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Exterior and production characteristics of Brač sheep

VLAHEK, Ivan* – KUSANOVIĆ, Jasna – SUŠIĆ, Velemir – EKERT KABALIN, Anamaria – MENČIK, Sven – PIPLICA, Aneta – POPOVIĆ Niko – MAURIĆ MALJKOVIĆ, Maja

University of Zagreb, Faculty of Veterinary Medicine, Vjekoslava Heinzela 55, Zagreb, Croatia
*Corresponding author: ivlahek@vef.unizg.hr

Abstract

The Brač sheep is a locally adapted population within the Dalmatian Pramenka breed, shaped by the specific environmental conditions of the Croatian island of Brač. Despite its cultural and agricultural significance, this sheep population has not yet been fully described in scientific literature. This study aimed to record the exterior and productive traits of the Brač sheep to support its recognition and conservation as an autochthonous genetic resource. A total of 65 adult ewes, 13 adult rams, 12 male lambs and nine female lambs from nine flocks were included in the study. The animals were kept primarily on pasture and used either for meat production or as dual-purpose, for milk and meat. Body weight and seven morphometric traits were recorded. Measurements were conducted using a scale, Lydtin stick, measuring tape, and callipers. Lactation yield was assessed in five ewes after weaning of lambs. Milk was measured every 30 days until drying-off, and post-weaning milk yield was calculated using the Fleischmann formula. The average body weight of ewes was 41.08 kg, and that of rams was 54.55 kg. Rams were larger than ewes in all measured exterior traits. Withers height averaged 61.94 cm in ewes and 68.04 cm in rams, while sacral height was 62.85 cm and 68.00 cm, respectively. Hip width showed the greatest variation, with a coefficient of variation of 15.71% in rams and 8.11% in ewes. Average milk production from weaning of lambs until drying was 68.7 litres per ewe. All examined lambs were singletons. The Brač sheep is characterized by a small body frame and modest productive performance, which are comparable to those of other Croatian Pramenka-type breeds.

Keywords: Brač sheep, Dalmatian Pramenka, morphometry, production

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Introduction

Local livestock populations represent an important component of animal genetic resources because they have evolved under specific environmental conditions and traditional management systems, resulting in valuable adaptations to local production environments. Their phenotypic characterisation is an essential prerequisite for the conservation, sustainable utilisation, and future improvement of indigenous sheep populations. Exterior characteristics and productive performance remain the primary criteria for describing local sheep populations and distinguishing them from closely related breeds.

The Brač sheep is a locally adapted population of the Dalmatian Pramenka traditionally reared on the Croatian island of Brač. The island is characterized by a typical Mediterranean climate, extensive karst pastures and sparse natural vegetation, conditions that have shaped sheep production and influenced the adaptation of this population over centuries (DERADO, 1984; KEČKEMET, 1998; VOJNOVIĆ, 1991). Traditionally, the Brač sheep has been managed under extensive grazing systems as a dual-purpose animal, producing both lamb and milk, while wool has gradually lost its economic significance. Today, lamb and traditional Brač sheep cheese remain the most valuable products of this production system.

Historical records indicate that sheep breeding has been among the most important agricultural activities on the island for centuries and has played a significant role in the local population's economy and cultural heritage (KURSCHNER, 1937; ZDANOVSKI, 1947; GAMULIN and VIDOVIĆ, 1975). Nevertheless, despite its long tradition and local importance, the Brač sheep has never been comprehensively described in the scientific literature. Available information is limited to historical reports and local publications, whereas recent data on its exterior characteristics and productive performance are scarce.

Therefore, this study aimed to provide an updated phenotypic characterisation of the Brač sheep by evaluating its exterior characteristics and productive performance under current breeding conditions.

Material and methods

Animals

The study included 99 Brač sheep: 65 adult (2-6 years) ewes, 13 adult (2-6 years) rams, and 21 lambs. The animals were randomly sampled from nine privately owned flocks located on the island of Brač, Croatia. All flocks were managed under traditional extensive production systems, with natural pasture serving as the primary feed resource supplemented by meadow hay when necessary. Depending on the production system, animals were reared either for lamb production or under a dual-

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purpose system for both milk and meat production. All lambs included in the study originated from the same nine flocks and were born during the same lambing season. Data was collected from January to November 2024.

Morphological measurements

Body weight was recorded for all rams and lambs. Out of 65 ewes, 45 were in early pregnancy and were weighed, while 20 were in late pregnancy and were not suitable for weighing. Body weight was measured using an electronic scale and recorded to the nearest 0.01 kg.

Morphometric measurements were recorded in centimetres following standard livestock evaluation procedures. Withers height, sacral height and body length (measured from the cranial edge of the shoulder joint to the caudal edge of the pin bone) were determined using a Lydtin measuring stick. Chest circumference and cannon bone circumference were measured using a measuring tape, whereas chest depth and hip width were determined with a livestock calliper.

Average daily gain was calculated as follows: birth weight was subtracted from weaning weight, and divided by the number of days from birth to weaning.

Milk production

Milk production was evaluated in five 3-year-old ewes after weaning (approximately two months after lambing), as lambs remained with their dams throughout the suckling period and milking commenced only after weaning. Individual daily milk yield was recorded at approximately 30-day intervals until drying off (three months after weaning), in accordance with the official Croatian milk recording guidelines (JURKOVIĆ *et al.,* 2021). Post-weaning milk yield (total amount of milk from weaning of lambs until drying) was calculated using the Fleischmann method.

Results and discussion

The body weight and morphometric characteristics of adult Brač sheep are presented in Table 1. Adult ewes had an average body weight of 41.08 kg, whereas rams averaged 54.55 kg. As expected, rams exhibited greater values for all recorded body measurements, including withers height, sacral height, body length, chest circumference, chest depth, hip width and cannon bone circumference. The greatest variability was observed in hip width, particularly in rams, with a coefficient of variation of 15.71%. Cannon bone circumference showed no recorded variation within either sex, with all measured ewes having a value of 7 cm and all rams a value of 8 cm.

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Table 1: Body weight and morphometric characteristics of adult Brač sheep

Variable	Sex	n	Mean	St.dev.	Min.	Max.	Coefficient of variation, %
Body weight (kg)	F*	45	41.08	7.40	28.30	58.00	18.00
	M**	13	54.55	8.30	38.00	70.00	15.21
Withers height (cm)	F	65	61.94	3.04	53.00	68.00	4.91
	M	13	68.04	2.76	63.00	72.00	4.06
Sacral height (cm)	F	65	62.85	3.06	56.00	69.00	4.87
	M	13	68.00	2.78	64.00	73.00	4.08
Body length (cm)	F	65	68.14	3.65	56.50	78.00	5.36
	M	13	74.08	4.61	66.00	82.00	6.22
Chest circumference (cm)	F	65	83.54	5.87	72.00	100.00	7.03
	M	13	89.46	6.74	77.00	104.00	7.53
Chest depth (cm)	F	65	29.97	2.10	25.00	35.00	7.02
	M	13	32.92	2.18	28.00	36.00	6.62
Hip width (cm)	F	65	17.25	1.40	14.00	21.00	8.11
	M	13	18.31	2.88	15.50	27.00	15.71
Cannon bone circumference (cm)	F	65	7.00	0	7.00	7.00	0
	M	13	8	0	8.00	8.00	0

*F – Female; **M – Male

The average body weight of adult ewes falls within the range reported for the Dalmatian Pramenka breed (35–45 kg), while the average body weight of rams corresponds to the upper limit of the published breed standard (MIOČ *et al.,* 2011). Compared with other Croatian indigenous sheep breeds, the body weight of Brač ewes is lower than that reported for Lika Pramenka and Pag sheep but comparable with Cres sheep and slightly higher than Krk and Rab sheep (MIOČ *et al.,* 1998; MIOČ *et al.,* 2004; PAVIĆ *et al.,* 2005; PAVIĆ *et al.,* 2006). The average withers height of ewes (61.94 cm) was similar to that reported for Lika Pramenka, Pag and Cres sheep, although slightly higher than the values described for the Dalmatian Pramenka breed standard and Krk sheep (MIOČ *et al.*, 1998; MIOČ *et al.*, 2004; PAVIĆ *et al.,* 2005; PAVIĆ *et al.,* 2006; MIOČ *et al.,* 2011). As in other Pramenka-type sheep, body length exceeded withers height, reflecting the typical body conformation of this group of breeds. The slightly greater sacral height than withers height observed in ewes indicates a mildly elevated hindquarters, whereas these measurements were almost identical in rams.

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Table 2: Body weight of Brač lambs at birth and at weaning (kg)

Traits	Sex	n	Average age (days)	Mean	St.dev.	Min.	Max.	Coefficient of variation %
Birth weight (kg)	F*	9	0	2.66	0.12	2.5	2.9	4.65
	M**	12	0	2.81	0.14	2.6	3.1	5.13
Weaning weight (kg)	F	9	52	16.67	2.38	13	20	14.30
	M	12	52	16.92	2.31	14	20	13.68

*F – Female; **M – Male

The body weights of lambs at birth and at weaning are summarised in Table 2. Male lambs were slightly heavier than females both at birth (2.81 vs 2.66 kg) and at weaning (16.92 vs 16.67 kg), although the differences between sexes were small. Average daily weight gain was nearly identical, at 271 g in males and 270 g in females.

Birth weights recorded in the present study were lower than those previously reported for Pag sheep (SUŠIĆ *et al.,* 2008) and lower than the official performance recording data available for Dalmatian Pramenka (PRPIĆ *et al.,* 2019). Nevertheless, these comparisons should be interpreted cautiously because the national database mainly includes selected male lambs used for performance testing, and those tend to be the best animals reared for reproduction. Likewise, weaning weights of Brač lambs were slightly lower than the reference values reported for Dalmatian Pramenka (MIOČ *et al.,* 2011), reflecting the extensive production conditions under which the investigated flocks were managed.

Milk production results are presented in Table 3. Average post-weaning milk yield during the milking period was 68.7 L per ewe, with individual production ranging from 56.6 to 95.3 L. Since lambs remained with their dams until weaning, only the milk produced after weaning was included in the calculation of post-weaning milk yield. Under these management conditions, the milking period lasted approximately two to three months, corresponding to a total lactation length of about five months. Milk production results should be interpreted with caution because milk recording was performed in only five ewes, and therefore these results should be considered preliminary.

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Table 3: Milk production of Brač sheep

Sheep	Post-weaning milk yield (L)
Ewe no. 1	61.9
Ewe no. 2	60.2
Ewe no. 3	56.6
Ewe no. 4	95.3
Ewe no. 5	69.5
Average	68.7

Conclusion and recommendation

The present study provides an updated phenotypic characterization of the Brač sheep, a locally adapted population of the Dalmatian Pramenka breed reared under extensive Mediterranean production systems on the island of Brač. Adult animals exhibited small body frame, while productive performance was comparable to that reported for other Croatian Pramenka-type sheep.

The results presented in this study contribute to the scientific documentation of the Brač sheep. Further investigations, including larger sample sizes and long-term monitoring of productive and reproductive performance, are recommended to support the preservation and promotion of this valuable local sheep population.

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References

DERADO, K. (1984): Reljef otoka Brača. *Bračkizbornik.* 14:7–13.

GAMULIN, J. – VIDOVIĆ, I. (1975): Etnografski prikaz otoka Brača. *Narodna umjetnost.* 11/12:463–494.

JURKOVIĆ, D. – PAVIČIĆ, J. – IVKIĆ, Z. – PAŠALIĆ, D. – ŠPEHAR, M. – SOLIĆ, D. – MOLNAR, M. – VRANIĆ, I. – STRUČIĆ, D. – BOŽIĆ, N. (2021): Označavanje, kontrola proizvodnosti i procjena uzgojnih vrijednosti ovaca i koza. Hrvatska agencija za poljoprivredu i hranu, Zagreb, Croatia.

KEČKEMET, D. (1998): *Brač: vodič kroz povijest i kulturnu baštinu.* Brački zbornik d.o.o., Supetar, Croatia.

DOI: https://doi.org/10.59913/dagr.2026.24466

KURSCHNER, Z. (1937): O ovčarstvu i sirarstvu na otoku Braču. *Gospodarski list*. 3:40–42.

MIOČ, B. – PAVIĆ, V. – BARAĆ, Z. (1998): Odlike eksterijera ličke pramenke. *Stočarstvo.* 52:93–98.

MIOČ, B. – PAVIĆ, V. – IVANKOVIĆ, A. – BARAĆ, Z. – VNUČEC, I. – ČOKLJAT, Z. (2004): Odlike eksterijera i polimorfizmi proteina krvi krčke ovce. *Stočarstvo.* 58:331–341.

MIOČ, B. – PAVIĆ, V. – BARAĆ, Z. – SUŠIĆ, V. – PRPIĆ, Z. – VNUČEC, I. – MULC, D. (2006): Vanjština rapske ovce. *Stočarstvo.* 60:163–171.

MIOČ, B., – PAVIĆ, V., – BARAĆ, Z., – VNUČEC, I., – PRPIĆ, Z., – MULC, D., – ŠPEHAR, M. (2011): *Program uzgoja ovaca u Republici Hrvatskoj.* Hrvatski savez uzgajivača ovaca i koza, Zagreb, Croatia.

PAVIĆ, V. – MIOČ, B. – BARAĆ, Z. – VNUČEC, I. – SUŠIĆ, V. – ANTUNAC, N. – SAMARDŽIJA, D. (2005): Vanjština paške ovce. *Stočarstvo.* 59:83–90.

PAVIĆ, V. – MIOČ, B. – SUŠIĆ, V. – BARAĆ, Z. – VNUČEC, I. – PRPIĆ, Z. – ČOKLJAT, Z. (2006): Vanjština creske ovce. *Stočarstvo.* 60:3–11.

PRPIĆ, Z. – ZORKO, J. – VNUNEC, I. – MULC, D. (2019): Porodna masa i odlike rasta muške janjadi hrvatskih izvornih pasmina ovaca. *Proceedings of the 54th Croatian and 14th International Symposium on Agriculture*, Vodice, Croatia, 501–505.

SUŠIĆ, V. – EKERT KABALIN, A. – ŠTOKOVIĆ, I. – PAVIČIĆ, Ž. – MIOČ, B. – PAVIĆ, V. – BARAĆ, Z. (2008): Paška ovca: učestalost janjenja i porodna masa janjadi tijekom zimsko-proljetne sezone. *Proceedings of the XVI Mediterranean Federation for Health and Production of Ruminants*, Zadar, Croatia, 521–525.

VOJNOVIĆ, F. (1991): Suvremena demogeografska obilježja srednjodalmatinskih otočnih općina. MSc Thesis, Faculty of Science, University of Zagreb, Zagreb, Croatia.

ZDANOVSKI, N. (1947): Preradba ovčjeg mlijeka na otoku Braču. *Stočarstvo*. 1:34–36.