

## PRODUCTIVITY AND CONVERSION OF SOWN GRASSLANDS IN THE PLAINS AREA OF BANAT

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### Abstract

The sown meadows, consisting of complex mixtures of grassland grasses and legumes species ensure a high level of production, a high quality of feed, an important source of biological nitrogen, which ensures the protein autonomy of the forage system. The paper highlights the influence of the structure of some perennial grasses and legumes, sown in the plains area, on the production of plant dry matter, on the use of the sown grassland, on the conversion into animal products and on the economic efficiency of the pratoecosystem in relation to animals. Carried out studies have shown that sown grasslands, consisting of a complex mixture (*Lolium perenne* 30 % + *Festuca pratensis* 30 % + *Trifolium repens* 20 % + *Lotus corniculatus* 20 %), in the plains area, used for grazing with sheep, obtains, in average, about 9 t/ha feed dry matter, over 3200 l/ha milk production and very high milk quality (5.5 % protein and 8.0 % fat). The research results showed an increase of sheep's milk production in complex mixtures in both years of experience, compared to the mixture variant consisting only of grass species. The value of the quality indices of sheep's milk is higher, both in protein and fat, in the grazed variant, sown with a complex mixture of grasses and legumes, compared to the variant sown with only a mixture of grass species. In livestock farms, the complex sown grassland, consisting of several species of grassland grasses and legumes (multispecies) secures and makes the fodder system more efficient, ensuring both the constant increase of the feed value of the fodder and the increase of the quality indices of the animal products.

**Key words:** sown grassland, grasses and legumes grassland mixtures, mowing, grazing, sheep milk, milk quality

Sown or temporary grasslands are one of the most complex agro-ecosystems in agriculture, whose functionality and use are based on the soil-plant-animal-environment relationship (Dragomir *et al.*, 2009). The establishment of these cultures implies the knowledge of the following aspects: the agrobiological particularities of the component species from the floristic structure of the mixtures; establishing the types of mixtures according to the seasonal pedoclimatic conditions and the use of the sown or temporary grasslands (Dragomir, 2005; Moga, 1983; Motcă *et al.*, 1994; Popovici *et al.*, 1979). The use, productivity, quality and longevity of temporary grasslands are influenced by the degree of applied technology (Simtea *et al.*, 1980, 1992; Motcă *et al.*, 1988; Moga, 1987, Sauer *et al.*, 2004)

The paper highlights the influence of the structure of some perennial grasses and legumes, sown in the plains area, on the production of plant dry matter, on the use of the sown grassland, on the conversion into animal products and on the

economic efficiency of the pratoecosystem in relation to animals.

### MATERIAL AND METHOD

The research was carried out at the Research Center for Grasslands and Fodder Plants, within the University of Agricultural Sciences and Veterinary Medicine of Banat Timișoara, under the conditions of a cambic chernozem, weakly gleezed, moderate decarbonate, clay-loamy soil, with a low acidic soil reaction, in the surface horizons and alkaline in the underlying horizons.

In order to quantify the soil-plant-animal relationship, a complex experimental device was designed and developed, with the following experimental factors: A – Type of mixture (a1 – *Lolium perenne* 50% + *Festuca pratensis* 50%; a2 – *Lolium perenne* 50% + *Trifolium repens* 50%; a3 – *Lolium perenne* 50% + *Lotus corniculatus* 50%; a4 – *Lolium perenne* 30% + *Festuca pratensis* 30% + *Trifolium repens* 20% + *Lotus corniculatus* 20%); B – Type of use (b1 – mowing; b2 – grazing)

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Upon establishment of the experience, a general agrofond of complex fertilizers was applied, at a dose of 200 kg/ha. Nitrogen fertilizers were administered during the vegetation periods, at a dose of N150, in different phases: N50, at the beginning of vegetation, N50, after the first mowing or pasture cycle, and N50 after the next mowing or grazing cycle.

The grazing of the experimental variants was done with Țurcana sheeps, with a load of 2 UVM/ha.

In the two years of production, the following quantitative and qualitative parameters were determined: the production of dry matter, the milk production of sheeps and the value of milk quality indices.

For some production farms, the results obtained through efficient use of sown meadows

(pure culture and mixtures) grazed with sheeps, for the production of milk and meat are presented.

## RESULTS AND DISCUSSIONS

Sown grasslands, consisting of simple or complex mixtures of grassland grass and legume species, are characterized by some important features: they provide a dense vegetable carpet, for a period of several years; it ensures a high level of production and a high quality of feed; the presence of legumes in the floristic composition is an important source of nitrogen, which can ensure the protein autonomy of the forage system; the robustness of the sown grasslands ensures a good self-regulation under stress or operating conditions.

Table 1  
The influence of the type of mixture and sown grasslands method of use in the plain area of Banat, on the production of dry matter (1st year of production)

Type of mixture	Mowing		Grazing with sheep		Difference (mowing-grazing) (t/ha)
	t/ha	%	t/ha	%	
<i>Lolium perenne</i> 50% + <i>Festuca pratensis</i> 50%	7.00	88.2	6.54	80.9	0.46
<i>Lolium perenne</i> 50% + <i>Trifolium repens</i> 50%	8.20	103.2	8.39	103.8	-0.19
<i>Lolium perenne</i> 50% + <i>Lotus corniculatus</i> 50%	7.52	94.7	8.23	101.9	-0.71
<i>Lolium perenne</i> 30% + <i>Festuca pratensis</i> 30% + <i>Trifolium repens</i> 20% + <i>Lotus corniculatus</i> 20%	9.06	114.1	9.15	113.2	-0.09
Mixture average	7.94	100	8.08	100	-0.14

During the first year of production, all 3 types of simple mixtures studied, used by mowing, produced dry matter productions smaller than the complex mixture (consisting of *Lolium perenne* 30% + *Festuca pratensis* 30% + *Trifolium repens* 20% + *Lotus corniculatus* 20%), with 0.86 - 2.06 t / ha, with the lowest level at *Lolium perenne* 50% + *Festuca pratensis* 50% mixture. If we refer to the

average production of mixtures, it turns out that the complex mixture achieves the highest increase of dry matter, by 14.1% more. In the case of the use by grazing, it is found that in all mixtures of grasses and legumes a slight increase of the production of dry substance is obtained, compared to the mowed variants. However, the differences between the two modes of use are insignificant (Table 1).

Table 2  
The influence of the type of mixture and sown grasslands method of use in the plain area of Banat, on the production of dry matter (2nd year of production)

Type of mixture	Mowing		Grazing with sheep		Difference (mowing-grazing) (t/ha)
	t/ha	%	t/ha	%	
<i>Lolium perenne</i> 50% + <i>Festuca pratensis</i> 50%	6.56	86.4	6.00	77.6	0.56
<i>Lolium perenne</i> 50% + <i>Trifolium repens</i> 50%	7.88	104.1	8.31	107.5	-0.43
<i>Lolium perenne</i> 50% + <i>Lotus corniculatus</i> 50%	7.16	94.6	7.66	99.1	-0.50
<i>Lolium perenne</i> 30% + <i>Festuca pratensis</i> 30% + <i>Trifolium repens</i> 20% + <i>Lotus corniculatus</i> 20%	8.73	115.3	8.94	115.6	-0.21
Mixture average	7.57	100	7.73	100	-0.16

In the second year of production, the overall level of dry matter production was lower than in the first year, due to the low level of precipitation

and their uneven distribution during vegetation. Among the mixtures studied it stands out also this year, the complex mixture, consisting of the two

species of grasses and the two species of legumes, which has achieved the highest yields, both at the variant used by mowing (8.73 t / ha SU), as well as the pasture variant with the sheep (8.94 t / ha SU).

In the second year, the differences in dry matter in all the studied mixtures, are in favor of grazing. (Table 2).

Table 3  
**Milk conversion of forage production of temporary grassland, used by grazing with sheep (3 grazing cycles)**

Type of mixture	1st year of production		2nd year of production	
	l/ha	%	l/ha	%
<i>Lolium perenne</i> 50% + <i>Festuca pratensis</i> 50%	2936	100	2903	100
<i>Lolium perenne</i> 50% + <i>Trifolium repens</i> 50%	2826	96.2	2771	95.4
<i>Lolium perenne</i> 50% + <i>Lotus corniculatus</i> 50%	2668	90.8	2638	90.9
<i>Lolium perenne</i> 30% + <i>Festuca pratensis</i> 30% + <i>Trifolium repens</i> 20% + <i>Lotus corniculatus</i> 20%	3429	116.8	3145	108.3

The conversion into milk of sown grasslands production is the best method of efficient use of feed production, both through the production of milk obtained and by its quality. In the first year of production, the largest quantity of sheep milk (3429 l/ha) was obtained in the pasture variant sown with complex mixture, which achieved a production increase with 16.8% higher than the

pasture variant sown with simple mixture of grasses (*Lolium perenne* 50% + *Festuca pratensis* 50%). Also, of the two types of simple mixtures, we noticed the mixture made of 50% *Lolium perenne* + 50% *Trifolium repens*, which resulted in a higher production of sheep's milk, with 5.9% in the first year, respectively 5.0% in the second year (Table 3).

Table 4  
**The value of the quality indices of sheep's milk, in the conditions of grazing some grasslands grass and legume mixtures (%)**

Type of mixture	1st year of production		2nd year of production	
	Protein	Fat	Protein	Fat
<i>Lolium perenne</i> 50% + <i>Festuca pratensis</i> 50%	4.91	6.60	4.67	6.53
<i>Lolium perenne</i> 50% + <i>Trifolium repens</i> 50%	5.30	7.90	4.92	7.22
<i>Lolium perenne</i> 50% + <i>Lotus corniculatus</i> 50%	5.18	7.36	4.88	6.98
<i>Lolium perenne</i> 30% + <i>Festuca pratensis</i> 30% + <i>Trifolium repens</i> 20% + <i>Lotus corniculatus</i> 20%	5.67	8.21	5.37	7.88

The presence of legume species, both in simple mixtures and in complex mixtures, favored the increase of the quality indices of sheep's milk during the two years of production (Table 4). Thus, the protein content of milk, in the first year of grazing, increased from 4.91%, to the mixture of *Lolium perenne* 50% + *Festuca pratensis* 50%, to 5.30%, to the mixture of *Lolium perenne* 50% + *Trifolium repens* 50%, to 5.18%, to the mixture of *Lolium perenne* 50% + *Lotus corniculatus* 50% and to 5.67% to the mixture of *Lolium perenne* 30% + *Festuca pratensis* 30% + *Trifolium repens* 20% + *Lotus corniculatus* 20%. The protein content in the second year increases from 4.67%, to the simple mixture of the two grass species, to 5.37%, to the complex mixture of the two grasses and two legumes studied.

Also, the fat content of milk has the same growth allure, both in simple mixtures, consisting of a species of grasses (*Lolium perenne*) and a

legume species (*Trifolium repens*, *Lotus corniculatus*), as well as the complex mixture. In the first year, in the complex mixture the fat content was 8.21%, compared to only 6.60% in the simple mixture of grasses, and in the second year the values were 7.88% in the complex mixture, compared to only 6.53% for the simple mixture of grasses.

## CONCUSSIONS

In livestock farms, the complex sown grassland, consisting of several species of grassland grasses and legumes (multispecies) secures and makes the fodder system more efficient, ensuring both the constant increase of the feed value of the fodder and the increase of the quality indices of the animal products.

The research results showed an increase of sheep's milk production in complex mixtures by

16.8% in the first year and 8.3% in the second year of grazing. compared to the mixture variant consisting only of grass species.

The value of the quality indices of sheep's milk is higher. both in protein and fat. in the grazed variant. sown with a complex mixture of grasses and legumes. compared to the variant sown with only a mixture of grass species.

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