STUDY OF PRODUCTION CHARACTERS OF THREE FOREIGN *LOLIUM PERENNE* VARIETIES IN THE TIMISOARA'S CLIMATIC CONDITIONS

STUDIUL CARACTERELOR DE PRODUCȚIE LA TREI SOIURI STRĂINE DE *LOLIUM PERENNE* ÎN CONDIȚIILE CLIMATICE DE LA TIMIŞOARA

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Abstract: *In the following paper we present the behavior of foreign genotypes of Lolium perenne (perennial ryegrass), namely EMINENT, CALIBRA and LEIA, in conditions of Timisoara, in the perspective of enriching the current assortment of fodder plants varieties. We have studied the biometric indicators such as: length of vegetative and generative shoots, the number of vegetative and generative shoots, and the number of green leaves /vegetative and generative shoot, weight of a shrub and leaf area/shoot. Following analysis of data obtained, it can be observed that the CALIBRA variety recorded the best results, being superior front of LEIA and EMINENT varieties, in terms of vigor and ability to synthesize biomass.*

Rezumat: *Lucrarea de față prezintă comportamentul unor genotipuri străine de Lolium perenne (zâzanie), şi anume EMINENT, CALIBRA şi LEIA, în condițiile pedo-climatice de la Timişoara, în perspectiva îmbogățirii sortimentului actual de soiuri de plante furajere. S-au luat în studiu următorii indici biometrici: lungimea lăstarilor vegetativi şi generativi, numărul de lăstari vegetativi şi generativi, numărul de frunze verzi/lăstarii vegetativi şi generativi, greutatea unei tufe şi suprafața foliară/lăstar. În urma analizei datelor rezultate, se observă că soiul CALIBRA a înregistrat cele mai bune rezultate, fiind superior soiurilor LEIA şi EMINENT, în ceea ce priveşte vigoarea şi capacitatea de a sintetiza biomasă.*

Keywords: *perennial ryegrass, foreign varieties, adaptation*
Cuvinte cheie: *Lolium perenne, soiuri străine, adaptare*

INTRODUCTION

The knowledge of characteristics of different fodder varieties has a great importance for growers, because only knowing them they can be exploited. The variety of fodder plants must meet very different requirements of soil and climate, because is necessary to produce forage in any climate, on all types of soil, in dry or wet areas, in warm or cold zones, in irrigated and non-irrigated. This wide range of requirements can be covered by zoning the fodder plant species and within each species, by zoning the varieties (VARGA , 1998).

Experiences with varieties or hybrids have a permanent character, because for most cultivated species occur, in every year, new varieties and hybrids both nationally and internationally, which require testing before being introduced into culture of a given area. The main purpose of those experiences is to identify the most valuable varieties in terms of growing capacity, quality and other traits of agricultural interest (CIULCA, 2002).

MATERIAL AND METHOD

The research was carried out in the experimental fields of Culture of grasslands and fodder plants discipline, USAMVB Timisoara, the experience being placed on a chambic chernoziom weakly gleyed soil type, with salinisation in depth.

The studied material is represented by three foreign varieties of *Lolium perenne*, namely EMINENT, CALIBRA, LEIA. Sowing was made on 03.10.2007, with a 12.5 cm

distance between rows. Seeding density is 1280 germinal seeds/m^2. Sowing depth is 2.5cm.

Experience is placed after the method of randomized blocks in three repetitions. A parcel surface is 20 m^2 (5m x 4m).

Assessment of quantitative characters of the production was based on biometric measurements from 10 plants in each plot - repetition. Thus, was made the determinations on plant about morphological characters, namely: the length of vegetative and generative shoots, the number of vegetative and generative shoots, the number of green leaves/ vegetative and generative shoots, weight of shrubs and leaf area /shoot.

The morphological characteristics have been determinate (length and width of leaves, plant height) with a graduated ruler.

The fraternity degree and the number of leaves / shoot were determined by making direct counts.

The weight determination was been performed by using a portable electronic scale.

To determine foliar surface was used the method of determining foliar area, using leaf parameters, after the formula:

$$A = b \times (L \times B)$$

where:

A-is the leaf area

L-the maximum length of leaf

B-maximum width of leaf

b-factor which is multiplied by the product of L and B and he is 0.905 for grasses.

The data calculation and interpretation obtained from the performance measurements and calculations mentioned above were processed by conventional methods of statistical analysis. The significance of differences between graduations and combinations of various factors has been established through analysis of variance and u test (CIULCA, 2006).

RESULTS AND DISCUSSION

Results regarding the length of the shoots

Table 1

The length of generative / vegetative shoots of *Lolium perenne* varieties

Variant / **Length of generative sprigs**	$\bar{x} \pm sx$	$s\%$	u	Significance
Mt. EMINENT	28.06±0.15	1.79		
CALIBRA	36.72±0.24	2.08	29.88	***
LEIA	35.55±0.04	0.41	45.08	***
	DL 5%=2,26 (cm)	DL 1%=3,25 (cm)	DL 0,1%=4,78 (cm)	
Length of vegetative sprigs	$\bar{x} \pm sx$	$s\%$	u	Significance
Mt. EMINENT	13.12±0.06	1.67		
CALIBRA	18.98±0.66	11.11	8.74	***
LEIA	15.80±0.25	5.19	9.99	***
	DL 5%=2,26 (cm)	DL 1%=3,25 (cm)	DL 0,1%=4,78 (cm)	

The length of generative shoots is very significantly higher than of the witness EMINENT, whatever varieties is taken in the study. Exactly the same phenomenon was met at

the length of vegetative shoots, the differences between the witness and the other two varieties are very significantly higher (Table 1).

Results on the number of generative and vegetative shoots / plant

By comparing the shoots number of *Lolium perenne* varieties taken in the study, can be observed that the highest value in the number of generative shoots, meets the Leia variety, where the number of generative shoots is distinct significantly higher than witness variety, EMINENT. Regarding the CALIBRA variety, the number of generative shoots is not statistically significant compared to witness.

The number of vegetative shoots / plant it is different for the three varieties studied: the witness variety EMINENT meets the highest value in the number of shoots, followed by CALIBRA variety, respectively LEIA, in both varieties the number of vegetative shoots / plant, being very significantly lower than control variety EMINENT (Table 2, Fig. 1).

Table 2

The number of shoots of *Lolium perenne* varieties

Variant **Length of generative sprigs**	$\bar{x} \pm sx$	$s\%$	u	Significance
Mt. EMINENT	11.3 ± 0.77	21.69		
CALIBRA	13.5 ± 0.94	22.15	1.79	-
LEIA	14.1 ± 0.27	6.20	3.40	**
	DL 5%=2,26	DL 1%=3,25	DL 0,1%=4,78	
Length of vegetative sprigs	$\bar{x} \pm sx$	$s\%$	u	Significance
Mt. EMINENT	113.4 ± 2.38	6.65		
CALIBRA	73 ± 4.18	18.11	-8.39	ooo
LEIA	51.5 ± 0.85	5.27	-24.40	ooo
	DL 5%=2,26	DL 1%=3,25	DL 0,1%=4,78	

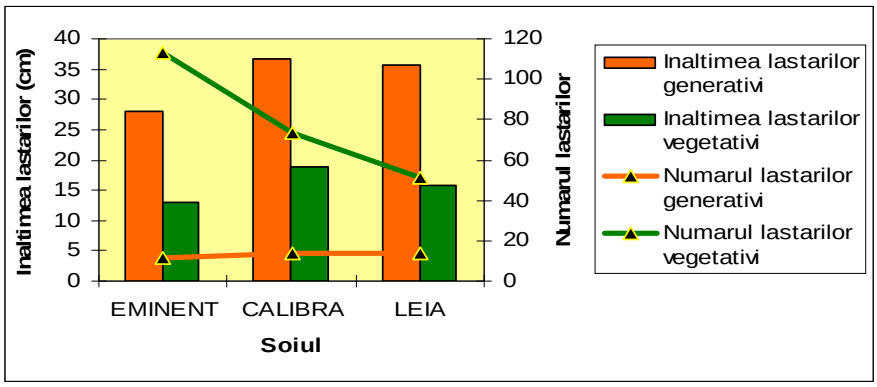

Figure1. Graphical representation of the relationship between shoots length/number of *Lolium perenne* varieties

Results on the number of leaves / shoot

The highest value in terms of number of leaves / generative shoot occurred in LEIA variety, which is significantly higher than that of the witness EMINENT. In CALIBRA variety the number of leaves / generative shoot is significantly lower than control variety.

The number of leaves on vegetative shoots is different from the three varieties studied: in the CALIBRA variety the number of leaves / vegetative shoot is distinctly lower than EMINENT witness and the LEIA variety is significantly lower compared with the control variety **(Table 3, Fig. 2).**

Table 3

The number of green leaves on the shoot of *Lolium perenne* varieties

Variant / **Number of green leaves/ generative sprig**	$\bar{x} \pm sx$	$s\%$	u	Significance
Mt. EMINENT	1.73±0.07	14.17		
CALIBRA	1.42±0.05	12.77	-3.2	o
LEIA	2.09±0.10	16.02	2.74	*
	DL 5%=2,26	DL 1%=3,25	DL 0,1%=4,78	
Number of green leaves/ vegetative sprig	$\bar{x} \pm sx$	$s\%$	u	Significance
Mt. EMINENT	3.53±0.05	4.51		
CALIBRA	3.11±0.09	9.99	-3.85	oo
LEIA	3.25±0.09	9.68	-2.55	o
	DL 5%=2,26	DL 1%=3,25	DL 0,1%=4,78	

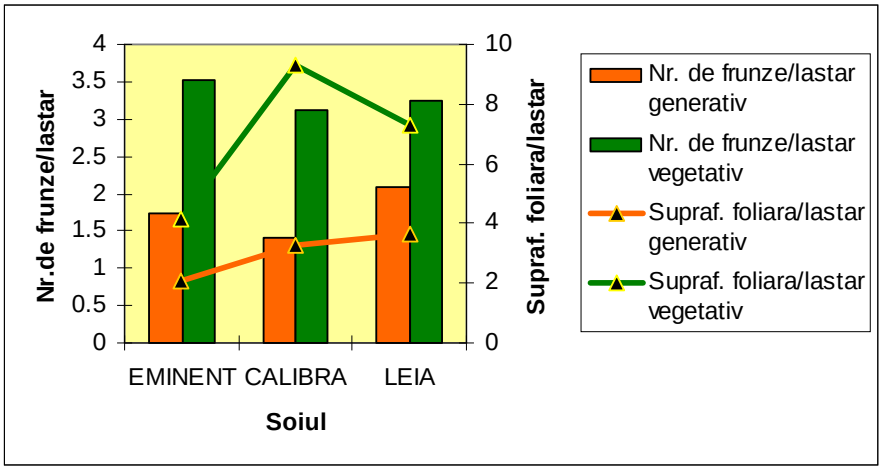

Figure 2. Graphical representation of the relationship between the number of leaves on the shoot and leaf surface per shoot of *Lolium perenne* varieties

Results on the leaf surface

Regarding the leaf area / vegetative and generative shoot of CALIBRA variety, those are significantly higher compared with the EMINENT variety, taken as control. Analyzing the leaf surface of LEIA variety, it is noted that this is distinct significantly higher than the control

EMINENT variety for generative shoots, and very significantly higher for vegetative shoots (Table 4).

Table 4

Leaf area per shoot of *Lolium perenne* varieties

Variant **Leafs surface/ generative sprig**	$\bar{x} \pm sx$	$s\%$	u	Significance
Mt. EMINENT	2.05±0.17	26.81		
CALIBRA	3.29±0.12	12.13	5.77	***
LEIA	3.67±0.40	34.89	3.67	**
	DL 5%=2,26 (cm^2)	DL 1%=3,25 (cm^2)	DL 0,1%=4,78 (cm^2)	
Leafs surface/ vegetative sprig	$\bar{x} \pm sx$	$s\%$	u	Significance
Mt. EMINENT	4.12±0.19	15.24		
CALIBRA	9.30±0.50	17.26	9.50	***
LEIA	7.28±0.23	10.14	10.31	***
	DL 5%=2,26 (cm^2)	DL 1%=3,25 (cm^2)	DL 0,1%=4,78 (cm^2)	

Results on the weight of a bush

It is noted that between the studied varieties are differences in terms of plant weight. Thus, both CALIBRA variety and the LEIA variety, the weight of a bush is very significantly higher compared with control EMINENT variety (Table 5).

Table 5

The weight of a *Lolium perenne* bush

Varianta **Greutatea tufei (g)**	$\bar{x} \pm sx$	$s\%$	u	Semnificație
Mt. EMINENT	9.71±0.79	25.90		
CALIBRA	16.66±0.91	17.44	5.71	***
LEIA	15.20±0.53	11.05	5.73	***
	DL 5%=2,26 (g)	DL 1%=3,25 (g)	DL 0,1%=4,78 (g)	

CONCLUSIONS

Analyzing the results obtained from *Lolium perenne* varieties, EMINENT, CALIBRA and LEIA, we can draw the following conclusions:

- the **CALIBRA** variety has the highest values in terms of length of vegetative and generative shoots, leaf area / vegetative shoot of and weight of a shrub. Compared with LEIA and EMINENT varieties, this variety is more vigorous, it has a good capacity of shooting, has a large leaf surface, not by the number of leaf / shoot, where this variety has low values, but by the large size of leaves. These features justify, in fact, that at this variety was obtained the greatest value in the weight of a shrub.

- the **LEIA** variety is remarkable for the average values, between minimum and maximum, in terms of the length of shoots, number of leaves / shoot, leaf area and weight of a shrub.

- the **EMINENT** variety is a less vigorous variety than the other two varieties of *Lolium perenne*, with a good capacity to shoot, it develops a large number of leaves / shoot, but small, all leading to this variety showed the lowest value in terms of weight of a shrub.

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