YIELD CAPACITY AND PRODUCTION COSTS IN VERDI RED CLOVER VARIETY CULTIVATED IN PECICA, ARAD COUNTY

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Abstract: *The beginnings of the red clover crops in our country are not known, after Varga et al (1998), in the middle XIX century the red clover was cultivated in the Romanian Countries, and first recorded information about red clover crops begins in the end of the XVII century. In our country climatic condition and agriculture evolution the red clover production decreased continually, in the 1990 the national production was 1962 thousand tonnes, and in 1453 thousand tonnes (http://www.insse.ro/cms/files/pdf/ro/cap14.pdf). In this agricultural context we indented to approach the rentability of an red clover crop used for forage and for seed production for the exploitation during three years. The purpose of this study was carried to test the yield capcity in Verdi red clover variety cultivated in Pecica, Arad County, at PF Zorici on 10 hectares. As a control production was used the national and Arad County average yield, from Romanian Statistical Anuary. The biological material used was represented by Verdy variety cultivated on a hablic chernozem batigleic soil type. The applied technology was the following: winter plowghing, chemical imputs NPK 16-16-16 at 40 kg s.a./ha, seed bed preparation and spring seeding, seed quantity was 20 kg/ha, and 12.5 cm between rows. The total costs from the setting of red clover crop on 10 hectares in 2007 are coming from the costs regarding the mechanical works, material expense that were cost 15.500 lei (Romanian currency). In the first exploitation year was obtained 11.5 t/hay/ha, (three time cuting) and in the second 11.5 t/hay/ha. The total maintenance and production costs for the first production year was 1800 lei, and the production value for the first pexploitation year was 46000 lei (that means 0.4 lei/kg/hay).*

Key words: *Trifolium pratense L., Verdi red clover variety, yield, production costs*

INTRODUCTION

The beginnings of the red clover crops in our country are not known, after VARGA et al. (1998), in the middle XIX century the red clover was cultivated in the Romanian Countries, and first recorded information about red clover crops begins in the end of the XVII century. In our country climatic condition and agriculture evolution the red clover production decreased continually, in the 1990 the national production was 1962 thousand tonnes, and in 1453 thousand tonnes (http://www.insse.ro/cms/files/pdf/ro/cap14.pdf).

In this agricultural context we indented to approach the profitability of a red clover crop used for forage and for seed production for the exploitation during three years [1; 4; 9].

MATERIAL AND METHODS

The purpose of this study was carried to test the yield capacity in Verdi red clover variety cultivated in, Arad County, at P.F. Zorici, on 10 hectares. As a control production was used the national and Arad County average yield, from Romanian Statistical Yearbook. The locality Pecica covers two distinct forms of relief: a low plain, located in the flooding meadow of the Mures River, and a high plain, spreading towards the north and north-west of the locality, both particularly fertile.

The climate of the area is moderate continental, with Mediterranean influences; the

average annual temperature is 10.8^0C. The annual average amount of precipitations in the area of the locality is 584 mm/m-. The precipitations regime has a continental character. The largest amounts of water fall at the end of spring and at the beginning of summer, in May and June, and the smallest ones in winter, in January and February.

The soil on which we established the red clover crop was a Baltic gleyic chernozem with the following features: medium texture and glomerular structure that ensure good aeration and good permeability for the water and air, a good useful water holding ability, and low resistance to soil works, which provides it with the highest agro-productive potential. But because it is in an area characterised by low and uneven precipitation levels, it needs irrigation equipment. To maintain and recover the fertility of this soil, it needs organic and mineral fertilization.

The biological material used was represented by Verdi variety. This is a diploid cultivar developed by the Verneuil Company (France). The stem is erect. Plant height oscillates between 65 and 75 cm. The shoots are fine, dark green. The leaves are oval-elongated. The Verdi red clover cultivar is 2-4 days more precocious than the Select red clover cultivar. Regeneration after each mowing is quick and the perennity is strong, with high yields in the 2nd and 3rd years of vegetation. It is resistant to wintering and to fall, and medium resistant to mildew.

The pre-emergent crop was wheat. After harvesting the wheat, we applied the total herbicide Glifogan. We administered the complex fertiliser NPK 16-16-16 in amount of 40 kg of active substances. Preparation of the soil was made through tillage 25 cm deep in the soil, in aggregate with a fixed-cutters harrow. Preparation of the germination bed was made with a cutter. Before the sowing we lightly crushed the soil.

Sowing was done at the end of summer, with 20 kg/ha of seed. The sowing depth was 1.5 cm, at a row distance of 5 cm. After sowing, we crushed the soil to put the seed in contact with the soil and to get an even sprouting.

The control of the dicot weeds was done with the weed killer Basagran Forte 2.5 l/ha, while the control of monocot weeds was done with the weed killer Agil 1 l/ha, when the clover had two pairs of true leaves. Disease and pest control was done with the insecticide Decis and with a tebuconazol-based fungicide. Mowing was done in the budding-blooming phase; we also spread the clover to dry it evenly and quickly, after which we gathered and baled the hay.

RESULTS AND DISCUSSIONS

Since the goal of the paper was to study the profitability of the Verdi red clover cultivar cultivated for fodder over a period of exploitation of 3 years, we studied initially the costs related to the establishment of the red clover crop on an area of 10 ha on the lands of the P.F. ZORICI farm in Pecica (Arad County), associated with the material expenses generated by the maintenance and exploitation of the crop.

Table 1.

Costs of mechanical works upon the establishment of a fodder red clover crop on 10 ha

Mechanical and material expenses	Ha	Cost/ha	Total
Summer tillage 25-30 cm	10	150 RON	1,500 RON
Soil crushing	10	100 RON	1,000 RON
Fertilising	10	300 RON	3,000RON
Sowing, applying herbicides and insecticides	10	1,000 RON	10,000 RON
Total			15,500 RON

Data presented in Table 1 show that in order to establish a red clover crop we need to make the following expenses: tillage + soil preparation + sowing – 250 Ron/ha; chemical fertilisers (200 kg) – 300 RON/ha; seed, herbicide and insecticide – 1,000 RON/ha, i.e. a total

cost of establishment of 1,550 RON/ha.

Mechanical and material expenses for the maintenance and harvesting of a red clover crop in the 1st year of vegetation

In the case of a fodder red clover crop, we consider that the average exploitation needs 3 years, since the 4th year yields the least.

Pest control was done by applying the insecticides Lamdex and Proteus, (200 g/ha of Lamdex and 250-300 g/ha of Proteus), reaching 100-120 RON/ha. For the entire area of 10 ha, the price of the produce is 1,000-1,200 RON, together with the manual labour and the fuel, reach a final level of 1,600 RON.

The 1st mowing was done upon 80-90% red clover budding in May. Mowing was done with the POTINGER mower 1.85 m wide. After mowing, we turned over the hay mechanically with a DEUTZ-FARE rake. With the same equipment we gathered the hay in larger piles to make baling easier. Baling was done with the baling press NEW-HOLAND 841, 1.5 m wide.

Mowing, spreading, gathering, and baling cost 300 RON/ha, and resulted in an amount of hay of 4.5 t/ha. The bales thus obtained are round and weigh 200-220 kg each.

The 2nd mowing was done at the beginning of the blooming of the red clover crop, at the beginning of July. Mowing, spreading, gathering, and baling cost 300 RON/ha, and yielded 4 t/ha.

The 3rd mowing was done at the beginning of blooming of the red clover crop at the end of August and at the beginning of September.

Mowing, spreading, gathering, and baling cost 300 RON/ha, and resulted in an amount of hay of 3.5 t/ha.

Table 2.

Costs of mechanical and material works for the maintenance of the red clover crop in the 1st year of exploitation

Nr.	Materials used	Area/ha	Unit of measure/ha	Total materials	Cost/um	Total cost
1	Lamdex	10	0.2 l/ha	2 l	150/l	400 RON
2	Proteus	10	0,250 l/ha	2.5 l		800 RON
3	Baling string	10	1 kg/ha	10 kg		200 RON
4	Application of insecticides + manual labour					400 RON
Total						1,800 RON

Thus, crop maintenance works and harvesting mechanical works reached a total value of 1,800 RON for the 10 ha of red clover crop.

The analysis of the cost of establishing a red clover crop on an area of 10 ha reached 15,500 RON, together with the amount of 1,800 RON representing the value of the material and mechanical elements used in the 1st year of exploitation. The total cost of establishing and exploiting the red clover crop in the 1st year was 17,300 RON.

From a productive point of view, we obtained 11.5 t of hay/ha, i.e. a total production of 115 t. The sale price was 0.4 RON/kg of hay, which corresponds to the amount of 46,000 RON.

The amount of money from the sale of the red clover hay from the 10 ha reached 46,000 RON, which, after we deduced the costs of establishing and exploiting in the next year, we obtained a profit of 28,700 RON.

In the 2nd and 3rd years of exploitation of the red clover crop we made the following works:

We applied the insecticides Lamdex and Proteus (200 g/ha of Lamdex and 250-300

g/ha Proteus), the value of the amount applied per ha ranging between 100 and 120 RON. For the 10 ha of red clover, the price of the produce ranged between 1,000 and 1,200 RON, to which we need to add the costs of the manual labour and of the fuel of 1,600 RON. The cumulated costs for the 2nd and 3rd years reached 3,200 RON.

The 1st mowing was done upon 80-90% budding of red clover in May. Mowing was done with a POTINGER mower 1.85 m wide. After mowing, we spread the piles of hay mechanically, with a DEUTZ-FARE rake. With the same equipment we gathered the hay in larger piles to ease the baling. Baling was done with the baling press NEW-HOLAND 841, 1.5 m wide.

Mowing, spreading, gathering, and baling cost 300 RON/ha, and resulted in an amount of hay of 4 t/ha. The bales thus obtained are round and weigh 200-220 kg each. The total yield of the 1st mowing in the 2nd and 3rd years was 8 t of hay/year/ha or 80 t of hay from the 10 ha.

The 2nd mowing was done at the beginning of the blooming of the red clover crop, at the beginning of July. Mowing, spreading, gathering, and baling cost 300 RON/ha, and resulted in an amount of hay of 4 t/ha. The total yield of the 2nd mowing in the 2nd and 3rd years was 8 t of hay/year/ha or 80 t of hay from the 10 ha.

The 3rd mowing was done at the beginning of the blooming of the red clover crop at the end of August and at the beginning of September. Mowing, spreading, gathering, and baling cost 300 RON/ha, and resulted in an amount of hay of 3.5 t/ha. The total yield of the 2nd mowing in the 2nd and 3rd years was 7 t of hay/year/ha or 70 t of hay from the 10 ha.

Table 3.

Analysis of the yield value, of the annual profit and of the total profit from a red clover crop on 10 ha

Nr.	Specification	2008	2009	2010
1.	Value of the production	46,000 RON	46,000 RON	46,000 RON
2.	Profit	28,700 RON	44,200 RON	44,200 RON
3.	Profit 2008-2010			117,100 RON

Thus, we can say that:

- mechanical and material costs related to the establishment of the red clover crop at the end of the summer 2007 on an area of 10 ha on the lands of the PF ZORICI farm from Pecica reached 15,500 RON;
- the year 2008 was the 1st year of exploitation, when we mowed 3 times and produced hay; the yield of the 3 mowing totalled 11.5 t/hay/ha or 115 t/hay/ha; the costs related to the maintenance and exploitation of the red clover crop for 2008 totalled 1,800 RON;
- the value of the hay obtained in 2008 (115 t) reached 46,000 RON (i.e., 0.4 RON/kg of hay);
- deducing from this value the costs of establishing the red clover crop in 2007 and of exploiting in 2008 we obtained a profit of 28,700 RON;
- in 2009, the yield was closed to that of 2008, i.e. 46,000 RON.
- in 2010, the yield was 11 t/ha hay, and we obtained a profit of 44,200 RON

CONCLUSIONS

As we can see in the results presented above, the crop of Verdi red clover cultivar cultivated on an area of 10 ha produced 115 t of hay annually. The costs of establishing the crop were covered since the 1st year of exploitation, with a total profit estimated for the period 2008-2010 of 117,100 RON.

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