A STUDY OF SOME PRODUCTION CHARACTERISTICS OF DUPSKA PRAMENKA LAMBS WITH THE AIM OF GENETIC CHARACTERIZATION OF THE BREED*

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Summary

Characterization of animal genetic resources includes all activities related to morphometric, production and genetic characterization. The aim of these work was production characterization of Dupska pramenka, as a valuable genetic resource of Bosnia and Herzegovina. In these paper, parameters of birth weight and development of lambs up to the age of 180 days were monitored. The lambs were raised in extensive feeding conditions. Birth weight was measured for a total of 116 lambs, 47 female and 69 male. The average birth weight of lambs is 3.81 kg, females 3.78 and males 3.83. The weight of the lambs was also recorded at the age of 30, 90 and 180 days old. A total of 30 lambs were monitored, 15 female and 15 male. The average weight of lambs was 10.43 kg (30 days), 20.95 kg (90 days) and 32.75 kg (180 days). Average daily gain of lambs was 221.00 g (0-30 days), 175.67 g (30-90 days) and 130.33 g (90-180 days). The total gain of lambs was 6.62 kg (0-30 days), 10.51 kg (30-90 days) and 11.70 kg (90-180 days). The results showed that there is a statistically significant correlation between some analyzed parameters.

Key words*: autochthonous breed, characterization, weigh of lambs, daily and total gain, correlation*

INTRODUCTION

Sheep production in Bosnian and Herzegovina (BiH) is mostly based on the production of autochtonous sheep breed with modest production characteristics. Dupska pramenka belongs to the autochthonous strain of pramenka breed, with a triple direction of production: milk, meat and wool. The original habitat of these strains is in the central part of Bosnia and Herzegovina, especially on the Vlašić mountain and the surrounding municipalities. Most of the sheep production in BiH is based on the breeding of Dupska pramenka sheep.

The characterization of animal genetic resources must consider an appropriate system of identification of individuals, a quantitative and qualitative description of the breed,

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habitat and production systems in which the animals are raised and which they are adapted (Caput *et al*., 2010). The goal of genetic characterization is to gain more knowledge about resources, their current and potential future use in food production under defined environmental conditions, and their current status regarding endangerment (FAO, 1984).

The characterization of animal genetic resource is based in three directions: morphologic, production and genetic characterizazion. Morphological characterization of Dupska pramenka sheep breed is reported (Važić *et al*., 2017a, Važić *et al*., 2017b). Genetic characterization was performed through hemoglobin polymorphism (Važić et al., 2015; and Važić *et al*., 2017c), and DNA characterization (Ćinkulov *et al*., 2008; Ćurković *et al*., 2016). According to production characterization, some results of milk production can be found (Važić *et al*., 2003). Momić (2014) reported the classification, linear measurements, texture, and meat colour, and Drzaic *et al.* (2017) report the effect of sex on slaughter traits and measurements of Dupska pramenka sheep lamb. Analysis of Pramenka lamb meat was part of the research by Grabež *et al.* (2019) and the results showed that the meat of the Dupska Pramenka has certain advantages compared to the meat of the lambs of the Norwegian White and the Pivska Pramenka sheep.

The aim of these staudy was to improve results of production characterization of Dupska pramenka breed, through analysis parameters of growth and development of lambs aged up to 180 days.

MATERIAL AND METHODS

The birth weight of the lambs was measured at a total of 116 lambs from 109 ewes (7 ewes had twins). 30 lambs, 15 male and 15 female, were randomly selected to measure growth parameters. The body weight of the lambs was measured four times: at birth, at 30, 60 and 180 days of age. Based on the measured weights, average daily growth and total achieved growth of lambs were recalculated. The lambs were always with their mothers from birth to the age of 180 days. In the first 15 days of life, the lambs suckled, and from the third week they had available meadow hay and concentrate for lambs in limited amount.

Descriptive statistics were performed for birth weight, body weight, average daily growth and total achieved growth of lambs until the age of 180 days. Phenotypic correlations for lambs aged 0-90 days and lambs aged 90-180 days were calculated. For lambs aged up to 90 days, correlations were made for the following traits: birth weight (X1), body weight at 90 days (X2), total achieved growth (X3) and average daily gain (X4). For lambs aged 90-180 days, correlations were made for the following traits: body weight at 90 days (X5), body weight at 180 days (X6), total achived growth at 90-180 days (X7) and average daily growth at 90-180 days (X8). The statistical program SPSS version 22.0 was used for data processing.

RESULTS AND DISCUSSION

The average birth weight of lambs was 3.81 kg, recpectively 3.78 female, 3.83 male lambs (table 1). The small difference in the birth weight of lambs between male and female lambs can be explained by the fact that there were more twins in the total number of male lambs, which have a lower birth weight compared to singles.

Table 1. The birth weight of lambs, kg

sex	n	mean	SD	SEM	CV	Min	Max
F	47	3.78	0.50	0.07	13.23	2.55	4.80
M	69	3.83	0.69	0.08	17.75	1.50	5.15
F+M	116	3.81	0.62	0.06	16.27	1.50	5.15

F-female; M-male; n-number; SD-standard deviation; SEM-standard error of mean; CV-coefficient of variation; Min-minimal value; Max-maximale value

The fertility of Dupska Pramenka sheep is very low. Based on 109 monitored births, 116 lambs were obtained, that means that only 7 sheep had twins. Comparing with other Pramenka strains, it can be concluded that the birth weight of Dupka Pramenka lambs is higher than Pirotska Pramenka lambs, 2.61 kg (Antić, 1954), similar to Svrljiska and Sjenicka (Milosavljević, 1955; Trajić, 1978), but smaller compared to Kupreška lambs (Palina, 1957).

In order to monitor the dynamics of growth and development of lambs, the weight of lambs aged 30, 60 and 180 days was measured. The results are shown in table 2. The body weight of lambs 30 days aged ranged from 9.99 kg (female) to 10.87 kg (male).

Table 2. The body weight of lambs, aged 30, 60 and 180 days

age (days)	sex	n	mean	SD	SEM	CV	Min	Max
30	M	15	10.87	1.47	0.39	13.52	8.70	13.30
	F	15	9.99	1.44	0.39	14.41	7.90	12.30
	M+F	30	10.43	1.52	0.28	14.57	7.90	13.30
90	M	15	21.61	1.91	0.51	8.84	17.10	24.50
	F	15	20.29	1.59	0.43	7.84	17.90	22.90
	M+F	30	20.95	1.88	0.35	8.97	17.10	24.50
180	M	15	33.87	3.21	0.86	9.48	24.10	37.20
	F	15	31.62	1.70	0.45	5.38	28.20	34.40
	M+F	30	32.75	2.80	0.52	8.55	24.10	37.20

F-female; M-male; n-number; SD-standard deviation; SEM-standard error of mean; CV-coefficient of variation; Min-minimal value; Max-maximale value

In the first month of growth, the lambs consumed mother's milk, and from the fifteenth day they were given concentrate for lambs in limited amounts. With the development of the pre-gastric, the lambs could also take hay, which was given to their mothers.

Comparing with other Pramenka strains, it can be concluded that the lambs weight aged 30 days of Dupka Pramenka is higher than Sjenicka (Mastilović and Slijepčević, 1957), but smaller compared to Ovčepoljska (Tokovski *et al*., 1987). The body weight of Dupska Pramenka lambs aged 90 days ranged from 20.29 (female) to 21.61 kg (male). The obtained results are similar with Lička (Mikulec *et al*., 1979), higher than Sjenička (Milosavljević, 1955) and Šarplaninska (Bičanin, 1958), but smaller than Ovčepoljska Pramenka lambs (Tokovski *et al*., 1987). The body weight of Dupska Pramenka lambs aged 180 days ranged from 31.62 (female) to 33.87 kg (male), similar to other Pramenka strain, except Pivska Pramenka lambs which was significantly higher (Marković, 1994).
The movement of average daily growth of lambs is followed, and results are shown in table 3. The average daily growth of Dupska pramenka lambs in the first 30 days was 221 g, respectively 232 g on male and 210 g on female lambs.

Table 3. The movement of average daily growth of lambs (g)

age (days)	sex	n	mean	SD	SEM	CV	Min	Max
0-30	M	15	232.00	50.23	13.43	21.65	160	310
	F	15	210.00	48.99	13.10	23.33	140	280
	M+F	30	221.00	50.82	9.43	23.00	160	310
30-90	M	15	178.67	23.91	3.34	13.38	140	250
	F	15	173.33	14.47	3.54	7.19	150	190
	M+F	30	175.67	19.09	3.54	10.87	140	250
90-180	M	15	134.67	26.30	7.03	19.53	80	170
	F	15	126.00	20.26	5.42	16.08	70	150
	M+F	30	130.33	23.87	4.43	18.32	70	170

F-female; M-male; n-number; SD-standard deviation; SEM-standard error of mean; CV-coefficient of variation; Min-minimal value; Max-maximale value

Obtained results are similar with other results reported in literature. The average daily growth on Svrljiska pramenka lambs was 123 g (Živković and Kostić, 1953), which is lower in compare with obtained results. Spiridović and Jašović (1989) reported 283 g daily growth on male and 256 g on female Baljuša Pramenka lambs, which is higher in compare whith obtained data.
The average daily growth of Dupska pramenka lambs from 30 to 90 days was 175.67 g, respectively 178.67 g on male and 173.67 g on female lambs. Trajić (1978) reported daily growth for Sjenička pramenka male lambs 140 g, respectively female lambs 125 g, which is lower than obtained results. The average daily growth of Dupska pramenka lambs aged from 90 to 180 days was 130.33 g. In order to monitor the dynamics of growth and development of lambs, the total achieved growth until the age of 180 days was measured. The results are shown in table 4.

Table 4. The total achieved growth of lambs until the age of 180 days (kg)

age (days)	sex	n	mean	SD	SEM	CV	Min	Max
0-30	M	15	6.94	1.48	0.40	21.33	4.85	9.15
	F	15	6.29	1.48	0.40	23.05	4.30	8.50
	M+F	30	6.62	1.51	0.28	22.81	4.30	9.15
30-90	M	15	10.65	1.41	0.37	13.24	8.20	14.70
	F	15	10.36	0.71	0.19	6.85	8.70	11.20
	M+F	30	10.51	1.12	0.21	10.66	8.20	14.70
90-180	M	15	12.07	2.33	0.62	19.30	7.00	14.90
	F	15	11.33	1.81	0.49	15.98	6.50	13.80
	M+F	30	11.70	2.12	0.39	18.12	6.50	14.90

F-female; M-male; n-number; SD-standard deviation; SEM-standard error of mean; CV-coefficient of variation; Min-minimal value; Max-maximale value

The male lambs had a higher average total growth in all three monitored intervals. The difference between the sexes increased with age, which is expected because male lambs develops faster than female lambs.
Phenotypic correlations for growth traits are calculated. According the obtained results it can be concluded that there is correlation between some growth traits (table 5).

Table 5. The values of coefficients of correlation for growth characteristics of lambs

age	0-90 days					
relations	X1:X2	X1:X3	X1:X4	X2:X3	X2:X4	X3:X4
coefficient of correlation	0.17	-0.03	-0.04	0.98*	0.97*	0.99*
age	90-180 days					
relations	X5:X6	X5:X7	X5:X8	X6:X7	X6:X8	X7:X8
coefficient of correlation	0.63*	-0.07	-0.04	0.75*	0.75*	1.00*

Coefficient of correlation between body weight at 90 days (X2) and total achived growth (X3) and average daily growth (X4) at lambs 90 days old are statisticaly significant. Also, statisticaly significant correlation between total achived growth (X3) and average daily growth (X4) was confirmed. For lambs aged 90-180 days, a statistically significant correlation between body weight at 90 (X5) and body weight at 180 days (X6), and this indicates that the lambs that had a higher body weight at 90 days retained this advantage until the age of 180 days. Also, the statisticaly significant correlation between body weight at 180 days (X6) and total achived growth (X7) and average daily growth (X8) was confirmed.

CONCLUSION

Dupska pramenka sheep is a valuable genetic resource of Bosnia and Herzegovina and the most of sheep production in BiH is based on the breeding of these sheep. The average birth weight of lambs was 3.81 kg. The average weight of lambs aged 30, 90 and 180 days was 10.43 kg, 20.95 kg and 32.75 kg. According obtained results we can conclude that there is a statistically significant correlation between some analyzed traits. Based on the literature data, there are no more recent works that investigated the growth and development of lambs not only of Dupka Pramenka, but also of other strains from Balkan Peninsula. The obtained results are valuable from the aspect of characterization of Dupska pramenka sheep as an animal genetic resources.

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ISTRAŽIVANJE NEKIH PROIZVODNIH KARAKTERISTIKA JANJADI DUPSKE PRAMENKE S CILJEM GENETIČKE KARAKTERIZACIJE RASE

Rezime

Karakterizacija animalnih genetičkih resursa podrazumijeva sve aktivnosti vezane za morfološke, proizvodne i genetičke karakteristike. Cilj rada je bila proizvodna karakterizacija dupske pramenke, kao vrijednog genetičkog resursa Bosne i Hercegovine. U radu su praćeni parametri mase pri rođenju i razvoja jagnjadi uzrasta do 180 dana. Porođajna masa je mjerena kod 116 jagnjadi, 47 ženskih i 69 muških. Prosječna porođajna masa jagnjadi je bila 3,81 kg, odnosno 3,78 kg ženskih i 3,83 kg muških jagnjadi. Težina jagnjadi je također mjerena pri uzrastu od 30, 90 i 180 dana. Ukupno je praćeno 30 jagnjadi, 15 ženskih i 15 muških. Prosječna masa jagnjadi je bila 10,43 kg (30. dana), 20,95 kg (90. dana) i 32,75 kg (180. dana). Prosječni dnevni prirast jagnjadi je bio 221,00 g (0-30 dana), 175,67 g (30-90 dana) i 130,33 g (90-180 dana). Ukupni prirast jagnjadi je bio 6,62 kg (0-30 dana), 10,51 kg (30-90 dana) i 11,70 kg (90-180 dana). Rezultati su pokazali statistički značajnu korelaciju između nekih praćenih parametara.

Ključne riječi: *autohtona rasa, karakterizacija, masa jagnjadi, dnevni i ukupni prirast, korelacije*