

EXPERIMENTAL RESULTS REGARDING MINERAL FERTILIZATION AND FORMS OF NITROGEN, APPLIED TO TEMPORARY MEADOWS IN THE CENTRAL AREA OF OLTENIA

Mihaela Adelina GOȘEA (VÎLCOMEANU)¹ and Constantin COTIGĂ²

(1) Payment and Intervention Agency for Agriculture, Main street, no.133, Orodel Dolj, România

(2) University of Craiova, Faculty of Agronomy, Craiova, Dolj, România

author email: mihaela_gosea@yahoo.com

Corresponding author email: mihaela_gosea@yahoo.com

Abstract

The use of fertilizers is an important measure to increase and improve the quality of the fodder obtained from the temporary meadows (Barbulescu C. and colab. 1987).

From the research carried out by us, it resulted that mineral fertilizers, especially nitrogen-based, contribute not only to the increase of the biomass harvest, respectively its quality, but especially to the improvement of the structure of the species used to make up the mixture of herbs.

In this sense, for the area where the research was carried out, the use of the dose of P_{70} combined with the application of an annual dose of N_{120} in the form of nitrolimestone contributed to obtaining a production of about 9,7 t/ha s.u. and with the most favorable economic effects..

Key words: temporary meadows, phosphorus doses, nitrogen doses, forms of nitrogen

INTRODUCTION

The fertilization of temporary meadows is a mandatory measure because the species used have high requirements for the nutrients in the soil, so they can only show their productive potential under the conditions of a good supply of the soil with these elements (Moga I. and al. 1983; Matei Gh. and al. 1994).

In the event that they are used with the agro-fund, chemical fertilizers, both those based on nitrogen and phosphate and potassium are necessary. Their efficiency increases considerably when the soil is well supplied with other nutrients, in other words when a suitable ratio is created between these (Cotigă C. 2012).

MATERIALS AND METHODS

The experiments were placed on the luvosol from S.C.D.A. Simnic Craiova in the spring of 2019. The newly established temporary meadow was composed of 60% perennial grasses and 40% perennial forage legumes.

The factors studied were:

Factor A = phosphorus doses, with three graduations:

a1= P_0

a2= P_{70}

a3= $P_{70} K_{50}$

Factor B = forms of nitrogen with 4 degrees:

b1=ammonium nitrate

b2=ammonium sulfate

b3=nitrolimestone

b4=urea

Factor C = nitrogen doses with 4 graduations:

c1= N_0

c2= N_{60}

c3= N_{120}

c4= N_{180}

Phosphorus was applied at the establishment of the temporary meadow under the basic tillage, while nitrogen was administered fractionally on harvest cycles (mowing).

RESULTS AND DISCUSSIONS

If we refer to the influence of the forms of nitrogen, respectively the doses of nitrogen applied on the P₀ farm (table 1) on the production of biomass in the temporary meadow, on average over three years of experimentation we find the following:

- the production of s.u. had values between 1.4 t/ha s.u. in the form of ammonium sulfate nitrogen with the N₀ dose, respectively 6.7t/ha s.u. in the form of nitrolime nitrogen, with a dose of N₁₈₀.

Table 1. The influence of nitrogen forms and nitrogen doses applied on agricultural P₀ on the production of temporary meadow (2020-2022 average) t/ha s.u.

Phosphorus dose	Forms of nitrogen	Doses of nitrogen	Production absolute	Production relative %	Difference
P ₀	Ammonium nitrate	N ₀	1,6	100	Mt
		N ₆₀	3,9	244	2,3
		N ₁₂₀	5,9	369	4,3
		N ₁₈₀	6,2	388	4,6
	Ammonium sulfate	N ₀	1,4	88	-0,2
		N ₆₀	3,7	231	2,1
		N ₁₂₀	5,9	369	4,3
		N ₁₈₀	6,0	375	4,4
	Nitrolimestone	N ₀	1,8	113	0,2
		N ₆₀	4,5	281	-2,9
		N ₁₂₀	6,5	406	4,9
		N ₁₈₀	6,7	419	5,1
	Urea	N ₀	1,7	106	0,1
		N ₆₀	4,2	263	2,6
		N ₁₂₀	6,3	394	4,7
		N ₁₈₀	6,6	413	5,0

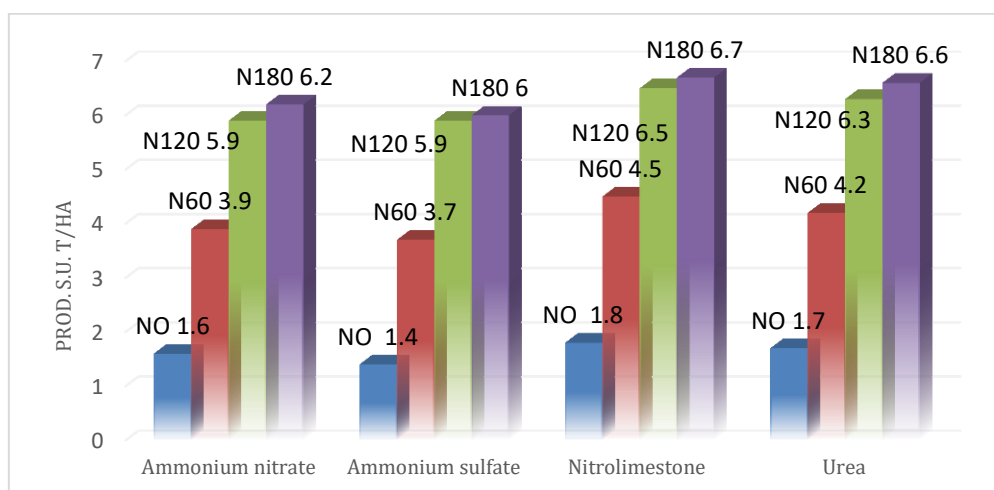


Figure 1. The effect of nitrogen forms and nitrogen doses applied on agricultural P₀, on production in temporary meadow (2020-2022 average)

Regarding the influence of the forms of nitrogen and the doses of nitrogen

applied, on an agrofund of P₇₀ (table 2) on the production of biomass in the

temporary meadow, on average over following can be found: three years of experimentation, the

Table 2. The influence of nitrogen forms and nitrogen doses applied on agricultural P₇₀ on the production of temporary meadow (2020-2022 average) t/ha s.u.

Phosphorus dose	Forms of nitrogen	Doses of nitrogen	Production absolute	Production relative %	Difference
P ₀	Ammonium nitrate	N ₀	1,6	100	Mt
P ₇₀	Ammonium nitrate	N ₀	2,8	175	1,2
		N ₆₀	6,3	394	4,7
		N ₁₂₀	9,0	563	7,4
		N ₁₈₀	9,0	563	7,4
	Ammonium sulfate	N ₀	1,4	88	-0,2
		N ₆₀	5,7	356	4,1
		N ₁₂₀	7,4	463	5,8
		N ₁₈₀	7,7	481	6,1
	Nitrolimestone	N ₀	3,5	219	1,9
		N ₆₀	7,5	469	5,9
		N ₁₂₀	9,7	606	8,1
		N ₁₈₀	9,7	606	8,1
	Urea	N ₀	3,1	194	1,5
		N ₆₀	6,7	419	5,1
		N ₁₂₀	8,6	538	7,0
		N ₁₈₀	8,9	556	7,3

- the production of s.u. had values between 1.4 t/ha s.u. in the form of ammonium sulfate nitrogen, with the dose of N₀ respectively 9.7 t/ha s.u. in the form of nitrolime nitrogen with doses of N₁₂₀ and N₁₈₀;

- in the form of nitrogen, ammonium sulfate, the production of s.u. fluctuated from 1.4 t/ha s.u. (N₀) at 7.7 t/ha s.u. (N₁₈₀);

- quite high harvests, compared to the previous one, were obtained in the forms of urea nitrogen, at the doses of N₁₂₀ (8.6 t/ha s.u.) and N₁₈₀ (8.9 t/ha s.u.);

- in the form of nitrogen, ammonium nitrate, the production of s.u. had values between 2.8t/ha s.u. (N₀) respectively 9.0 t/ha s.u. (N₁₂₀ and N₁₈₀) (figure 2)

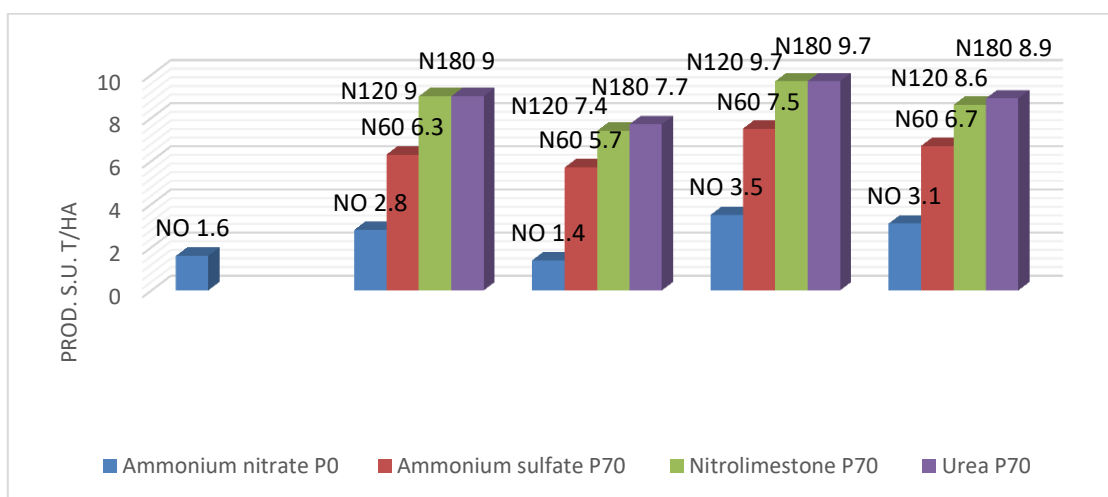


Fig. 2. The effect of nitrogen forms and nitrogen doses applied, on the P₇₀ agrofund, on production in the temporary meadow (average 2020-2022)

If we refer to the influence of nitrogen forms and nitrogen doses applied, on the P₇₀K₅₀ agrofund (table 3) on the

production of s.u. at the temporary meadow we find the following:

Table 3. The influence of nitrogen forms and nitrogen doses applied on the P₇₀ K₅₀ agricultural plot, on temporary meadow production (average 2020-2022) t/ha s.u.

Phosphorus dose	Forms of nitrogen	Doses of nitrogen	Production absolute	Production relative %	Difference
P ₀	Ammonium nitrate	N ₀	1,6	100	Mt
P ₇₀ K ₅₀	Ammonium nitrate	N ₀	2,5	1156	0,9
		N ₆₀	6,1	381	4,5
		N ₁₂₀	8,8	550	7,2
		N ₁₈₀	8,5	531	6,9
	Ammonium sulfate	N ₀	2,2	138	0,6
		N ₆₀	5,7	356	4,1
		N ₁₂₀	7,8	488	6,2
		N ₁₈₀	8,2	513	6,6
	Nitrolimestone	N ₀	2,9	181	1,3
		N ₆₀	7,1	444	5,5
		N ₁₂₀	9,4	588	7,8
		N ₁₈₀	9,2	575	7,6
	Urea	N ₀	2,7	169	1,1
		N ₆₀	6,5	406	4,9
		N ₁₂₀	9,3	581	7,7
		N ₁₈₀	9,0	563	7,4

-a biomass production had values between 2.2 t/ha s.u. in the form of ammonium sulfate nitrogen, the N₀ form respectively 9.4 t/ha s.u. in the form of nitrolime nitrogen, form N₁₂₀;

- a harvest level very close to the maximum was obtained in the form of urea nitrogen at the N₁₂₀ dose, namely 9.3 t/ha s.u.;

-increased biomass harvests were also achieved in the forms of nitrogen:

ammonium nitrate (8.8 t/ha s.u. at the dose of N₁₂₀), ammonium sulfate (8.2 t/ha s.u. at the dose N₁₈₀), nitrolimestone (9 .2

t/ha s.u. at the dose of N₁₈₀) and in the case of urea with the dose of N₁₈₀ when 9.0 t/ha s.u. was obtained (Fig. 3.)

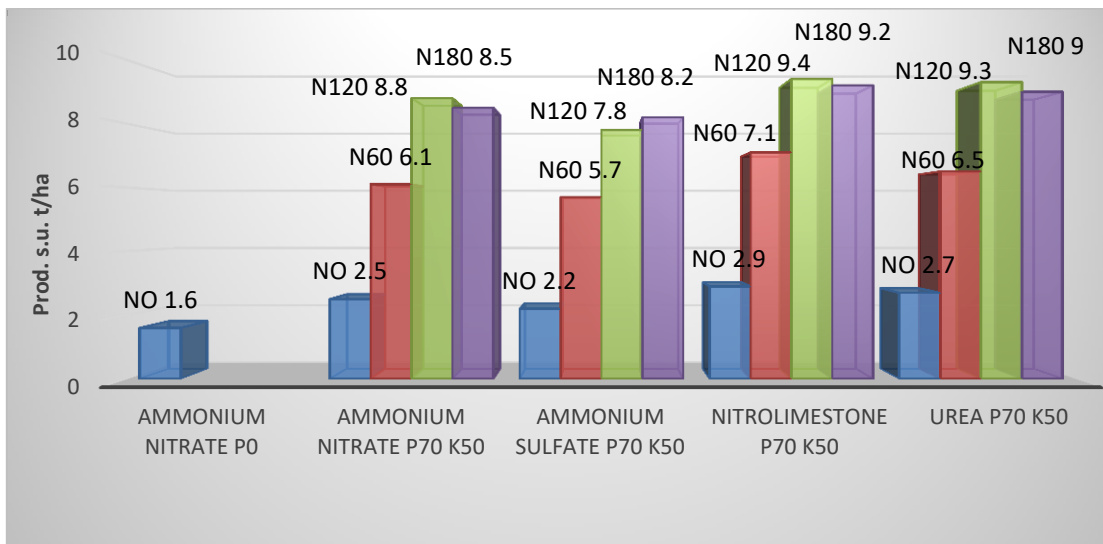


Figure 3. The influence of nitrogen forms and nitrogen doses applied on the P₇₀K₅₀ agricultural field on temporary meadow production (average 2020-2022) t/ha s.u.



Figure 4. Temporary meadow

CONCLUSIONS

1. Mineral fertilizers, used judiciously, represent an important means of obtaining the botanical composition, thus the quality of the temporary meadow.

2. Phosphorus fertilizers are absolutely necessary on the luvosol in the research area, because its content is deficient in this macroelement.

3. Mineral fertilizers with phosphorus and potassium are applied only together with those with nitrogen, since alone they do not determine increases in yield.

4. For the temporary meadow in the research area, the mineral fertilization mixture $P_{70}N_{120}$ is recommended.

5. It is also recommended to use nitrolime or urea forms of nitrogen, to the detriment of ammonium nitrate, as the latter can lead to an even greater acidification of the soil in the following years, with unfavorable effects on the vegetation of temporary meadows.

REFERENCES

- Bărbulescu, C. și colab. (1987) *Pajiștile de deal din România*, Editura Ceres, București
- Cotigă, C. (2012) *Cultura pajiștilor și a plantelor furajere (vol.I)*, Editura Sitech, Craiova
- Moga, I. și colab. (1983) *Plante furajere perene*, Editura R.S.R
- Motcă, Gh. și colab. (1994) *Pajiștile României*, Editura Tehnică Agricolă, București