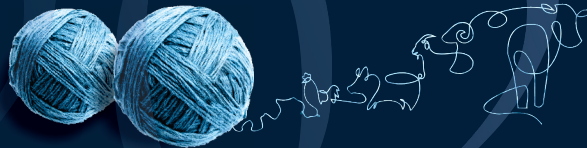


13th
INTERNATIONAL
SYMPOSIUM

MODERN
TRENDS
IN LIVESTOCK
PRODUCTION



P R O C E E D I N G S

6 - 8 October 2021, Belgrade, Serbia

Institute for Animal Husbandry
Belgrade - Zemun, SERBIA

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PATRON

Ministry of Education, Science and Technological
Development of the Republic of Serbia

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PUBLISHER

Institute for Animal Husbandry, Belgrade-Zemun, Serbia
Editor-in-Chief
Čedomir Radović, PhD, Senior Research associate
Director of the Institute for Animal Husbandry, Belgrade-Zemun

Editor

Zdenka Škrbić, PhD, Principal Research Fellow
Institute for Animal Husbandry, Belgrade-Zemun

The Proceedings is printed by the Institute for Animal Husbandry,
Belgrade, 2021

biotechnology.izs@gmail.com

www.istocar.bg.ac.rs

Circulation 100 copies.

ISBN 978-86-82431-77-0



IMPORTANCE, PRODUCTIVITY AND POTENTIALS OF LOCAL SERBIAN SHEEP BREEDS

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Abstract: Due to the political, demographic and economic situation, agriculture in Serbia changed, including also the structure in sheep breeds. Traditional sheep breeding centers with large pasture areas and large number of local breeds and strains are deserted, and, consequently, sheep production focused on meat production, in intensive systems, but in expensive and inadequate ways. This led to decreasing number in local breeds (pramenka) with its strains. In this research, two most numerous pramenka strains were observed, Sjenica and Svrljig strains, concerning their number, productive and reproductive parameters. Population of registered and active heads in 2020. was 139,319 for Sjenica and 19585 for Svrljig strain. Weight on birth for Sjenica and Svrljig lambs were 3.20 and 3.15, while weight after 30 days and on weaning was 11.06, 11.42 and 27.02 and 24.97, respectively. Lambing index was 1.27 for Sjenica and 1.29 for Svrljig strain. Svrljig strain had longer lactation (104 vs. 88 days), with higher milk production (64.05 kg vs. 55.01 kg), but protein content was higher in Sjenica sheep's milk (5.08% vs. 4.19%). Besides their importance on agro-biodiversity and genetic pool, these strains are best adapted for breeding conditions that are in hilly and mountainous parts of Serbia. As triple production strains, their milk, meat and wool could be used in processing to traditional, high-quality products with additional value, so can provide extra income for the farmers which leads to survival and sustainable development of rural areas.

Key words: Indigenous breeds, genetic resources, sustainable development, milk, wool

Introduction

The changes in the political and economic situation that have affected Serbia in the last few decades have led to a series of adjustments in the agricultural sector, including the breeding of small ruminants. Due to the pronounced trend of

deagrarization and demographic depopulation of the villages, there was a decrease in the number of sheep (Petrović *et al.*, 2011; Petrovic *et al.*, 2013). Traditional sheep breeding centers in the hilly mountainous area have been deserted, and small ruminants have moved to lower areas. Under the influence of western European trends, sheep are raised in certain lowland areas, primarily for meat production, but in an expensive and inadequate way. Large financial resources are given for the import of different breeds of sheep. This neglects the fact that this production would be more profitable, and the products are of incomparably better quality in ecologically preserved areas of hills and mountains by growing indigenous populations (Caro Petrovic, 2014). Indigenous breeds are less demanding, sturdier than imported genotypes, and with lower production inputs (Cekic *et al.*, 2018). Also, local sheep breeds are very important as genetic resources. Variability of the breed guarantees the sustainability of production in times of possible climate change, the emergence of new diseases and other reasons why commercial the race will not be able to achieve the expected production (Stojanović, 2019).

The objective of this study was to determine current state, number and level of productivity of two very important local populations from the Pramenka breed group. These are the Sjenica and Svrljig strains, which are also the most numerous local sheep in Serbia. Sjenica strain is named after town of Sjenica, in western part of Serbia, which is characterized with plateau at more than 1000 m above sea level. Population of this strain is widespread mainly on western and south-western part of Serbia. The color of wool is white, but there are specific black patches of hair around eyes, mouth, and half of the ears. Ewes are polled, rams have large and strong horns. The tail is long, often reaching the ground.

Svrljig strain is named after village in south-eastern part of Serbia, characterized with hilly-mountainous landscape. Majority of population is spread in eastern part of Serbia. The color of wool is white, but the hair color can be white with dark and black dots, with black mouth. Most recognizable characteristic for this strain is white tuft of wool above forehead. Ewes are polled, rams can be with or without horns. Tail is also long, reaching the ground.

Both strains are entering reproduction cycle quite late, with more than 12-18 months of age, depending on the breeding conditions. They are finishing growth after 3 years, and they are triple production strains, used for milk, wool and meat.

Material and Methods

Research included active ewes and rams, both Sjenica and Svrljig strains. Number of heads represents the number of animals registered in the main book (Herdbook), which are active and productive in the last five years. Number of animals is taken from the Annual Report of the Institute for Animal Husbandry

“Activities report and results of the control of realization of breeding programs in 2020” for sheep in Central Serbia.

All measurements and record keeping were performed in period from 01.10.2018. to 30.09.2019. The live weight of mature animals was measured at the beginning of the mating season, while the live weight of lambs were measured at birth, after 30 days of life and on weaning, which was around 90 days in the case of this genotypes.

The index of lambing is calculated as the index of the total number of descendants based on the total number of animals that gave birth. In addition to these parameters, yield of raw wool were measured, which was done right after the shearing.

Examined milk parameters were: lactation duration, milk yield for lactation after the weaning of lambs, average daily milk production, and average protein content and average milk fat content. Milk control was carried out by a modified absolute (AT) method, carried out at intervals of 28-34 days, alternating in the morning and evening (ICAR, 2018). The first measurement was done after the weaning of lambs, and the milk components (proteins and milk fat) were determined by Ekomilk and Milkoscan apparatus.

The collected data were processed using the statistical package Statistica for Windows (*Stat. Soft Inc. 7*), and the basic parameters of descriptive statistics (arithmetic mean, minimum and maximum values, standard error of the mean and variation coefficient) were calculated.

Results and Discussion

In table 1 number of active heads of both strains in last five years is shown. Sjenica population is expanding more quickly than Svrlijig population. One of the major reason for population growth are stimulative measures of the government in terms of subsidies. Although number of animals under control of productive parameters is increasing, it is still insufficient for stable and constant production. These strains are reared in extensive and semi-extensive systems, where large part of nutrition system in spring-autumn represents grazing on non-cultivated pastures and hay-based nutrition in winter months. Also, the size of flock is still in intervals 10-50 heads per household or farms, which is not enough for demands of the market. The structure of the farms and the current number of heads do not allow a stable distribution of products on the market.

Table 1. Number of active and controlled heads of Sjenica and Svrljig sheep in last five years

Genotype	Year				
	2016	2017	2018	2019	2020
Sjenica strain	32,751	38,313	74,587	105,573	139,319
Svrljig strain	9,314	12,981	14,781	18,166	19,585

Productive parameters of two strains are showed in table 2. Live weight of Sjenica lambs on birth, after 30 days and on weaning were 3.20, 11.06 and 27.02, respectively. *Petrović et al. (2011)* reported similar weights at birth and after 30 days (3.09 and 11.82 kg, respectively), while weaning weight was lower (21.16 kg).

Live weight of Svrljig lambs were 3.15, 11.42 and 24.97, respectively. Although birth weight and weight after one month of age are similar to Sjenica strain, Svrljig lambs were lighter on weaning than Sjenica lambs. Lambing weight was slightly lower than in 3.38 and 3.27 reported in previous researches (*Petrović et al. 2011; Cekic et al., 2018*, respectively), while weight after first month of life was slightly higher than previously reported (10.99 and 10.56, respectively). In research reported by *Caro Petrović et al. (2012)*, slightly heavier lambs on birth was reported with 3.89, but live weight after month was 10.29. Weight on weaning was accordant to 24.65 reported in *Cekic et al. (2018)* but lower than 26.66, reported in *Petrović et al. (2011)*. As milk in the first month is the major feed in lambs nutrition, their weight is highly correlated with milk production of their mothers. Both Sjenica and Svrljig lambs are weaned at the roughly age of three months.

Weight of the adult animals is highly correlated with quality of feed and current condition of the animals at the moment of measurement, so this parameter varies the most (*Cekic et al., 2019*). Weight of adult Sjenica ewes was 58.23 kg, which was higher than 52 kg reported in *Mekić et al. (2007)*, and similar to 57.98, reported in *Petrović et al. (2011)*. Weight of adult Svrljig ewes was 56.31 kg, slightly higher than 54.53 reported in *Petrović et al. (2011)*, and 55.84, reported in *Cekic et al. (2019)*.

Yield of raw wool for Sjenica and Svrljig strain was 2.29 and 2.84, respectively. Those results are similar to the previous research, which reported 2.32 and 2.79 (*Cekic et al. 2018; Petrović et al., 2011*).

Table 2. Productive parameters of Sjenica and Svrlijig sheep

Genotype	No. of controlled heads	Statistical parameter	Lambing index	Weight on birth (kg)	Weight on 30 days (kg)	Weight at weaning (kg)	Weight of adults (kg)	Wool yield (kg)
Sjenica strain	55,794	Mean	1.27	3.20	11.06	27.02	58.23	2.29
		Min	1.00	2.38	7.23	19.95	42.53	1.41
		Max	1.78	4.04	15.43	32.13	69.00	3.29
		Se	0.02	0.05	0.22	0.35	1.18	0.07
		CV (%)	11.77	11.38	14.80	9.71	14.99	22.84
Svrlijig strain	14,157	Mean	1.29	3.15	11.42	24.97	56.31	2.84
		Min	1.09	2.47	8.10	47.64	35.44	1.21
		Max	1.64	3.91	15.42	29.65	66.79	4.45
		Se	0.03	0.07	0.31	0.58	1.10	0.11
		CV (%)	11.62	11.59	14.43	12.45	10.34	21.18

*Mean – arithmetic mean; Min – smallest value; Max – largest value; Se – standard error of the mean; CV – variation coefficient

Lambing index of autochthonous genotypes is on average 1 - 1.3 (Cekic et al., 2018), and values for Sjenica and Svrlijig strains were 1.27 and 1.29, respectively, and in line with this values.

Milk production control was performed on a total of 3,825 Sjenica and 3,810 Svrlijig ewes, and results are shown in table 3. Lactation lasted on average 88 and 104 days, respectively, and ewes gave an average of 55.01 and 64.05 kg of milk without the amount lambs consumed, and daily production was 0.63 kg and 0.62 kg. Protein and fat content was 5.08% and 6.75% for Sjenica sheep, and 4.20% and 6.71% for Svrlijig sheep, respectively.

Table 3. Control of milk production of Sjenica and Svrlijig sheep

Genotype	Number of heads	Statistical parameter	Lactation period (days)	Total milk yield (kg)	Daily milk production (kg)	Average milk fat content (%)	Average protein content (%)
Sjenica strain	3,825	Mean	88	55.01	0.63	6.75	5.08
		Min	65	38.32	0.44	5.71	3.08
		Max	136	86.50	0.85	8.20	5.85
		Se	4.34	2.88	0.03	0.21	0.15
		CV (%)	18.77	19.74	17.28	12.47	11.88
Svrlijig strain	3,810	Mean	104	64.05	0.62	6.71	4.19
		Min	64	34.64	0.48	3.09	2.44
		Max	144	115.27	1.19	8.39	5.64
		Se	3.33	3.53	0.03	0.23	0.15
		CV (%)	16.61	24.47	22.53	16.67	17.76

*Mean – arithmetic mean; Min – smallest value; Max – largest value; Se – standard error of the mean; CV – variation coefficient

Results for Svrlijig strain differ from previous research, where higher parameters were reported (*Mekić et al., 2005*). Lactation lasted for 165 days, with a yield of 128.2 kg milk consisted from 6.54% milk fat content. Amount of milk production is acceptable, but not sufficient for autochthonous breeds. From the results, it is evident that Svrlijig strain had longer lactation than Sjenica strain, but daily production was similar. Sjenica strain showed higher protein content than Svrlijig, but fat content was similar. Among the various components of the milk, proteins and fat are of fundamental importance, due to their contribution to the yield, flavour and sensory features of dairy products (*Scintu et al., 2007*). Variability in milk traits can be exploited in positive direction throughout planned selection and better rearing (*Maksimović et al., 2019*), and further work is needed to improve those traits.

By processing milk, highly valuable, famous products such as white Sjenica cheese, or Svrlijig belmuz could be obtained. On the other hand, Sjenica and Svrlijig lamb are famous delicacies. Currently, the wool market is not satisfactory, and the price of wool is very low, it often cannot even cover the cost of shearing. However, wool of local breeds is suitable for the production of traditional products (socks, vests) or souvenirs, which can contribute to added value. All of these traditional, high quality products, provide additional value and extra profit for breeders and contribute to the sustainability of sheep production.

These breeds have triple production (meat, milk and wool).

Conclusion

Population of Sjenica sheep is larger than Svrlijig, but their productive parameters are similar, except for the weight of lambs after weaning, which was higher for Sjenica strain. Although there is an increasing trend in the number of Sjenica and Svrlijig sheep, the number is still insufficient. Concerning milk production, Svrlijig strain was more productive, but the average protein content was lower than in Sjenica strain. In comparison to imported, more productive and specialized genotypes, the production of these strains is lower, but, given the fact that they are productive in extensive systems, with harsh environmental factors, their production is satisfactory. These strains are best adapted to the conditions in which they are reared, and with very modest inputs, they give high-value products. By processing them, the high-quality, traditional products with additional value are obtained. These strains, as two largest representatives of locally-adapted, autochthonous strains, have a huge importance on the agro-diversity of the Republic of Serbia, but also for the whole Balkan peninsula, and even Europe.

With modest production and insufficient number of animals, productive and processing potential is still low. Work on the popularization of these genotypes and their traditional products is imperative, because they are very important for the survival and sustainable development of rural areas.

Značaj, produktivnost i potencijali autohtonih rasa ovaca u Srbiji

Bogdan Cekić, Dragana Ružić Muslić, Nevena Maksimović, Violeta Caro Petrović, Ivan Ćosić, Tamara Stamenić, Madlena Andreeva

Rezime

Usled političke, demografske i ekonomske situacije, poljoprivreda u Srbiji se promenila, uključujući i rasni sastav ovaca. Tradicionalni ovčarski centri sa velikim pašnim prostranstvima i velikim brojem autohtonih rasa i sojeva su napušteni, i posledično je fokus ovčarske proizvodnje prebačen na intenzivne sisteme proizvodnje mesa, koji su skupi i neodgovarajući. Ovo je dovelo do smanjenja broja pramenki sa svojim sojevima. U ovom istraživanju, praćena su dva soja pramenke: sjenički i svrljiški, uključujući njihov broj, produktivne i reproduktivne parametre. Kontrolisana populacija ovih životinja u 2020. godini je bila 139319

sjeničke i 19585 svrljiške pramenke. Prosečna telesna masa na rođenju jagnjadi sjeničke pramenke je iznosila 3,20, a svrljiške 3,15, dok je telesna masa nakon trideset dana i na odlučanju iznosila 11,06 i 11,42, odnosno 27,02 i 24,97, redom. Indeks jagnjenja je bio 1,27 za sjeničku pramenku i 1,29 za svrljišku pramenku. Svrljiška pramenka je imala dužu laktaciju od sjeničke (104 i 88 dana), veću proizvodnju mleka (64,05 kg i 55,01 kg), ali je sadržaj proteina bio veći kod sjeničke pramenke (5,08% i 4,19%). Pored značaja koji imaju na agro-biodiverzitet i genetički pul, autohtone rase i sojevi su adaptirani na uslove gajenja koji preovladavaju u brdsko-planinskim delovima Srbije. Kao predstavnici trojnog smjera proizvodnje, njihovo mleko, meso i vuna mogu da se koriste za dobijanje tradicionalnih, kvalitetnih proizvoda dodate vrednosti, te mogu da obezbede dodatni prihod odgajivačima, što doprinosi opstanku i održivom razvoju ruralnih područja.

Ključne reči: Autohtone rase, genetički resursi, održivi razvoj, mleko, vuna

Acknowledgement

The results of the research presented in this paper were financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia, on the basis of the Agreement on the realization and financing of scientific research work of SRO in 2021 no. 451-03-9/2021-14/200022.

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