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RESEARCHES CONCERNING THE EFFECT OF SOME BIOLOGICALLY-ACTIVE PRODUCTS ON FORAGE BIOMASS YIELD IN SMOOTH BROME

CERCETĂRI PRIVIND EFECTUL UNOR PRODUSE BIOLOGIC ACTIVE ASUPRA PRODUCŢIEI DE BIOMASĂ FURAJERĂ LA OBSIGA NEARISTATĂ

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Vegetal biostimulants are organic products (natural or synthesized) that exert upon plant growth an action similar to the phytohormones' one, when they are applied in small amounts, in certain stages of plant development. Biostimulants change organisms or organs' development, nutrition or resistance, under various stress conditions, by inducing changes into the vital processes leading to the improvement of crop quality and quantity, to a better and more operative mechanical harvesting and to an improvement in the agricultural products' preservation. The application of biologically-active products in the smooth brome crop determined growth of the dry matter yield of up to 1.11 t/ha depending on the product used, and the foliar surface index increased in the variants with application of biologically-active products with up to 1.16 m^2SA/m^2 land, compared to the control variant.
***Key words**: biologically-active products, dry matter yield, smooth brome*

Introduction

Biologically-active products may exert a phytohormonal or hormonal interfering-type action (focused on the growing and development phenomena), or they may influence other phyto-physiological processes (stomata movement, assimilating capacity, etc.).

Regarding biostimulants, as they are extremely active products, the success provided by their application depends upon the performance of a uniform compound dispersion at the level of organs or tissues responding to this treatment, so that the substance access will be duly assured at the reaction place. In order to obtain the proper reaction, we must consider the optimal moment for treatment application (period and

climate), given the fact that plant behavior depends much on the environmental conditions. They exert a specific influence upon some physiological functions or biochemical reactions, the effect being morphogenetic or metabolic.

Materials and Methods

The researches were carried out at USAMVB Timişoara, on a slightly gleyied chernozem, with moderate alkalization below 100 cm, slightly decarbonated, on fine medium loess deposits, medium argillaceous clay.

The objective of our researches was to quantify the biostimulants' effect on dry matter yield in smooth brome. During the vegetation period, in order to complete the objectives proposed, we performed the following observations and determinations: foliar surface, herbage yield and dry matter yield.

The biological material used during the three years of field researches consisted of *Bromus inermis* – Olga breed.

The biologically-active products used in the researches were the following: Green fuse, Stimupro, Agrostemin, Sea start, Super plant, Bionat, Mega grow.

The experiment consisted of 8 variants, placed by the Latin rectangle method, in four replications, on a lot surface of 20 m^2 and a total surface for an experiment of 640 m^2. Seeding was made on a general agrifound of $P_{50}K_{70}$. Nitrogen-based fertilizers were applied in N_{50} doses only in the early spring, before plants started their vegetation, in each experimental year.

The treatments with biologically-active products were applied many times during the vegetation period, depending on the mowing number, in the following doses: V1 – control (untreated); V2 – Green fuse (250 ml/ha); V3 – Stimupro (1 l/ha); V4 – Agrostemin (750 g/ha); V5 – Sea start (4 l/ha); V6 – Super plant (0,5 l/ha); V7 – Bionat (3 l/ha); V8 – Mega grow (0,5 l/ha).

In case of the species studied, treatments with biologically-active products were applied when plants reached a growing height of 10-12 cm.

Results and Discussions

The synthesis of the results achieved during the three production years leads to the conclusion that, successive to the application of various biostimulant products, we may achieve forage yields much bigger than in the untreated control variant, smooth brome being one of the forage species strongly influenced by such products (Table 1).

In the three production years, we achieved average yield growth between 0.52 – 1.11 t/ha DM, depending on the product applied. Therefore the following biostimulants are made evident: Stimupro with a yield growth of 1.11 t/ha DM (respectively 14.64%); Green fuse, which induces a DM yield growth of 0.87 t/ha DM (respectively 11.58%); Bionat with a growth of 0.85 t/ha (respectively 11.31%) DM; Mega grow with 0.76 t/ha DM (respectively 9.98%).

The results presented in Figure 12.5 show the direct result caused by the biostimulants studied on dry matter yield in smooth brome during the three years of study.

Table 1

Influence exerted by some biostimulants on dry matter yield in smooth brome during the three year of production studied

Specification	Average DM yield t/ha	Differences t/ha	Differences %	Significance
Control	7.51	-	100	-
Green fuse	8.38	0.87	111.58	*
Stimupro	8.61	1.11	114.64	**
Agrostemin	7.95	0.44	105.85	-
Sea start	8.03	0.52	106.92	-
Super plant	8.10	0.60	107.85	-
Bionat	8.36	0.85	111.81	*
Mega grow	8.26	0.76	109.98	*

DL 5% 0.68 t/ha; DL 1% 0.94 t/ha; DL 0.1% 1.31 t/ha

Therefore, depending on the biostimulants used, the dry matter yield has the following order: in the case of the variant with application of Stimupro, dry matter yield is 8.61 t/ha, for Green fuse the level of dry matter yield is 8.38 t/ha, in the variants with application of Bionat and Megagrow it is 8.36, respectively 8.26 t/ha under the conditions in which the average dry matter yield recorded in the control variant is 7.51 t/ha.

Determinations performed regarding the foliar index value reveal that in this situation, too, the biostimulants applied exert a different influence from one product to another. So, in the case of smooth brome, depending upon the biopreparation type applied, the foliar index value ranges between 4.98 – 5.79 m^2FA/m^2 land, compared to the untreated control variant, where FIV is 4.63 m^2FA/m^2 land (Table 2).

Table 2

Biostimulants' effects upon the foliar surface index (ISF) in smooth brome (m^2 FS/m^2 land)

Smooth brome	control	Green fuse	Stimupro	Agrostemin	Sea start	Super plant	Bionat	Mega grow
x	4.630	5.300	5.790	4.980	5.110	5.140	5.760	5.460
Sx	0.047	0.058	0.082	0.063	0.057	0.076	0.091	0.052
s2	0.022	0.033	0.068	0.040	0.032	0.058	0.083	0.027
s	0.149	0.183	0.260	0.199	0.179	0.241	0.288	0.165
s%	3.228	3.445	4.493	3.994	3.507	4.694	4.992	3.016

Among the variants studied, the biggest influence upon the foliar index value was exerted by the preparations Stimupro (with an index of 5.79 m^2FA/m^2) and Bionat (5.76 m^2FA/m^2 land).

The study on the correlation between the dry matter yield and the foliar surface index proves that the relationship between these two characteristics is positive, with a correlation coefficient of 0.934 (Figure 1). This demonstrates that as bigger the foliar surface index is, as bigger is the biomass yield achieved.

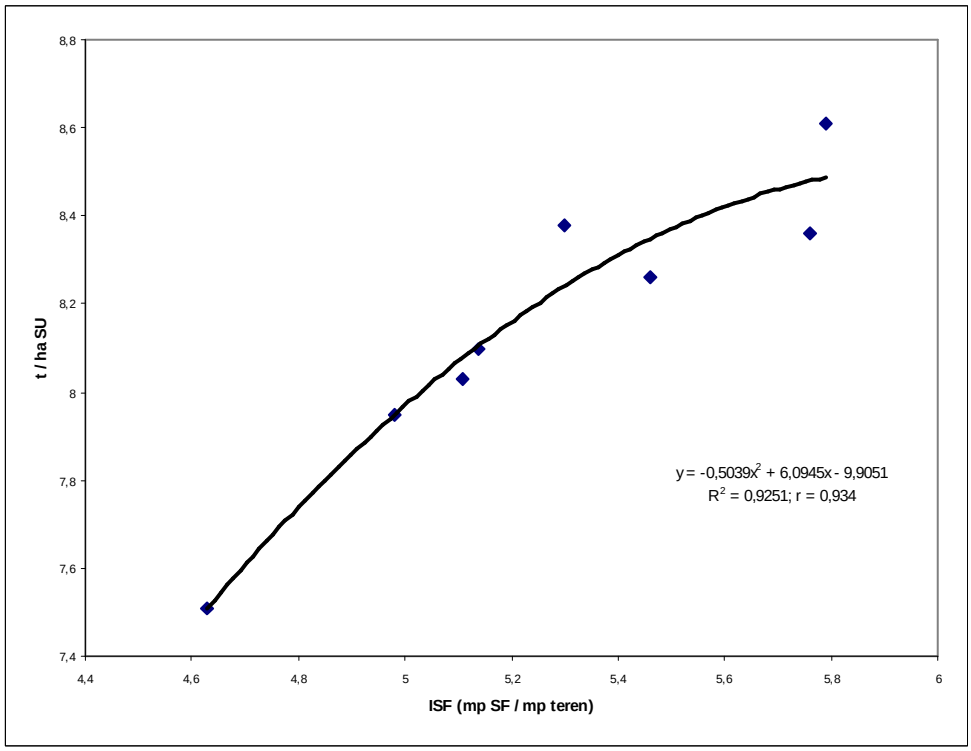

Figure 1. Correlation between the foliar surface index and the dry matter yield in smooth brome successive to the application of biostimulants

Conclusions

The synthesis of the results achieved during the three experimental years leads to the conclusion that the most efficient biologically-active product, used in smooth brome, is Stimupro, which determines an increase in the dry matter yield with up to 14.63% compared to the untreated control variant.

The foliar surface index ranges between 4.98 – 5.79 m^2FS/m^2 land compared to the untreated control variant where FSI is 4.63 m^2SF/m^2 land. The foliar surface index increased in the variants with application of biologically-active products with up to 1.16 m^2FS/m^2 land, compared to the control variant.

The study of the correlation between the dry matter yield and the foliar surface index proves that the relationship between these two characteristics is positive, with a correlation coefficient of 0.934.

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