

Productivity of the Uhruska sheep ewes fed with haylage with addition of *Festulolium*

Krzysztof Patkowski, Mirosław Pięta, Anna Szymanowska

University of Life Sciences in Lublin, Faculty of Biology and Animal Breeding,
Department of Small Ruminants Breeding and Agriculture Advisory,
Akademicka 13, 20-950 Lublin

The aim of this study was to estimate the productivity of the ewes fed haylage (hay silage) with the addition of *Festulolium* and alfalfa (*Medicago varia*) on the growth and development of lambs born from these ewes. Ewes in the experimental group were fed with haylage containing *Festulolium* and alfalfa. *Festulolium* is a new cross species between *Festuca pratensis* and *Lolium multiflorum* (Italian ryegrass). Haylage was fed during pregnancy and lactation. It was noted that the sheep ate haylage eagerly. Furthermore, fertility rates, milk yield, and fecundity were high in the group fed with haylage both. Additionally, the experimental ewes' condition after weaning was very good. Body weights of lambs of experimental and control groups were even. Generally, the obtained findings indicate positive effects of feeding haylage with addition of *Festulolium* to sheep during pregnancy and lactation. Feeding haylage to the ewes resulted in very high fertility, fecundity, and milk yield.

KEY WORDS: sheep/haylage / *Festulolium* / milk yield / milk composition / body weight

Festulolium is a generic hybrid cultured in Poland, a cross between meadow fescue (*Festuca pratensis*) and Italian ryegrass (*Lolium multiflorum*). This species is designated for multiannual cultivation on rotated fields. It is characterized by a high yield of a good quality dry matter crop. It is usually cultivated in combination with alfalfa and clover. Its high sucrose concentration promotes its application for silage preparation. The sowing rate is 40 kg of seed per hectare (clear sowing). During a full year period, 4 crops of green matter are obtained from each production farm. The optimal period of spring regrowth falls on the phase of stalk shooting, the crops being taken at regular 4-5 week intervals. As a result, the fodder obtained in this way is characterized by the highest concentration of proteins, the best digestibility and high energetic value [2].

The aim of this study was to estimate the productivity of the ewes fed haylage with addition of *Festulolium* and alfalfa (*Medicago varia*) and the growth and development of lambs born from these ewes.

Material and methods

A research was conducted at the Experimental-Research Station of Small Ruminants in Bezek. Uhruska Sheep ewes, which are included in the scope of preservative breeding programme, constituted the object of the said research. Ewes in the third month of pregnancy were divided in two groups: control group and experimental group. The control group was fed with meadow hay, dry beet pulp pellet steeped before consumption, and concentrates. In contrast, the experimental group was fed mainly with haylage prepared with *Festulium* and alfalfa, with minor addition of hay and concentrates. This mode of feeding was applied until May, when the ewes are normally admitted to the pasture. Feeding of ewes in both groups was in accordance to their nutritional requirements in analyzed physiological period [4]. The chemical analysis of haylage was conducted at the Laboratory of the Institute of Animal Nutrition at University of Life Sciences in Lublin, in accordance with the binding procedures [1]. Since the second week of life, the lambs of ewes from both groups were fed with hay: firstly with crumpled oat, and later, with concentrates consisting of bran and meal. The objects of the study included 182 ewes at similar age.

Body weights of ewes were measured at the beginning of the study, after lambing, and after weaning of lambs. Additionally, after weaning, a point assessment of ewes' condition was performed.

Four test milkings of ewes were performed during lactation, and concentrations of somatic cells, protein, lactose, and fat in the samples were determined. Moreover, milk yield for 72 days of lactation was assessed. The examination of the samples was carried out at the Dairy Industry Laboratory in Lublin. Body weights of lambs were measured at birth as well as when the lambs were 28 and 56 day-old.

Due to different number of animals in the subclasses, analysis of variance least square means [6] was applied for the purpose of statistical calculations. Moreover, effect of the year of experiment was taken into account in the statistical model for all examined values. As far as daily milk yield and chemical composition of milk is concerned, successive milking effect was taken into consideration. In case of lamb growth analysis, the statistical model took into account effect of the year of experiment, sex, and type of birth. The results of the analyses are presented as Least Square Means (LSM) and Standard Errors (SE).

Results and discussion

The produced haylage was of high quality, what was confirmed by the six fold measurement of the level of lactic acid, butyric acid, and acetic acid, as well as by pH measurement. It contained 49.7% of dry matter, which is a higher value than in the case of silage [5, 8]. Furthermore, as the haylage included alfalfa, protein content was high and amounted to 175.4 g/kg of dry matter. Silage intake by ewes during pregnancy was lower than during lactation (Table 1).

At the beginning of the experiment, body weights of ewes were not significantly different and amounted to 71.7 kg and 72.9 kg on average in the control group and in the experimental groups respectively (Table 2). After lambing, however, body weights of ewes in the experimental group were much higher than body weights of those in the control group. The

Table 1 – Tabela 1

Chemical composition of haylage
Skład chemiczny i wartość pokarmowa skarmianej sianokiszonki

Specification Wyszczególnienie	
Dry matter (%) Sucha masa (%)	49.7
Concentration in 1 kg d.m. fodder (g) Zawartość w 1 kg s.m paszy (g)	
crude protein białko ogólne	175.4
ether extract tłuszcz surowy	26.2
ash popiół	116.4
crude fibre włókno surowe	262.2
nitrogen-free extractives bezzotowe wyciągowe	419.5
Average intake of haylage (kg of dry matter/item/day) Średnie pobranie sianokiszonki (kg s.m./szt./dzień)	
pregnancy ciąża	0.78
lactation laktacja	1.54

difference amounted to 4.1 kg and was statistically significant at $P \leq 0.05$. After lactation period, body weight of ewes in the experimental group was 69.1 kg, and of those in the control group – 67.7 kg. Similarly, body condition (Table 2) and fertility of the ewes in the

Table 2 – Tabela 2

Body weight of ewes in different periods and assessment of ewes' condition
Masa ciała matek w różnych okresach oraz ocena ich kondycji

Traits Cechy	Control group Grupa kontrolna n=72		Experimental group Grupa doświadczalna n=110	
	LSM	SE	LSM	SE
Body weight at the beginning of experiment (kg) Masa ciała na początku doświadczenia (kg)	71.7	1.2	72.9	0.9
Body weight 2 days after lambing (kg) Masa ciała w drugim dniu po wykocie (kg)	65.2*	1.4	69.3*	0.9
Body weight at weaning of 90-day lambs (kg) Masa ciała przy odłączeniu jagniąt w 90. dniu (kg)	67.7	1.2	69.1	0.9
Conditions score (points) Ocena kondycji (pkt)	4.20	0.06	4.37	0.05

* $P \leq 0.05$

Table 3 – Tabela 3Reproduction traits of ewes
Wskaźniki rozrodu matek

Traits Cechy	Control group Grupa kontrolna n=72		Experimental group Grupa doświadczalna n=110	
	LSM	SE	LSM	SE
Fecundity (%) Płodność (%)	90.45*	2.55	98.31*	1.86
Litter size of birth Wielkość miotu urodzonego	1.432	0.075	1.550	0.052
Litter size of rearing Wielkość miotu odchowanego	1.208	0.085	1.349	0.059

*P≤0.05

experimental group were higher (fertility: 98.31%) than of those in the control group (fertility: 90.45%). The difference in fertility was statistically significant at P≤0.05. Moreover, in the case of ewes fed with the haylage, the size of born and weaned litter was higher than in the case of ewes in the control group (Table 3). Similar findings for ewes fed with silage were obtained by Leto et al. [3] and Sormunen-Cristian & Jauhiainen [7].

Daily milk yield from four milking of the ewes in the experimental group was 1.83 kg, while of those in the control group – 1.40 kg. As a result, milk yield from 72 days of lactation of ewes amounted to 131 kg and 101 kg in the experimental and in the control groups respectively. In the both cases the differences were statistically significant at P≤0.01 (Table 4). The levels of lactose, protein, and fat in the milk of the ewes from both of the groups were almost equal. However, somatic cell count in the milk of experimental ewes (312.7 thousand) was higher than in the milk of control ewes (530.4 thousand) in 1 millilitre (Table 5). No findings by Leto et al. [3] and Volanis et al. [9] indicated that feeding ewes with silage may not have any influence on chemical composition of milk – on the levels of fat, protein, and lactose.

Table 4 – Tabela 4Milk yield of ewes (kg)
Wydajność mleka matek (kg)

Specification Wyszczególnienie	Control group Grupa kontrolna n=30		Experimental group Grupa doświadczalna n=60	
	LSM	SE	LSM	SE
Daily milk yield Dobowa wydajność mleka	1.40**	0.06	1.83**	0.04
For 72 days of lactation Za 72 dni laktacji	101.10**	5.59	131.48**	3.73

**P≤0.01

Table 5 – Tabela 5

Content of somatic cells, proteins, lactose and fat in the ewes' milk
Zawartość komórek somatycznych, białka, laktozy i tłuszczu w mleku maciorek

Component of milk Zawartość w mleku	Control group Grupa kontrolna n=30		Experimental group Grupa doświadczalna n=60	
	LSM	SE	LSM	SE
Somatic cells (thousand in the 1 millilitre) Komórek somatycznych (tys. w 1 ml)	530.4	153.9	312.7	102.6
Lactose (%) Laktoza (%)	5.11	0.05	5.06	0.04
Protein (%) Białko (%)	5.43	0.03	5.39	0.02
Fat (%) Tłuszcz (%)	6.26	0.13	6.29	0.09

Body weights of lambs were equal in different periods, irrespectively of the group to which the ewes belonged. The only slight advantage concerned body weights of newly-born lambs: the average body weight of 56-day experimental lambs was 17.8 kg, and of the experimental – 17.9 kg (Table 6). However, higher milk yield of experimental ewes had no correspondence to body weight of the milk-fed lambs. Most probably, it was due to bigger size of the litters of experimental ewes.

Haylage containing the blend of *Festulolium* and alfalfa proved to be very good fodder for ewes during pregnancy and lactation, and was eagerly eaten by them. Feeding haylage to the ewes resulted in very high fertility, fecundity, and milk yield. Moreover, high milk yield did not have any negative influence on body weights of the ewes. Thus, the obtained findings indicate that *Festulolium* may be used as additive to haylage for sheep.

Table 6 – Tabela 6

Body weight of lambs in the different periods of rearing (kg)
Masa ciała jagniąt w różnych okresach odchowu (kg)

Body weight of lambs Masa ciała jagniąt	Control group Grupa kontrolna			Experimental group Grupa doświadczalna		
	n	LSM	SE	n	LSM	SE
After birth Po urodzeniu	90	4.75	0.11	155	4.96	0.08
28 days 28. dzień	76	11.6	0.3	139	12.2	0.2
56 days 56. dzień	69	17.8	1.0	140	17.9	1.0

REFERENCES

1. AOAC, 2000 – Association of official analytical chemists. Official methods of analysis. 17th edition. AOAC, Gaithersburg, MD.

2. BOROWIECKI J., 2001 – *Festulolium* – nowy gatunek trawy pastewnej w badaniach IUNG. (*Festulolium* – fodder grass' new species in investigations by IUNG). *Biuletyn Informacyjny IUNG* 16, 37-40.
3. LETO G., TODARO M., DI NOTO A. M., ALICATA M.L., 2002 – Comparison of Sulla-hay and Sulla-silage in the lactating ewes and their effects on milk and cheese characteristics. *Small Ruminant Research* 45, 301-306.
4. Normy żywienia bydła, owiec i kóz, 2001 – Instytut Zootechniki, Kraków.
5. O'DOHERTY J.V., MAHER P.F., CROSBY T.F., 1997 – The performance of pregnant ewes and their progeny when offered grass silage, maize silage or maize silage/ensiled super pressed pulp mixture during late pregnancy. *Livestock Production Science* 52, 11-19.
6. SAS Institute Inc., 2004 – User's Guide, v. 9.1.3, Cary.
7. SORMUNEN-CRISTIAN R., JAUHAINEN L., 2001 – Comparison of hay and silage for pregnant and lactating Finnish Landrace ewes. *Small Ruminant Research* 39, 47-57.
8. SPEIJERS M.H.M., FRASER M.D., THEOBALD V.J., HARESIGN W., 2005 – Effects of ensiled forage legumes on performance of store finishing lambs. *Animal Feed Sciences and Technology* 120, 203-216.
9. VOLANIS M., ZOIPOULOS P., TZERAKIS K., 2004 – Effects of feeding ensiled sliced oranges to lactating dairy sheep. *Small Ruminant Research* 53, 15-21.

Krzysztof Patkowski, Mirosław Pięta, Anna Szymanowska

Produkcyjność macierek owcy uhruskiej żywionych sianokiszonką z udziałem *Festulolium*

Streszczenie

Celem pracy była ocena produkcyjności macierek żywionych sianokiszonką z *Festulolium* i lucerny mieszańcowej oraz wzrostu i rozwoju jagniąt pochodzących od tych matek. Maciorki grupy doświadczalnej żywiono sianokiszonką z *Festulolium* i lucerny mieszańcowej. *Festulolium* jest nowym mieszańcem międzyrodzajowym powstałym ze skrzyżowania kostrzewy łąkowej i życicy wielokwiatowej. Sianokiszonkę stosowano w czasie ciąży i laktacji. Stwierdzono, że owce bardzo chętnie pobierały sianokiszonkę. W grupie żywionej sianokiszonką uzyskano wysoką płodność i plenność macierek. Charakteryzowały się one wysoką mlecznością, uzyskały dobre oceny za kondycję po odłączeniu jagniąt. Masa ciała jagniąt grupy kontrolnej i doświadczalnej była wyrównana. Uzyskane wyniki produkcyjne owiec żywionych sianokiszonką z udziałem *Festulolium* wskazują na pozytywne efekty wykorzystania jej w żywieniu owiec w czasie ciąży i laktacji.

SŁOWA KLUCZOWE: owce /sianokiszonka / *Festulolium* / wydajność mleka / skład mleka / masa ciała