Determination of the Optimal Planting Period in Persian Clover (*Trifolium Resupinatum L.*), in Plain Conditions

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Abstract
Persian clover (*Trifolium resupinatum* L.) represents an annual forage legume cultivated for forage quality and for its importance as ameliorating plant within the forage crop rotation. The researches performed on the determination of the optimal planting period at the beginning of autumn proved the existence of a direct relationship between the sum of temperatures at planting, at the beginning of winter, and the dry matter yield, respectively between the number of sprigs at the beginning of winter and the content in soluble sugars in roots. According to planting date, the dry matter yield oscillated between 1.5 t/ha in the variant planted on 20th September and 9.4 t/ha in the variant planted on 10th August.

Keywords: dry matter, planting epochs, soluble sugars, *Trifolium resupinatum*.

1. Introduction

Persian clover (*Trifolium resupinatum L.*) is an annual forage legume, adapted to clayey soils with pH>6. The Persian clover crop may be used for hay production, grazing or as green fertilizer. Its regeneration after the first cutting or after grazing is excellent. The planting at the beginning of autumn may be carried out in association with barley or ryegrass. Forage's nutritional value is a very high one [1 - 4].
This work presents the possibility of planting Persian clover at the end of summer – beginning of autumn.

2. Materials and methods

The researches were performed during 2005 – 2007 in the experimental fields belonging to Banat's University of Agricultural Sciences and Veterinary Medicine Timişoara. The experimental display comprised a monofactorial experience, consisted of 5 variants with the following planting epochs: 1 August, 10 August, 20 August and 10 September.
The planting was performed in three consecutive years (2005, 2006, 2007), with the variety Maral of Iranian origin; this belongs to the species *Trifolium resupinatum* var. *majus.* The planting norm was 12 kg/ha, in pure crop.
The results related to the dry matter obtained were interpreted with the help of the analysis variance method.

3. Results and discussion

The annual clover species, including the Persian clover, beside their nutritional value, present great importance for the agricultural structures that can be cultivated in different rotation systems, conferring the permanent land cover and also the increase of soil fertility.
Successive to the researches performed, we noticed that, in the case of the Persian clover, it is possible to apply the summer-autumn planting, but

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this should be carried out at the beginning of the interval. So, the results obtained during the first planting cycle (2005) proved that, compared with the variant planted on 1st August, with a yield of 3.36 t/ha DM, the biggest yield was obtained when the planting was performed on 10th August, with a yield of 9.38 t/ha DM, namely 6.02 t/ha more.

If the planting is delayed and performed on 20th August, the yield decreases to 7.63 t/ha DM. At the same time, the planting at the end of August (30th August) or at the beginning of September (10th September) influences negatively the Persian clover's yielding capacity, generating a yield of 4.47 t/ha DM, respectively 1.27 t/ha DM (Table 1.).

In the year 2006, lacking rainfall, the yields ranged between 0.65 – 5.81 t/ha DM, according to the planting epoch (Table 2.). This year, the maximal yield was obtained in the variant planted on 10th August as well.

In the third planting cycle, we obtained the biggest dry matter yields and a bigger planting period interval (Table 3.). This year (2007), the optimal planting epoch was on 20th August, when we obtained a yield of 12.08 t/ha DM, 5.90 t/ha more than in the case of the planting on 1st August. The planting on 10th August produced a good yield in Persian clover (12.03 t/ha), almost identical with the variant planted on 20th August. The later planting, on 30th August, generated a good yield, respectively 9.84 t/ha DM, compared with the planting on 10th September, with the most reduced yield (2.66 t/ha DM).

The mean results for the three production cycles prove that the optimal planting interval for Persian clover is between 10 and 30 August, when we obtained a significant yield of 5.80 – 9.10 t/ha DM. The earlier or later planting, outside this interval, leads to the reduction of this yield for 2 – 6 times (Table 4.).

Table 1. Planting epoch influence on DM yield in Persian clover (2005)

Planting epoch	t/ha	dif. t/ha	%	Semnificaţie
1 august	3,36	mt	100	
10 august	9.38	6,02	279,2	***
20 august	7,63	4,27	227,1	***
30 august	4,47	1,11	133	
1 septembrie	1,27	-2,09	37,8	0
	DL 5% = 1,48	DL 1% = 2,15	DL 0,1% = 3,23	

Table 2 Planting epoch influence on DM yield in Persian clover (2006)

Planting epoch	t/ha	dif. t/ha	%	Semnificaţie
1 august	2,81	-	100	
10 august	5,81	3,00	206,6	***
20 august	4,66	1,85	165,6	***
30 august	3,04	0,23	108,1	
1 septembrie	0,65	-2,16	23,2	000
	DL 5% = 0,58	DL 1% = 0,85	DL 0,1% = 1,27	

Table 3. Planting epoch influence on DM yield in Persian clover (2007)

Planting epoch	t/ha	dif. t/ha	%	Semnificaţie
1 august	6,18	mt	100	
10 august	12,03	5,85	194,1	***
20 august	12,08	5,90	195,1	***
30 august	9,84	3,66	159,2	***
1 septembrie	2,66	-3,52	43,1	000
	DL 5% = 0,35	DL 1% = 0,52	DL 0,1% = 0,78	

Table 4. Planting epoch influence on DM yield in Persian clover (mean of the three years)

Planting epoch	t/ha	dif. t/ha	%	Semnificaţie
1 august	4,1	-	100	
10 august	9,1	5	222	***
20 august	8,1	4	197,6	***
30 august	5,8	1,7	141,5	***
1 septembrie	1,5	-2,6	36,6	000
	DL 5% = 0,58	DL 1% = 0,85	DL 0,1% = 1,28	

4. Conclusions

In Banat's plain region, the Persian clover may be planted in the period end of summer – beginning of autumn, too, with very good results.
The mean results of the three experimental cycles proved that the optimal planting interval is between 10 and 30 August, when we obtained significant yields, of 5.80 - 9.10 t/ha DM.

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