 2.)

Regarding the influence of only nitrogen on the production of s.u. (table 3) we find that on average over the three years of experimentation, it had values of 3.6 t/ha s.u. at the dose of N₀, respectively 8.4 t/ha s.u. when fertilizing with the dose of N₁₈₀ at which the increase achieved was 4.8 t/ha s.u. very statistically significant.

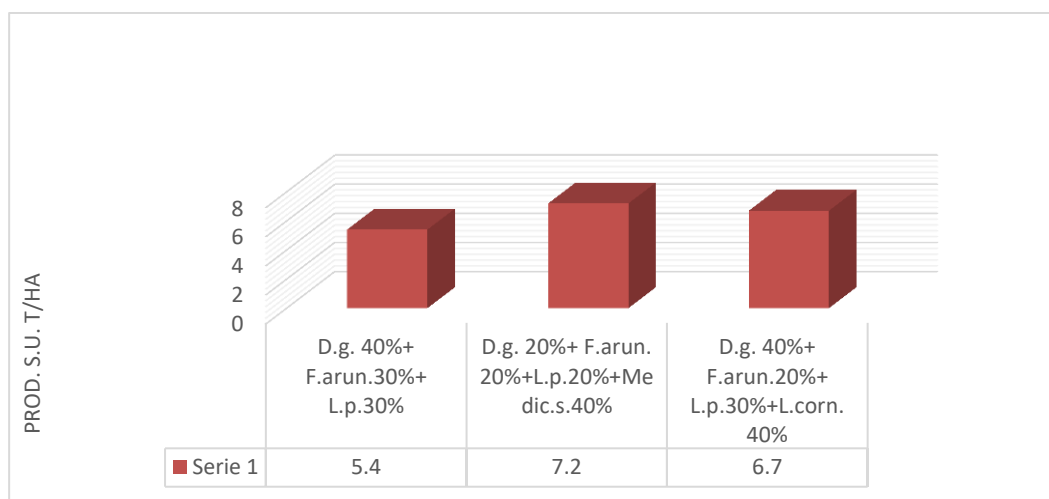


Figure 2. The effect of the type of mixture of grasses and perennial legumes on the production of s.u., average 2020-2022



Figure 3. Mixture of grasses and perennial legumes

Table 3. The influence of nitrogen on the production of s.u. for mixtures of perennial forage grasses and legumes, average 2020-2022 t/ha s.u.

Doses of nitrogen	Production absolute	Production relative %	Difference	Significance
N ₀	3,6	100	Mt	-
N ₆₀	5,8	161	2,2	*
N ₁₂₀	7,7	214	1,1	***
N ₁₈₀	8,4	233	4,8	***

DI 5%
DI 1%
DI 0,1%

1,4 t/ha s.u.
2,8 t/ha s.u.
4,0 t/ha s.u.

A production quite close to the maximum achieved was obtained with a lower dose of nitrogen, namely N₁₂₀, 7.7t/ha s.u. and

in which the increase of 1.1 t/ha s.u. was also highly statistically significant (Figure 4).

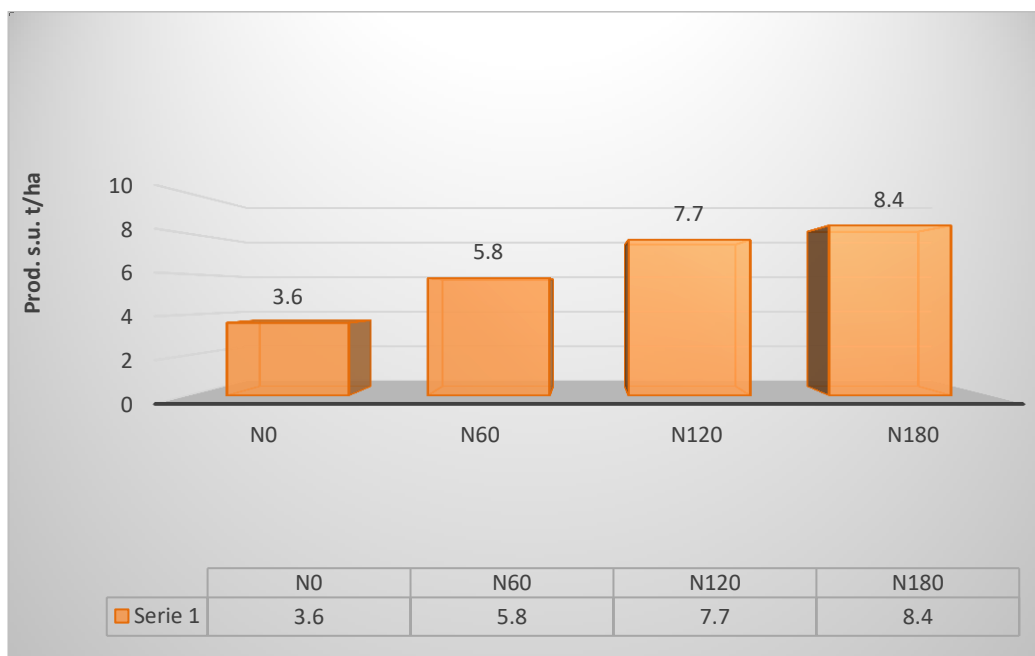


Figure 4. The effect of nitrogen doses on the production of s.u. to mixtures of grasses and perennial forage legumes, average 2020-2022

CONCLUSIONS

1. In the eco-pedological conditions of the experimental area, it is possible to use mixtures of grasses and perennial forage legumes and less often mixtures composed only of grasses.

2. Mixtures of perennial forage grasses and legumes make much better use of seasonal conditions, having a better resistance to drought and frost.

3. The fodder resulting from the temporary grass and leguminous meadows can be used by grazing, as green table in manger, hay or by ensiling.

4. For the central area of Oltenia, we recommend complex mixtures consisting of: *Dactylis glomerata* 20%+*Festuca arundinacea* 20%+*Lolium perenne* 20%+*Medicago sativa* 40%, as well as the mixture *Dactylis glomerata* 20%+*Festuca*

arundinacea 20%+*Lolium perenne* 20%+*Lotus corniculatus* 40%.

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