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EXPERIMENTAL RESULTS CONCERNING THE YIELD OF *DACTYLIS GLOMERATA* SPECIES IN CONDITIONS OF ROMANIAN PLAIN

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Abstract

The wide spreading of Dactylis glomerata in crop, as feeding crop, is explained by high productivity, great ecological and use plasticity, great vivacity and quality attributes approaching to the valuable fodder species.

An experiment was organized on Dactylis glomerata in sole crop and in mixture with Medicago sativa within Moara Domneasca Experimental Field. In the experiment there were studied two varieties of orchardgrass: Regent and Ambasador.

On the basis of the obtained results, we can observe that Dactylis glomerata species adapts excellent to the Romanian Plain conditions, ensuring in non-irrigated conditions both in sole crop and in mixture with Medicago sativa average yields of 4-5 t/ha D.M..

INTRODUCTION

From the species participating in the vegetal clover of temporary pastures from plain regions, it was studied the graminacea species with higher frequency in the botanical composition, respectively *Dactylis glomerata.*

Based on research effected in our country, it was found that *Dactylis glomerata* species has an excellent adaptabilityto the Romanian Plain conditions, achieving high an stable yields, both in irrigated and non-irrigated system.

In this paper there are presented the results obtained in 2009 within an experiment with *Dactylis glomerata* in sole crop and in mixture with *Medicago sativa*.

MATERIAL AND METHODS

Research was performed within the Moara Domneasca Experimental Didactic Farm, owned by University of Agronomic Sciences and Veterinary Medicine Bucharest.

Soil. The representative soil in the southern part of the country for the experimental field and for the oak area, belongs to the reddish preluvosoil type, presenting the following characteristics: loamy-clay texture; medium humus content in A horizon (2.77%) and relatively high in A/B horizon (about 1.2%); slight neutral-acid

reaction in A horizon (pH 6.29-6.64); phosphorus content of 17 ppm P_{AL} (poorly-medium supplied); potassium content, of 184 ppm K_{AL} (well supplied).

Climate. As a multiannual average, in the area of the experimental field, precipitations sum up 556.1 mm. During the vegetation period (March and September), there was a waterfall of 380 mm in average. In comparison with the normal climate regime of the area where the experimental field is situated, the research year was a warmly one.

As far as rainfall is concerned, the vegetation period was characterized by lack of spring rainfall and normal rainfall during summer months (Figure 1).

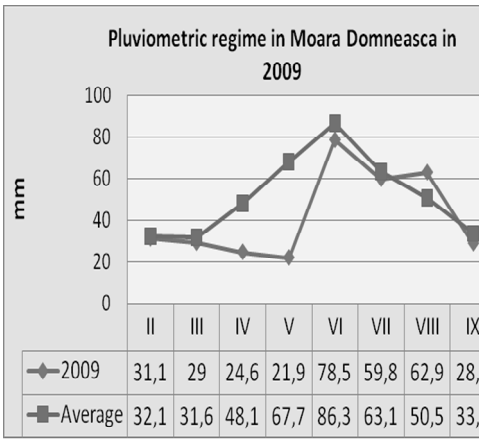

Fig. 1. Rainfall regime at Moara Domneasca, in 2009

Experimental factors: Factor A: Type of culture

a_1 – *Dactylis glomerata* in sole crop

a_2 – *Dactylis glomerata* 70% + *Medicago sativa* 30%

Factor B: Variety of *Dactylis glomerata*

b_1 – Regent (Romanian variety)

b_2 – Ambasador (English variety)

The experiment was established in 2008. Variants were placed in plots divided into four repetitions, with a plot area of 18 m^2. The experimental data refers to the second year of vegetation.

Measurement and analysis:

Shoots density - was determined for each variant, the surface of 400 cm^2 in 3 repetitions;

Leaf area index (LAI) - was determined by direct measurements only with *Dactylis glomerata* shoots;

Absolute growth rate (AGR) - was determined only with *Dactylis glomerata* species in sole crop, in the apex 10 cm level and after that, every 20 days at cycles I, II, III.

RESULTS AND DISCUSSION

***Dactylis glomerata* shoots density.** On the basis of the results presented in Table 1, it is estimated that the density of *Dactylis glomerata* shoots was higher in mixture with *Medicago sativa*.

Table 1

***Dactylis glomerata* shoots density**

Vegetation cycle	Sole crop (shoots/m^2)		*Dactylis glomerata* + *Medicago sativa* (shoots/m^2)	
	Regent	Ambasador	Regent	Ambasador
Cycle I	2025	2025	2450	2275
Cycle II	500	338	563	400
Cycle III	450	388	400	425

As seen from the experimental data presented in both sole crop and in mixture with *Medicago sativa*, Regent variety had a better capacity of twinning than Ambasador variety, recording an equal or a greater density in all vegetation cycles.

The highest shoots densities were realised in the first vegetation cycle both in sole crop and in mixture with *Medicago sativa*, respectively 2025 shoots/m^2 and 2450 shoots/m^2.

Leaf area index (LAI). Table 2 shows that the highest LAI values were recorded in the variant mixed with alfalfa, resulting that leguminous in the mixture had a positive influence on the orchardgrass plant development.

Table 2

Leaf Area Index

Period	LAI			
	Sole crop		*Dactylis glomerata* + *Medicago sativa*	
	Regent	Ambasador	Regent	Ambasador
April 12	2.08	3.01	4.60	4.09
May 05	7.16	9.45	8.28	7.11
June 06	1.12	1.12	1.12	1.11
June 25	2.15	1.83	3.00	1.10
July 28	1.49	1.00	1.70	1.04
August 16	1.06	0.57	0.98	1.08

So, in sole crop, the highest value of LAI index was obtained on May 5^{th,} with Ambassador variety, namely 9.45, when the plants were in flower phase, with 2 active leaves. The lowest LAI value was obtained on August 16, on the third cycle of harvest in a dry period, with Ambasador variety, respectively 0.57.

From Table 2 it can be seen that the Ambasador variety registered higher LAI values in the first part of the growing season and, during the summer months (June to August) showed lower LAI values than Regent variety.

In mixture with *Medicago sativa*, Regent variety had a better reaction in terms of leaf area index, achieving the maximum LAI value on May 5th, respectively 8.28. The minimum LAI value was obtained with Regent variety on August 10, namely 0.98.

Absolute growth rate (AGR). Regarding the absolute growth rate, in Table 3 is showna clear difference between those two orchardgrass varieties tested.

Table 3

Absolute growth rate

Period	Absolute growth rate (g/m^2/D.M./day)	
	Regent	Ambasador
April 12	4.37	6.02
May 05	8.36	5.67
June 06	5.48	4.35
June 25	3.11	3.23
July 28	5.00	4.64
August 16	3.18	2.27

Following the results presented in Table 3, it can be observed that the Regent variety had a faster absolute growth rate than the other variety of orchardgrass experienced.

At the same time, an almost perfect correlation between LAI and AGR (Figures 2 and 3) is registered with both varieties at the beginning of vegetation period (April 12 and May 5), as well as at the end of the vegetation period (August 16).

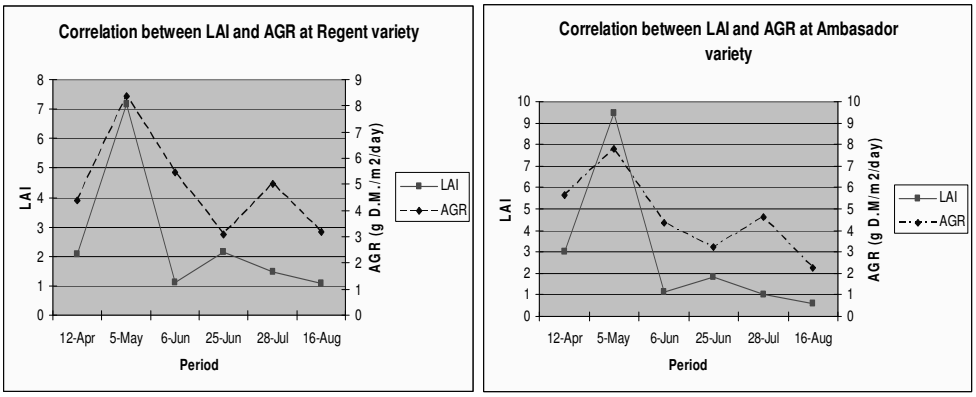

Fig. 2, 3. Correlations between LAI and AGR at Regent and Ambasador varieties

Dry matter yield per crop cycle. Regarding the dry matter yield, both in sole crop and in mixture, there were observed yield differences between those two orchard grass varieties that were tested.

Table 4

Dry matter yield

Cycle of harvest	**Dry matter yield** (t/ha)			
	Sole crop		Mixture	
	Regent	Ambasador	Regent + *Medicago sativa*	Ambasador + *Medicago sativa*
Cycle I	5.10	5.00	3.86	4.34
Cycle II	2.82	2.43	1.98	1.77
Cycle III	1.94	1.37	2.20	1.68
Total dry matter yield	**9.86**	**8.80**	**8.04**	**7.79**

Dl 5%=1.065 t/ha
Dl 1% = 1.700 t/ha
Dl 0.1% = 3.034 t/ha

From data presented in Table 4, we can observe that in mixture with *Medicago sativa*, the dry matter yields were relatively lower than those obtained in sole crop by *Dactylis glomerata* species.

In sole crop, the Regent variety achieved higher dry matter yields in all three crop cycles, compared with Ambasador variety. Thus, the maximum yield was obtained in the first harvest cycle, respectively 5.10 t/ha D.M. In the third harvest cycle there was obtained 1.94 t/ha D.M. In sole crop, Ambassador variety had a similar behaviour like Regent variety, the yields obtained from all three crop cycles being similar with those achieved by Regent variety.

In mixture, Regent variety assured higher yields than the other varieties tested, except the first harvest cycle, where a higher yield was obtained from Ambasador variety, respectively 4.34 t/ha D.M. The lowest yield in mixture was registered with Ambasador variety, respectively 1.68 t/ha D.M.

CONCLUSIONS

1. In the meteorological conditions of 2009, characterized by low rainfall regime during the growing season, and in Moara Domneasca Experimental Field, *Dactylis glomerata* species realised in average total yields of 7-10 t/ha D.M. in sole crop or in mixture with *Medicago sativa*.
2. *Dactylis glomerata* plant density, expressed as number shoots/m^2 ranged between 2000 and 2450, which means that leguminous species had a positive influence on the vegetation cover development.
3. *Dactylis glomerata* species adapts well enough to weather conditions from the Romanian Plain, ensures satisfactory yield increases both in sole crop and in mixture with *Medicago sativa,* in non-irrigate conditions.

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