RESEARCH ON THE IMPROVEMENT OF SOME TECHNOLOGICAL PARAMETERS FOR *BROMUS INERMIS* LEYSS. SEED CROPS

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Abstract

The fodder base represents the most significant means of increasing economic efficiency in the livestock sector. For this, permanent and sown meadows are an important source of fodder. The establishment of temporary meadows on the lands of steppe and forest-steppe areas, poorly productive, with erosion problems, the improvement of permanent meadows by overseeding, the reforestation of slopes, slopes, irrigation canals, requires the production of large quantities of perennial grass seeds, the most important species being *Bromus inermis* Leyss. The production of seeds for these species is done in separate cultures, according to a specific technology. Through the research carried out within the Research - Development Station for Meadows, Vaslui, was studied the influence of two factors, respectively, the distance between the rows and fertilization with mineral fertilizers on the behavior of the species *Bromus inermis* Leyss., in the first year of vegetation, being analyzed the ability of installation of the species and some morphoproductive elements.

Key words: distance between rows, fertilization, establishment capacity, morphoproductive parameters

Grasslands help manage water resources, store atmospheric carbon, conserve biodiversity, beautify the landscape and provide spaces for recreational activities (Dragomir N., 2009; Marușca T. *et al*, 2010).

The production of seed in forage perennial crops should be one of the concerns of agriculture, with the aim of improving permanent grasslands, rendering new land into use, and the considerable increase in temporary grassland areas, all of which require increasing quantities of seed.

In recent years, the trend of climate aridization has increased in the main agricultural areas, and this has a negative impact on crop productivity. For this reason, a very important issue is the identification of the most tolerant species and genotypes of feed grasses with the highest degree of adaptation to changing climatic conditions (Zhu Y. *et al*, 2018; Zolotarev V.N. *et al*, 2021). *Bromus inermis* Leyss. is one of the most widespread species of perennial grasses, it is found in almost all areas and has a high degree of adaptability to water stress conditions (Açikgöz E. and Tekeli A.J., 1980; Walton D.P. 1980; Samuil C. *et al*, 2010).

Through the research carried out at the Research - Development Station for Meadows Vaslui, was studied the influence of row spacing and fertilization on the behavior of *Bromus inermis* Leyss. species in seed production culture in the first year of cultivation.

MATERIAL AND METHOD

The purpose of this research was to analyze the influence of row spacing and fertilization on the behavior of the *Bromus inermis* Leyss. species in seed production culture in the first year of cultivation.

Following the researches were analyzed the influence of fertilization and the distance between rows on the plants height (cm) and shoots number (shoots·m^{-2}) at smooth brome in seed production culture, in the first year, to the second cycle of vegetation.

The research was conducted during the period of March to October 2021, at the Research - Development Station for Meadows, Vaslui (46°40'-36°10' north latitude and 27°44'-20°40' east longitude).

To achieve the proposed purpose, it was organized a bifactorial experience, 3x5 type, placed according to the method of subdivided plots, with the plot harvestable area of 13.5 m^2 (1.5 m x 9 m), in three replications. The factors studied were: A - the distance between rows with three

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graduations (a_1 - 25 cm, a_2 - 37.5 cm and a_3 - 50 cm) and B - fertilization with five graduations (b_1 - unfertilized, b_2 - $N_{50}P_{50}$, b_3 - $N_{50}P_{50}K_{50}$, b_4 - $N_{75}P_{75}K_{75}$ and b_5 - $N_{100}P_{100}K_{100}$).

The plants height (cm) by measuring, in 3 repetitions, the shoots on the rows located 1 m from the edge of the plot.

The shoots number (shoots·m^{-2}) was determined by counting the shoots, in 3 repetitions, from 1 linear m of the rows located 1 m from the edge of the plot, then the obtained number was expressed to m^2.

The biological material used was represented by the Iulia Safir smooth brome variety, variety approved in 2010 at the Research - Development for Meadows Station, Vaslui (Silistru D., 2011).

The fertilizers were applied at the time of preparation of the germinal bed.

In the area where the researches were carried out, the agricultural year 2020-2021 was favorable for the smooth brome crop. Temperatures and precipitation were very close to multi-annual averages.

The results were statistically interpreted by analyzing the variance and calculating the least significant differences.

RESULTS AND DISCUSSIONS

Analyzing the influence of the interaction between row spacing and fertilization on the height of plants at the smooth brome in the first year of vegetation (*table 1*), it was noted that this indicator had values between 20 cm on a_2b_5 variant (37,5 cm between rows, fertilized with $N_{100}P_{100}K_{100}$), and 34 cm on a_3b_3 variant (50 cm between rows, fertilized with $N_{50}P_{50}K_{50}$).

In general, by sowing at longer distances between rows, higher values of this indicator were obtained, and statistically significant positive differences from the control variant were obtained in the variants sown at the distance of 50 cm between rows (*figure 1*).

Table 1

The influence of the distance between the rows and the fertilization on the plants height

Variant		Plants height (cm)	Diferences (cm)	Diferences (%)	Statistical significance
Distance between rows	Fertilization				
a_1 - 25 cm (control)	b_1 - unfertilized (control)	27	control	100	control
	b_2 - $N_{50}P_{50}$	29	2	107.4	*
	b_3 - $N_{50}P_{50}K_{50}$	26	-1	96.3	
	b_4 - $N_{75}P_{75}K_{75}$	23	-4	85.2	ooo
	b_5 - $N_{100}P_{100}K_{100}$	23	-4	85.2	ooo
a_2 - 37.5 cm	b_1 - unfertilized	32	5	118.5	***
	b_2 - $N_{50}P_{50}$	28	1	103.7	
	b_3 - $N_{50}P_{50}K_{50}$	30	3	111.1	**
	b_4 - $N_{75}P_{75}K_{75}$	27	0	100.0	
	b_5 - $N_{100}P_{100}K_{100}$	20	-7	74.1	ooo
a_3 - 50 cm	b_1 - unfertilized	30	3	111.1	**
	b_2 - $N_{50}P_{50}$	28	1	103.7	
	b_3 - $N_{50}P_{50}K_{50}$	34	7	125.9	***
	b_4 - $N_{75}P_{75}K_{75}$	30	3	111.1	**
	b_5 - $N_{100}P_{100}K_{100}$	33	6	122.2	***
	LSD	*0.05*	*2*		
		0.01	*3*		
		0.001	*4*		

From the point of view of the effect of fertilization on smooth brome plants, in the first year of vegetation, the overall trend was negative. Thus, as the dose of complex fertilizer applied increased, the plants had a lower height. This can be attributed to the fact that plants, in the first year of vegetation, cannot make very good use of the applied enclosures, which can adversely affect the growth and development of plants, by concentrating the soil solution and reducing the capacity of the plants for soil solution absorption. All this conditioned not only the number of shoots·m^{-2}, but also other morphoproductive parameters.

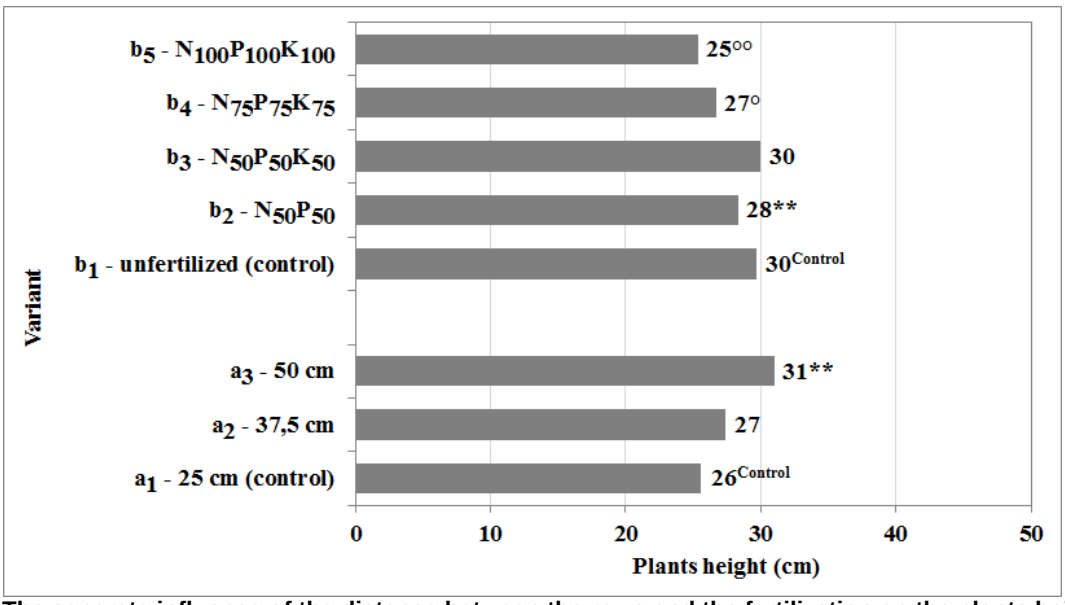

Figure 1 **The separate influence of the distance between the rows and the fertilization on the plants height**

The influence of the interaction between row spacing and fertilization on the number of shoots in the first year of vegetation (*table 2*), generated values ranging from 472 shoots·m^{-2} on a_1b_4 variant (25 cm between rows, fertilized with $N_{75}P_{75}K_{75}$) and 152 shoots·m^{-2} on a_3b_3 variant (50 cm between rows, fertilized with $N_{50}P_{50}K_{50}$).

Positive differences compared to the control variant, for this parameter, had no statistical assurance.

Table 2

The influence of the distance between the rows and the fertilization on the shoots number

Variant		Shoots number (shoots·m^{-2})	Diferences (shoots·m^{-2})	Diferences (%)	Statistical significance
Distance between rows	Fertilization				
a_1 - 25 cm (control)	b_1 - unfertilized (control)	376	control	100	control
	b_2 - $N_{50}P_{50}$	328	-48	87.2	
	b_3 - $N_{50}P_{50}K_{50}$	344	-32	91.5	
	b_4 - $N_{75}P_{75}K_{75}$	472	96	125.5	
	b_5 - $N_{100}P_{100}K_{100}$	380	4	101.1	
a_2 - 37.5 cm	b_1 - unfertilized	385	9	102.3	
	b_2 - $N_{50}P_{50}$	240	-136	63.8	
	b_3 - $N_{50}P_{50}K_{50}$	379	3	100.7	
	b_4 - $N_{75}P_{75}K_{75}$	395	19	105.0	
	b_5 - $N_{100}P_{100}K_{100}$	192	-184	51.1	oo
a_3 - 50 cm	b_1 - unfertilized	316	-60	84.0	
	b_2 - $N_{50}P_{50}$	368	-8	97.9	
	b_3 - $N_{50}P_{50}K_{50}$	152	-224	40.4	ooo
	b_4 - $N_{75}P_{75}K_{75}$	204	-172	54.3	oo
	b_5 - $N_{100}P_{100}K_{100}$	176	-200	46.8	ooo
	LSD	*0.05*	148		
		0.01	199		
		0.001	264		

For variants sown at 25 cm between rows, higher values were obtained than for sowing at greater distances, with an average of 157 shoots·m^{-2} higher than the variants sown at 50 cm between rows and 62 shoots·m^{-2} compared to the variants sown at 37,5 cm between rows (*figure 2*).

By applying mineral fertilizers, the values tended to decrease, but in the variants sown at a distance of 25 cm between rows the trend was to increase the number of shoots·m^{-2}.

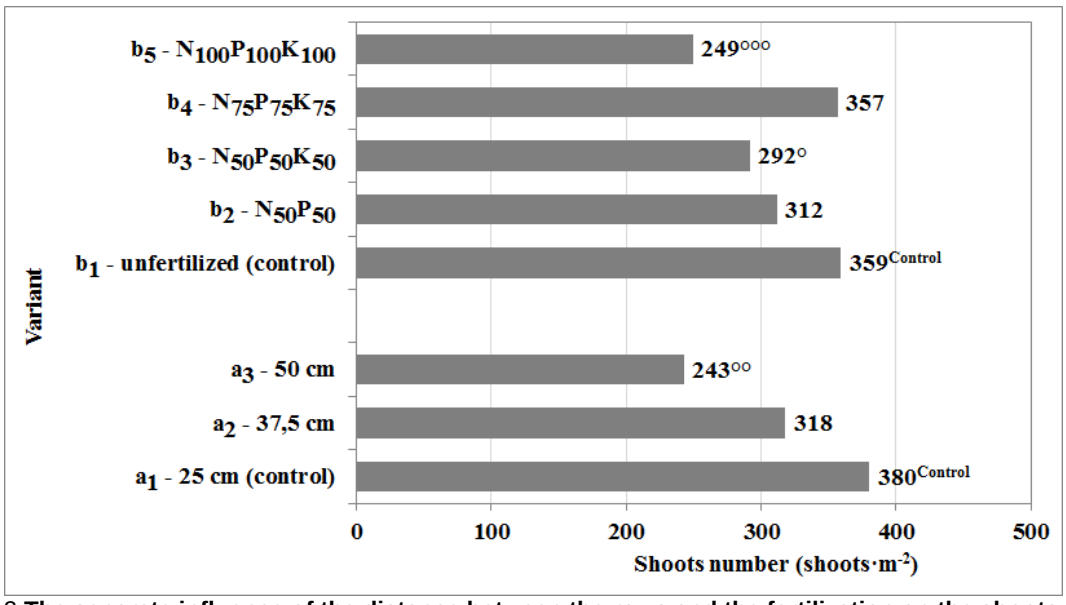

Figure 2 **The separate influence of the distance between the rows and the fertilization on the shoots number**

Both factors studied, respectively the distance between rows fertilization morphoproductive influenced to a certain extent the analyzed parameters, but the interaction between them has generated the higher differences. These aspects reinforce the understanding that all vegetation factors are interdependent and important.

CONCLUSIONS

The factors taken in the *study*, namely the sowing distance and the fertilization dose, had a different influence on the parameters analyzed in the first year of vegetation.

Sowing at a distance of 50 cm between the rows and by applying mineral fertilizers in moderate doses, generated higher plants in the first year of vegetation.

By the higher sowing depth, a large number of shoots·m^{-2} were generated, but with a lower height at the sowing distance between rows of 25 cm, compared to the distance of 50 cm between rows where the number of shoots·m^{-2} was lower and the height of the plants was higher.

In general, fertilization with complex mineral fertilizers applied in high doses did not have a positive effect on the height of plants and the number of shoots·m^{-2}.

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