THE DYNAMICS OF PHENOPHASES OF SOME FOREIGN *LOLIUM PERENNE* VARIETIES IN THE TIMISOARA'S PEDO-CLIMATIC CONDITIONS

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Abstract: *Knowing the main phonological characteristics of some perennial forage grasses varieties from the international assortment in the specific climatic conditions from the West of Romania, represent the main purpose of this paper. In this respect, in order to determinate the degree of precocity three foreign varieties of Lolium perenne, namely EMINENT, CALIBRA and LEIA., were studied and observed in stationary conditions of Timisoara. There were observed the dynamics of the main vegetation phenophases from beginning of vegetation until the harvest. The phenophases evolution, after BBCH code, it was noted in the first harvest cycle, in part for each studied variety, during 2008. The BBCH studied stages are the following: 0 = seed, 09 = emergence, 11 = was noted the date on which the first deployed leaf was visible, 29 = end of shoots, 36 = stem elongation, 59 = end formation of inflorescences, all inflorescences are made, 65 = full flowering, 50% of the anthers are mature. To express precocity was determined the precocity index (IP). For accurately determination of optimal timing of harvest for a variety, operating in different ways, have been established for grazing precocity index (IPp) in the height of apex to 10 cm from the ground and for hay precocity index (IPf) in the formation of flowering phenophase. Also, it was observed the duration of phenophase in relation to the amount accumulated degrees of temperature and amount of precipitation. After the data analysis, it was observed that Calibra variety is the earliest, followed by Leia variety and Eminent variety. Thus, with IPp 43b and IPf 51b, Calibra variety has reached the first maturity of harvest, compared with the other two varieties. Calibra variety was the earliest and related to specific climatic conditions of temperature and precipitation from the experimental area. Thus, we see that the Calibra variety accumulated the lower amount of temperatures to reach the optimal time of harvest, both for grazing (459.7 ^{0}C) and for hay (631^{0}C), compared with the Leia variety (487.2 ^{0}C until the start of grazing and 710.4 ^{0}C until the start of harvest by mowing for hay) and Eminent variety (519.3 ^{0}C until the start of grazing and 729.2 ^{0}C until the start of harvest by mowing for hay). Considering the range of precocity of all three studied varieties, result that the first harvest cycle can space out from one variety to another in an interval of seven days, making easy for farmer to achieve the green conveyer.*

Key words: *Lolium perenne, foreign varieties, precocity, phenology*

INTRODUCTION

In the last time many varieties of perennial pasture grasses were created, varieties that differ one from another by various characteristics, such as production capacity, resistance to disease, drought, winter and not least the degree of precocity.

In order to improve the rescheduling of forage production during the period of vegetation, the cultivation of some varieties with different degrees of precocity, is the best solution, besides which adds and fractionated application of fertilizers and cultivation of species with different growth rate. The wide range of precocity of varieties allows the formation of some mixture with varieties from the same class of precocity, which may be of different species, thus facilitating the achievement of green conveyer.

In this paper we proposed to present the dynamic of the main phenophases to three foreign origin varieties of *Lolium perenne* in relation to the specific of soil and climatic conditions in Timisoara and to determine their behavior in terms of the degree of precocity.

Regarding the precocity of species *Lolium perenne*, it falls in the intermediate group, forming spikes after the 50 days from beginning of vegetation (MOISUC, 2002).

MATERIAL AND METHODS

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

The biological studied material is represented by three foreign varieties of *Lolium perenne*, namely EMINENT, CALIBRA and LEIA.

The experience is placed after the method of randomized blocks, in three repetitions, a parcel surface is 20 m^2 (5m x 4m). Sowing was made on 15.09.2007, with a 12.5 cm distance between rows. Seeding density is 1280 germinable seeds/m2 and sowing depth is 2.5 cm.

The phenophases evolution, after BBCH code, it was noted in the first harvest cycle, in part for each studied variety, during 2008. The BBCH studied stages are the following:

- 0 = seed. Was recorded the date of sowing
- 09 = emergence. The coleoptil penetrate the soil surface. We have noted the day when 90% of plants have sprung. Also, being a crop sown in autumn, was needed and start-up vegetation date in spring.
- 11 = was noted the date on which the first deployed leaf was visible (true leaf)
- 29 = end of shoots: have reached the maximum number of shoots
- 36 = stem elongation (node 6 at least 2 cm above node 5)
- 59 = end formation of inflorescences, all inflorescences are made
- 65 = full flowering, 50% of the anthers are mature (ŞUMĂLAN, 2006).

To express precocity was used a scoring artificial system, called precocity index (Ip), which has the following characteristics:

- first number indicates the month;
- the second number indicates the decade of the month;
- point “a” or “b” indicates the first part or the second part of the decade.

For accurately determination of optimal timing of harvest for a variety, operating in different ways, have been established for grazing precocity index (IPp) in the height of apex to 10 cm from the ground and for hay precocity index (IPf) in the formation of flowering phenophase (SIMTEA, 1978).

RESULTS AND DISCUSSIONS

The data analysis in which the varieties of *Lolium perenne* go through the phenophase previously mentioned, allowed their characterization in terms of precocity, as in Table 1. It is observed that among the three studied varieties, Calibra variety is the earliest, with IPp 43b, reaching the optimal stage for grazing on 28.04, with two days before than the Leia variety, respectively, with four days earlier than Eminent variety. In terms of Ipf, the Calibra variety with Ipf 51b is also, the earliest, reaching the optimal time of harvest on 10.05, with 4, respectively 5 days earlier than Leia, respectively Eminent variety.

Table 1

Index of precocity of the studied varieties

The ***Lolium perenne varieties***	**IPp**	**IPf**
Calibra	43b	51b
Leia	43b	52a
Eminent	51a	52b

Thus, the three studied varieties allow the rescheduling of grazing beginning timing on a period of 5 days and a optimal timing of harvesting for hay within 7 days. Also, we see that Calibra variety reaches maturity of harvest in 57 days from the start in vegetation, compared with the Leia and Eminent varieties, which requiring 61, respectively 62 days to reach harvest maturity (Table 2)

Table 2

Phenological observations in the *Lolium perenne* varieties

Variety	Start-up in vegetation date	First harvest date		Number of days from the start-up in vegetation- harvest		The period and time when the first harvest is spanning			
		Grazing mode		Grassland mode	Grassland mode	Grazing mode		Grassland mode	
						Period	Time	Period	Time
Eminent	17.03.08	02.05.2008	16.05.2008	47	61	28.04-02.05	5 days	10.05-10.05	7 days
Calibra	15.03.08	28.04.2008	10.05.2008	45	57				
Leia	15.03.08	30.04.2008	15.05.2008	47	62				

From the figure 1 we can see that during the browsing of the main phenophase, the *Lolium perenne* varieties not differ between them to a large extent in terms the degree of precocity, thus that, of the six phenophase in the study followed, the most significant difference between the varieties can be found at phenophase 59, being 5-6 days.

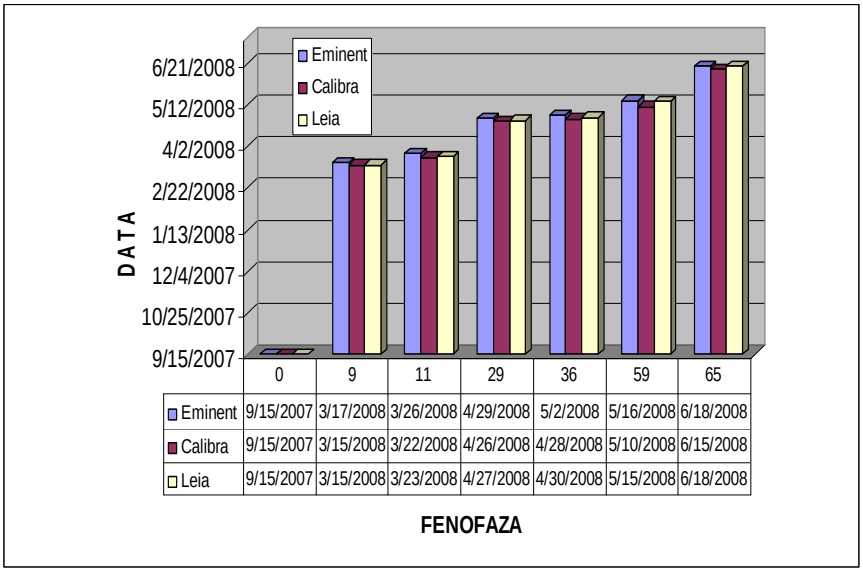

Figure 1. Graphical representation of the dynamics of the main phenophase in *Lolium perenne* varieties

An overview of phenophases duration, in relation to the amount of degrees of temperature accumulated and to amount of precipitation is presented in table 3. Thus, we see that the Calibra variety accumulated the lower amount of temperatures to reach the optimal time of harvest, both for grazing and for hay. The Eminent and Leia varieties requires 59.6 °, respectively 27.5 ° C in addition versus the Calibra variety to browse through the required time period to harvest maturity (grazing).

Table 3

Dynamics of some phenological phases in relation to the climatic conditions of temperature and precipitation

Observations		Variety		
		Eminent	Calibra	Leia
The amount of degrees of temperature ^{0}C	- from sowing to emergence of seeds	241.9	193.3	210.6
	- from start-up in vegetation to 10 cm height of apex above the ground (maturity for grazing)	519.3	459.7	487.2
	- from start-up in vegetation to end of the formating inflorescences (maturity for hay)	729.2	631	710.4
	- from the end of formating inflorescences to full flowering	683.1	717.2	701.3
The amount of precipitation l/mp	- from sowing to emergence of seeds	27.1	18.7	27.1
	- from start-up in vegetation to 10 cm height of apex above the ground (maturity for grazing)	55.5	58.4	58.4
	- from start-up in vegetation to end of the formating inflorescences (maturity for hay)	61.3	58.4	58.4
	- from the end of formating inflorescences to full flowering	148.8	144.3	148.8

The situation is similar in the case of browsing the period between the start of the vegetation and up to the harvest maturity for hay, the Eminent variety requiring the accumulation of 98.2 ° C in addition versus the Calibra variety and the Leia variety requiring 79.4 ^{o}C in addition versus the Calibra variety. Is noted that the Calibra variety is the earliest variety in comparison with Eminent and Leia varieties. Calibra variety has accumulated the fewest ^{o}C during the period between start of the vegetation and up to the harvest, fastest going through 09-59 phenophases.

CONCLUSIONS

The different degree of precocity of the three studied varieties of *Lolium perenne* allows the possibility of rational usage of the grass production. Regardless the use of the lawns, the Calibra variety is the earliest, followed by Leia variety and then by the Eminent variety.

BIBLIOGRAPHY

1. ISUC A., DUKIC D., 2002, Cultura plantelor furajere, Editura Orizonturi Universitare, Timişoara.
2. SIMTEA N., 1978, Determinarea momentului optim de începere a păşunatului în raport cu precocitatea soiurilor de graminee de pajişti, Lucrări ştiinţifice ale S.C.C.P. Măgurele - Braşov, vol.IV.
3. REVAZ J.P., 1970, La precocité des graminées fourragéres. Revue suisse d'agriculture, II, 3.
4. ŞUMĂLAN R., 2006, Fiziologie vegetală, Editura Eurobit, Timişoara