YIELD CAPACITY AND PRODUCTION COSTS IN NS BANAT ZMS II ALFALFA VARIETY CULTIVATED IN SIRIA, ARAD COUNTY

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Abstract *There can be appreciated that the land surfaces cultivated with forage plants will increase at least from two reasons, respectivelly the change of the human food structure in the advantage of the animal products and the absolute numeric increase of the humankind, the last one determinng the need of consistent food to be greater. From the forage plants that are distiguished considering the yield and qualitative importance the main are the leguminous. Most of the legumes are excelent forager species, mainly for the ruminants becvause of their increased content in proteins. This content is due to the symbiosis between legumes and bacteria from Rhyzobium genus. The purpose of this study is to approach the rentability of an alfalfa crop used for forage and for seed production for the exploitation during three years. For this purpose there were analysed the costs needed for the setting of the alfalfa field on s surface of 50 hectares on the teritory of the PlantProtection SRL from Siria locality (Arad County) associated with the material expenses generated by the crop maintenance. The biological material used was represented by NS-Banat ZMS II variety cultivated on a vertic faeziom soil type. The applied technology was the following: winter plowghing, seed bed preparation and spring seeding. The total costs from the setting of alfalfa crop on 50 hectares are coming from the costs regarding the mechanical works that were cost 19.750 lei (Romanian currency) and material expenses that were cost 41.250 lei, the total costs being 61.000 lei. From the analysis of the costs regarding the costs for the setting, maintenance and exploitation of the 50 hectares alfalfa crop was obtained 101200 lei for the first exploitation year and 309939 lei for the second. As a conclusion alfalfa crop is one of the most profitable culture for the farmers.*

Key words: *Medicago sativa L., production, NS-Banat ZMS II variety, yield, production cost*

INTRODUCTION

There can be appreciated that the land surfaces cultivated with forage plants will increase at least from two reasons, respectively the change of the human food structure in the advantage of the animal products and the absolute numeric increase of the humankind, the last one determining the need of consistent food to be greater [8; 11; 15]. From the forage plants that are distinguished considering the yield and qualitative importance the main are the leguminous [7]. Alfalfa is best adapted to deep, fertile, well-drained soils with a salt pH of 6.0 to 6.5 [8; 6; 4]. Most of the legumes are excellent forager species, mainly for the ruminants because of their increased content in proteins [13; 19; 4]. Preliminary evidence suggests that development of plants with more extensive root systems may provide one mechanism to improve alfalfa productivity under water-deficit conditions – particularly in flood irrigated environments [7]. This content is due to the symbiosis between legumes and bacteria from *Rhyzobium* genus [1; 5; 6].

MATERIAL AND METHODS

The purpose of this study is to approach the rentability of an alfalfa crop used for forage and for seed production for the exploitation during three years. For this purpose there

were analysed the costs needed for the setting of the alfalfa field on s surface of 50 hectares on the territory of the PlantProtect SRL from Siria locality (Arad County) associated with the material expenses generated by the crop maintenance.

The area of the commune of Siria is located in the central compartment of the Romanian Western Plain, a plain between the Mures and Crisul alb rivers. The characteristic feature of this plain consists in its contact with the mountain range: this is the only sector in Western Romania with no piedmont steps. The peaks bordering at East the Siria area reach 400-500 m altitude, decreasing 300 m over 2-4 km; at the brooder with the plain, the average heights are 11-120 m [2]. The characterisation of the climate regime was done after the recordings of the Meteorological Stations in Arad and Minis; the data recorded range the studied area in the climate province C.f.b.x., i.e. a temperate climate with moderate winters and relatively hot summers with precipitations all the year long.

The soil on which we set the alfalfa crop was a vertic phaesiom. The favourable physical and chemical features provide the soil with high natural fertility. The main factor diminishing production is the lack of precipitations during plant vegetation. To increase the yielding ability, we need to irrigate, to make deep aeration works, to fertilise organically and chemically, etc.

The biological material used was represented by NS-Banat ZMS II variety. This cultivar has been developed through the polycross method from the local alfalfa population of the Pannonia type. It is an early cultivar and it regenerates quickly after mowing. It is also tolerant to drought, to low temperatures, and it has a medium resistance to diseases. The yield of green volume in the not irrigated system is 84 t/ha (i.e. 18 t/ha of hay), and seed yield is 850 kg/ha; the crop allows frequent mowing.

To establish the crop, we tilled in the fall (25-30 cm) with a Case IH tractor of 280 HP aggregated with a Gregoire Beson plough with 7 cutters, followed by the disking work to level with a disc harrow. In the spring, before sowing, we worked the land with a combinatory (6 m width) and we sowed with a Case IH 170 tractor. If alfalfa is not directly fertilized with mineral nitrogen, was not influenced by the nitrogen applied to the other crops in rotation [1].

RESULTS AND DISCUSSIONS

In order to point out the profitability of an alfalfa crop for fodder and seed for durati of exploitation of 3 years, we analysed the costs of establishing the alfalfa crop on 50 ha on the lands of the PlantProtect SRL Farm in Siria (Arad County), associated with material expenses generated by the crop maintenance.

Table 1.

Costs related to mechanical works at the establishment of an alfalfa crop (50 ha) for fodder and seed

Mechanical works	Ha	Cost/ha	Total
Fall tillage 25-30 cm	50	150	7,500 RON
Land disking	50	70	3,500 RON
Fertilisation	50	25	1,250 RON
Preparing the land with a combinator	50	70	3,500 RON
Sowing	50	80	4,000 RON
TOTAL			19,750 RON

The total costs upon the establishment of an alfalfa crop of 50 ha are the result of the costs of mechanical works, i.e. 19,750 RON, and of the material costs (complex fertilisers 20-20-0, 250 kg/ha, seed 20 kg/ha) worth 41,250 RON, i.e. 61,000 lei.

Table 2.

Mechanical and material expenses aimed at maintaining the alfalfa crop in its 1st year of vegetation

Works	Ha	Cost/ha	Total
Applying herbicides (Pulsar)	50	25 RON	1,250 RON
1st mowing	50	100 RON	5,000 RON
Raking	50	30 RON	1,500 RON
Baling	50	120 RON	6,000 RON
Applying herbicides (Faster)	50	25 RON	1,250 RON
2nd mowing	50	100 RON	5,000 RON
Raking	50	30 RON	1,500 RON
Baling	50	120 RON	6,000 RON
TOTAL			27,500 RON

As for the expenses generated by the mechanical works aimed at maintaining the alfalfa crop in the first year of cropping, their total value was 27,500 RON. These expenses were generated by the following works: treatment with herbicides, 1st mowing, baling, treatment with insecticide, 2nd mowing, raking, and baling. As for the material expenses generated by the herbicides (Pulsar 1 l/ha and Faster 0.1 l/ha), by insecticides and by the baling rope for the 50 ha, their total value reached 13,000 RON.

As a conclusion, the total mechanical and material expenses for the maintenance and exploitation of an alfalfa crop of 50 ha in the 1st year of vegetation reached 40,500 RON, together with the expenses for the mechanical and material establishment of the crop of 61,000 RON, i.e. establishment expenses totalling 101,500 RON for the 1st year of vegetation.

The total income from the 1st year of vegetation in the alfalfa crop on 50 ha is 60,000 RON. Despite all this, the income deduced from the total amount spent on the crop establishment, maintenance and exploitation on the 50 ha, i.e. 101,500 RON, did not generate profit in the 1st year. The farm, in this case, still has to recuperate from the initial investment 41,500 RON.

Table 3.

Incomes from the alfalfa crop in the 1st exploitation year

Work	T/ha green volume	Cost/T	Total/ha	Total area
1st mowing	2.5 t/ha	200 RON/t	500 RON/ha	25,000 RON
2nd mowing	3.5 t/ha	200 RON/t	700 RON/ha	35,000 RON
Total incomes				60,000 RON
Total expenses (establishment, maintenance, exploitation)				10,1500 RON
Capital to recover				41,500 RON

As for the expenses generated by the mechanical works for the maintenance of the alfalfa crop in the 2nd year of cropping, their total value rose to 27,500 RON. These expenses were generated by the following works: treatment with herbicide, 1st mowing, raking, baling, treatment with insecticide, 2nd mowing, raking, and baling.

Table 4.

Mechanical and expenses aimed at maintaining the alfalfa crop in its 2nd year of vegetation

Work	ha	kg/ha	Cost/ha	Total
Fertilising	50	100	100 RON	5,000 RON
1st mowing				
Raking	50		30 RON	1,500 RON
Baling	50		120 RON	6,000 RON
Treating with herbicide				
Harvesting	50			
Treating with insecticide				
Desiccating	Reglone forte			
Harvesting alfalfa seed	50		150 RON	7,500 RON
Raking	50		30 RON	1,500 RON
Baling	50		120 RON	6,000 RON
Total				2,7500 RON

The material expenses related to the maintenance and exploitation of the alfalfa crop in the 2nd year of vegetation come from the summing up of the costs of the following elements: baling string, fertilisers (ammonia nitrate), insecticides, desiccant, and herbicides for the 50 ha of crop. The total value of these expenses was 44,650 RON for the 50 ha.

As a conclusion, the total mechanical and material expenses for the maintenance and exploitation of the alfalfa crop on the area of 50 ha in the 2nd year of vegetation reached 72,150 RON.

Analysing the incomes obtained from the exploitation of the alfalfa crop in the 2nd year of vegetation, we can draw the following conclusions:

The 1st mowing resulted in 3 t/ha of hay worth 200 RON/t, i.e. 600 RON/ha; multiplying the income per ha with 50, we get a total amount of 30,000 RON (Table 5).

The 3rd mowing resulted in 2.8 t/ha of hay worth 200 RON/t, i.e. 560 RON/ha; multiplying the income per ha with 50, we get a total amount of 28,000 RON (Table 5).

The 2nd mowing was destined to the seed production: this was the HARVESTING. We obtained 650 kg/ha, i.e. for 8 RON the kg of seed we obtained 5,302 RON; multiplied with 50 (the total number of ha cultivated with alfalfa), we obtained 25,939 RON, a final amount of money after the 5% losses resulted from the selection (Table 5).

Analysing the profit obtained in the 2nd year of vegetation from the 50-ha alfalfa crop exploited in a mixed system starts from the amount of 4,500 RON that the farmer needs to recuperate from the initial investment (establishing the alfalfa crop and maintaining and exploiting it in the 1st year of vegetation). In the calculus of the income obtained in the 2nd year of vegetation, we did not take into account the expenses engendered by the establishment of the alfalfa crop (mechanical and material expenses), since they were taken into account in the calculus of the incomes from the exploitation of the crop in the 1st year of exploitation.

Table 5.

Incomes from the alfalfa fodder and seed in the 2nd exploitation year

Works	t/ha and kg/ha	Price/t	Total/ha	Total/area
1st mowing	3 t/ha	200 RON/t	600 RON /ha	30,000 RON
3rd mowing	2.8 t/ha	200 RON/t	560 RON/ha	28,000 RON
Total mowing				58,000 RON
Seed	650 kg/ha	8 RON/kg	5302 RON/ha	263,200 RON
Total profit (seed – selection)	650 x 50 = 32,500 32,500 - 5% = 30,875	8 RON/kg		251,939 RON
Total income generated by hay + seed				309,939 RON

The total value of 650 kg/ha x 50 ha = 32,500 RON lost 5% because of the selection, i.e. 32,500 RON - 5% = 30,875 RON. The total price of the seed 30.875 x 8 RON = 251,939 RON.

Total profit in alfalfa cultivated on 50 ha in the 2nd year of vegetation from the valorising of hay and seed was 309,939 RON. The hay production in the 2nd year was worth 58,000 RON, and the seed production was worth 251,939 RON.

We deduced from the total profit of 309,939 from the 2nd year of vegetation the amount of 41,500 RON, an investment to recover, allowing us to obtain a net profit of 268,439 lei.

CONCLUSIONS

The analysis of the costs related to the establishment, maintenance and exploitation of an alfalfa crop on 50 ha on the area of the commune of Siria (Arad County, Romania), on the lands of the PlantProtect agricultural exploitation, shows an income of 01,500 RON in the 1st

year of vegetation and an income of 309,939 RON in the 2nd year of vegetation. The costs related to the establishment of the alfalfa crop on the area of 50 ha reached 610,000 RON. But even an undetailed analysis shows there can be profit in this crop.

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