

RESEARCH ON THE INFLUENCE OF COLOR VARIETY ON BODY DEVELOPMENT OF THE KARAKUL OF BOTOȘANI LAMBS

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Abstract

Research on the influence of color variety on body development of the Karakul of Botoșani lambs was carried out by determining their body indices from birth after product identification. The assessment of the influence of the color variety of Karakul of Botoșani products on their body measurements was carried out at the time of performance evaluation for the production of pelts. In order to highlight the results obtained, Karakul of Botoșani products were analyzed from the point of view of the influence of the color variety of which they are part on the height at the withers, the height at the rump, the thoracic perimeter and also the depth of the chest. Following the research carried out on the influence the color variety on the body measurements of the Karakul of Botoșani lambs at calving, the obtained results indicated a statistically significant relationship between the body measurements of the products and the color variety of which they belong. The data obtained at calving indicated higher average measurements within the batches with products from the black varieties (38.85 cm - height at the withers, 41.36 cm - height at the rump, 39.18 cm - thoracic perimeter, 16.04 cm - chest depth) compared to those obtained by the batches with products from the gray color varieties (38.01 cm - height at the withers, 40.06 cm - height at the rump, 38.12 cm - thoracic perimeter, 15.57 cm - chest depth).

Key words: body measurements, body indices, lambs, Karakul of Botoșani

INTRODUCTION

The research on the body measurements of the Karakul of Botoșani lambs was carried out in the creative unit of this sheep breed, named the "Research and Development Station in the Breeding of Sheep and Goats (R.D.S.B.S.G.)-Popăuți Botoșani". The current situation at the national level regarding the breeding of Karakul of Botoșani sheep requires the identification of innovative technical solutions capable of obtaining in the breeding units both young replacement sheep that correspond from the point of view of physical development, but also with a view to capitalizing on production of meat of the lambs that do not meet the criteria for retention in the sow or with a view to slaughtering them for the production of pelts.

Karakul of Botoșani sheep belong to a breed specialized for the production of pelts, but the meat production skills of this sheep breed should not be neglected due to the well-established characters for this production (Buzu I, 2014).

The research carried out will allow the identification within which color varieties of this breed have the best results obtained in terms of growth and body development in young lambs (Shoeman S.J., 1968). Within the Karakul of Botoșani breed, there are color varieties approved with the appearance of this breed with a high degree of improvement, but also color varieties recently approved or in the process of being approved with a lower degree of improvement (Buzu I, 2018). The current trend of decreasing market demand for the production of pelts both nationally and

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internationally lead to the need to introduce in the breeding program of the Karakul of Botoșani breed specific objectives for meat production in order to maintain the local and regional importance of the sheep belonging to this breed.

MATERIAL AND METHOD

The biological material used for the study on the influence of color variety on the growth and physical development of the Karakul of Botoșani sheep breed was from R.D.S.B.S.G.-Popăuți from Botoșani county. The study batch for the assessment of the influence of the color variety on the body measurements of Karakul of Botoșani products was composed at the initiation of the study from 617 lambs of the current year from the black, grayish, brown and gray color varieties obtained in the 2021 calving campaign. In order to highlight the aspects related to the growth and body development of the products, aspects related to body indices were analyzed by performing body measurements at calving.

The evaluation of the body measurements of the Karakul of Botoșani products was carried out with the help of the zoometer for height and depth measurements and with the help of the zootechnical roulette for perimeter measurements. The data obtained during the analysis period were centralized with the help of the calculation application MsExcel 2007, with the help of which the corresponding variation strings were drawn up, within which each one was coded in accordance with the specifics of the analyzed parameters.

For the statistical processing of the data from the study obtained as a result of the assessment of body measurements, the Microsoft Excel program was used, which allowed planning, collection, access, preparation, data management and presentation of the results, and version 26 of the IBM SPSS (Statistical Product and Service Solutions) software. Continuous variables were analyzed for normality and then expressed as mean±standard deviation, minimum and maximum (Popa M, 2008). To compare the averages of parameters between groups, the Student t test was used (in the case of comparing 2 groups), respectively the One-Way ANOVA

method (for multiple groups). A value of the coefficient of statistical significance $p < 0.05$ was considered significant.

Study batches were formed with products from the Karakul of Botoșani breed, the batches being differentiated from the point of view of the color variety of which the products are a part. The color varieties analyzed for the assessment of the calving weight of the products were from the black color variety, the grayish variety, the gray variety, the brown variety. The qualitative variables studied in the research are: sex, age category, color variety. The evaluated quantitative variables are represented by: the height at the withers of the products, the height at the croup of the products, the thoracic perimeter of the product, the depth of the chest, body weight.

The batches formed were maintained in similar conditions from the point of view of the technological factors that can directly influence the growth and body development of the products, thus to determine if there is a significant relationship between the color variety of Karakul of Botoșani products and their body measurements.

RESULTS AND DISCUSSIONS

Within the Karakul of Botoșani breed, the assessment of the qualitative characteristics of the curl and the assessment of the body weight is carried out in the first 24 hours after calving (Pascal C., 2015). On the basis of these results obtained following the evaluation of the properties, the further destination of the so products is also established: slaughter for the production of skins, retention for the reproduction, directed to meat production (Pascal C., 2019).

The evaluation of the body indices of the products of the Karakul of Botoșani breed was carried out at calving at the time of the assessment for the production of pelts. The physical indices analyzed are:

- height at the withers;
- height at the croup;
- thoracic perimeter;
- thorax depth.

According to the experimental protocol, measurements were made to assess the body indices of the Karakul of Botoșani lambs at

calving. The data obtained as a result of the assessment of the height at the withers of the products at calving were centralized and analyzed from a statistical point of view and are presented in table 1. To assess the height at the withers of the young Karakul of Botoșani sheep at calving, a number of 617 individuals were analyzed, obtained in the 2021 calving campaign within the R.D.S.B.S.G.-Popăuți. Their distribution according to the variety was thus 55 individuals from the grayish color variety, 151 individuals from the grayish color variety, 151 individuals from the brown color variety, 221

individuals from the black color variety and 190 individuals from the gray color variety.

To determine if there is a significant relationship between the height at the withers of the products at calving and the color variety, we used the One-Way ANOVA analysis of variance. By analyzing the data presented in table 1, it is shown that there is a different height at the withers at calving of the Karakul of Botoșani products depending on the color variety of which they belong ($F=11.372$; $p<0.001$).

Table 1. Height at the withers at calving Karakul of Botoșani lambs

Height at the withers at calving (cm)								
Color variety	N	Mean	Standard deviation	Standard error	Minimum	Maximum	F	p
Grayish Variety	55	38.85	2.040	.275	35	44	11.372	.000
Brown Variety	151	37.98	2.115	.172	30	44		
Black Variety	221	39.11	2.550	.172	30	45		
Gray Variety	190	38.01	2.122	.154	30	43		
Total	617	38.47	2.333	.094	30	45		

It is noted that the average height at the withers at calving for the analyzed Karakul of Botoșani products was 38.47 cm. The products belonging to the grayish color variety had an average height at the withers of 38.85 cm, the products from the brown variety 37.98 cm, the products from the black color variety 39.11 cm and those from the gray color variety with an average of the height at the withers of 38.01 cm

The height at the withers of Karakul of Botoșani products at calving according to the color variety is graphically represented in figure 1.

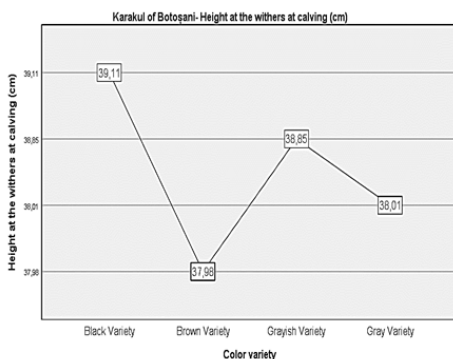


Fig. 1 Height at the withers at calving

Table 2. Height at the withers at calving

Height at the withers (cm)				
(I) Color variety	(J) Color variety	Mean dif. (I-J)	Std. Error	p
Grayish	Brown	.874	.359	.090
	Black	-.259	.343	1.000
	Gray	.849	.349	.091
Brown	Grayish	-.874	.359	.090
	Black	-1.133 [*]	.240	.000
	Gray	-.025	.248	1.000
Black	Grayish	.259	.343	1.000
	Brown	1.133 [*]	.240	.000
	Gray	1.108 [*]	.225	.000
Gray	Grayish	-.849	.349	.091
	Brown	.025	.248	1.000
	Black	-1.108 [*]	.225	.000

.The difference between the means is statistically significant at a threshold of 0.05.

The height at the withers of the products is influenced by their color variety, to highlight the differences regarding the height at the withers of the products and the color variety we applied the Bonferroni post hoc test (table 2). The results indicated higher heights at the withers of the products from the black varieties compared to the brown and gray variety products.

In order to highlight the influence of the color variety on the rump height of Karakul of Botoșani products at calving, we used the Anova One-Way variance analysis method. By analyzing the data presented in table 3, it can be seen that with regard to the height at the rump, the average obtained by the 617 individuals analyzed was 40.63 cm. The highest value of height at the rump was obtained by the individuals from the black variety with m=41.36 cm, followed by the

individuals from the gray variety with m=40.98 cm, those from the brown variety with m=40, 15 cm and the products of the gray color variety with m=40.06 cm. The results of the statistical analysis showed that the differences in the rump height of the products of the Karakul breed at calving are statistically significant (F=12.599, p<0.001). It can be stated that the rump height at calving of Karakul of Botoșani products is influenced by their color variety.

Table 3. Height at the rump at calving Karakul of Botoșani lambs

Height at the rump at calving (cm)								
Color variety	N	Mean	Standard deviation	Standard error	Minimum	Maximum	F	p
Grayish Variety	55	40.98	2.321	.313	37	46	12.599	.000
Brown Variety	151	40.15	2.249	.183	34	46		
Black Variety	221	41.36	2.655	.179	34	48		
Gray Variety	190	40.06	2.267	.164	34	46		
Total	617	40.63	2.481	.100	34	48		

To highlight the differences in rump height between the four analyzed color varieties, we applied the Bonferroni post hoc test. The results of the statistical analysis indicate significantly higher heights in the products of the black color variety compared to the products of the brown and gray color variety. (Table 4). The rump height of Karakul of Botoșani products at calving is graphically represented in figure 2.

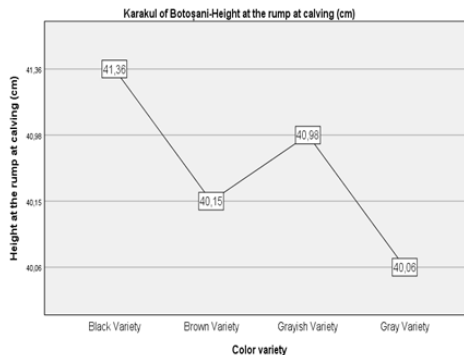


Fig. 2 Height at the rump at calving

Table 4 Height at the rump at calving

Height at the rump (cm)				
(I) Color variety	(J) Color variety	Mean dif. (I-J)	Std. Error	p
Grayish	Brown	.836	.380	.169
	Black	-.376	.364	1.000
	Gray	.919	.370	.079
Brown	Grayish	-.836	.380	.169
	Black	-1.212*	.255	.000
	Gray	.083	.263	1.000
Black	Grayish	.376	.364	1.000
	Brown	1.212*	.255	.000
	Gray	1.294*	.239	.000
Gray	Grayish	-.919	.370	.079
	Brown	-.083	.263	1.000
	Black	-1.294*	.239	.000

. The difference between the means is statistically significant at a threshold of 0.05.

According to the experimental protocol, the control groups with Karakul of Botoșani products were evaluated from the point of view of the thoracic perimeter at calving. The data on the average chest perimeter obtained by the products within the study groups are presented in table 5. Through the analysis and interpretation of the data on the chest perimeter of the products, we observe an average of the chest perimeter of m=39.18 cm for the products in the color variety black, the brown variety with m=38.50 cm, the grayish variety with m=38.47 cm and those from the gray color variety with m=38.12 cm.

Table 5. Thoracic circumference at calving Karakul of Botoșani lambs

Thoracic circumference at calving (cm)								
Color variety	N	Mean	Standard deviation	Standard error	Minimum	Maximum	F	p
Grayish Variety	55	38.47	2.284	.308	35	43	6.479	.000
Brown Variety	151	38.50	2.343	.191	32	47		
Black Variety	221	39.18	2.685	.181	32	46		
Gray Variety	190	38.12	2.377	.172	32	43		
Total	617	38.62	2.509	.101	32	47		

In order to highlight the influence of the color variety on the thoracic perimeter of products from the Karakul of Botoșani breed, we applied the One-Way Anova analysis of variance, the results obtained from the analysis of variance indicated the presence of a statistically significant difference in terms of the thoracic perimeter of the products at calving ($F=6.479$; $p<0.001$).

As in the case of the other evaluations, to highlight the differences regarding the thoracic perimeter of the products, we applied the Bonferroni post hoc test. The results of the statistical analysis are presented in table 6 and indicate a more developed thorax of the products of the black color variety compared to that of the products of the gray color variety. The differences between the other analyzed color varieties being insignificant.

Table 6. Thoracic perimeter at calving

Thoracic perimeter (cm)				
(I) Color variety	(J) Color variety	Mean dif. (I-J)	Std. Error	p
Grayish	Brown	-.024	.390	1.000
	Black	-.704	.373	.359
	Gray	.352	.379	1.000
Brown	Grayish	.024	.390	1.000
	Black	-.680	.261	.057
	Gray	.376	.270	.988
Black	Grayish	.704	.373	.359
	Brown	.680	.261	.057
	Gray	1.055*	.245	.000
Gray	Grayish	-.352	.379	1.000
	Brown	-.376	.270	.988
	Black	-1.055*	.245	.000

.The difference between the means is statistically significant at a threshold of 0.05.

The thoracic perimeter of Karakul of Botoșani products at calving is graphically represented in figure 3.

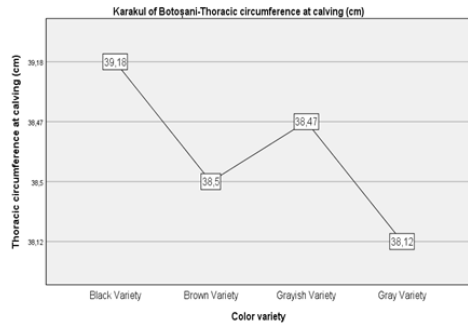


Fig. 3 Thoracic perimeter at calving

The study lot with products from the Karakul of Botoșani breed was evaluated from the point of view of torax depth at calving, the data obtained were centralized and analyzed from the point of view of the average chest depth (Table 7).

The influence of the color variety of products from the Karakul of Botoșani breed on the depth of the thorax at calving is highlighted by applying the Anova-OneWay analysis of variance test. The results of the test showed that the differences regarding the depth of the chest of the products at calving are significant depending on the color variety they belong to ($F=4.843$, $p<0.05$).

As a result of the analysis and interpretation of the data regarding the average thorax depth determined at calving for the Karakul of Botoșani sheep breed, it can be stated that the best results were obtained in the batch with products from the black color variety $m=16.04$ cm, followed by the products belonging to the brown color variety with $m=15.84$ cm, then the products from the grayish color variety $m=15.73$, followed by the products belonging to the gray color variety $m=15.57$. An average chest depth of 15.80 cm can be observed for all analyzed products (Table 7).

Table 7. Thorax depth at calving Karakul of Botoșani lambs

Thorax depth at calving (cm)								
Color variety	N	Mean	Standard deviation	Standard error	Minimum	Maximum	F	p
Grayish Variety	55	15.84	1.398	.188	14	20	4.843	.002
Brown Variety	151	15.73	1.166	.095	12	19		
Black Variety	221	16.04	1.381	.093	12	21		
Gray Variety	190	15.57	1.165	.085	12	18		
Total	617	15.80	1.280	.052	12	21		

Through the presented, it can be stated that the depth of the thorax at calving for products from the Karakul of Botoșani breed is influenced by their color variety. To highlight these differences regarding the depth of the chest in the Karakul of Botoșani products, we applied the Bonferroni post hoc test (Table 8).

Table 8. Thorax depth at calving

Thorax depth (cm)				
(I) Color variety	(J) Color variety	Mean dif. (I-J)	Std. Error	P
Grayish	Brown	.108	.200	1.000
	Black	-.200	.191	1.000
	Gray	.268	.194	1.000
Brown	Grayish	-.108	.200	1.000
	Black	-.308	.134	.131
	Gray	.160	.138	1.000
Black	Grayish	.200	.191	1.000
	Brown	.308	.134	.131
	Gray	.468*	.125	.001
Gray	Grayish	-.268	.194	1.000
	Brown	-.160	.138	1.000
	Black	-.468*	.125	.001

. The difference between the means is statistically significant at a threshold of 0.05.

Thorax depth at calving for the products of the analyzed Karakul of Botoșani breed is represented graphically in figure 4.

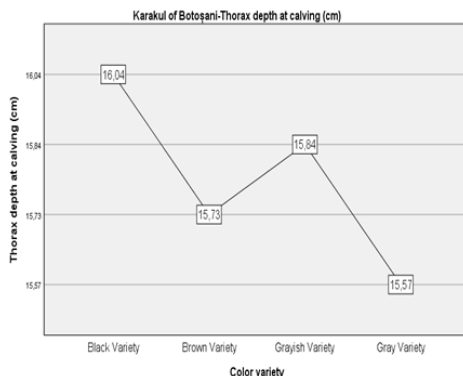


Fig. 4 Thorax depth at calving

The results of the statistical analysis revealed significant differences in the depth of the thorax at calving for Karakul of Botoșani products from the black variety compared to those belonging to the gray color variety.

CONCLUSIONS

Regarding the height at the withers of Karakul of Botoșani products at calving and their color variety, there is a significant relationship, resulting from the application of the One-Way ANOVA test ($F=11.372$; $p<0.001$). The results indicated significantly higher heights at the withers at calving in the lot with lambs from the black variety compared to products belonging to the brown and gray varieties. The average height at the withers at calving for the analyzed Karakul of Botoșani products was 38.5 cm.

The height at the rump of the products of the Karakul of Botoșani breed is significantly statistically influenced by their color variety. The results of the Anova OneWay analysis showed that the differences in the rump height of the products of the Karakul of Botoșani breed at calving are statistically significant ($F=12.599$, $p<0.01$). The highest value of height at the rump was obtained by the individuals from the black variety with $m=41.36$ cm, followed by the individuals from the grayish variety with $m=40.98$ cm, those from the brown variety with $m=40.15$ cm and the products of the gray color variety with $m=40.06$ cm. The Bonferroni post-hoc test results indicated higher rump heights for products from the black variety compared to products from the brown and gray varieties.

The thoracic perimeter of the products of the Karakul of Botoșani breed at calving is influenced by the color variety of which they are part, by applying the One-Way ANOVA test, the result was $F=6.479$; $p<0.001$.

Therefore, their thoracic perimeter is statistically influenced by the color variety to which the products belong. The average thoracic perimeter at calving was 39.18 cm for the products of the black variety, followed by the products of the brown variety with 38.50 cm, the products of the grayish variety with 38.47 cm and those of the gray color variety by 38.12 cm. The results of the statistical analysis indicate a more developed thoracic perimeter of the products from the black color variety compared to that of the products from the gray color variety.

Regarding the depth of the thorax of Karakul of Botoșani products at calving, the result of the analysis of variance indicated the presence of a statistically significant difference ($F=4.843$, $p<0.05$). As in the case of the thoracic perimeter of Karakul of Botoșani products Botoșani at calving, the individuals from the black color variety have the highest average ($m=16.04$ cm), followed by the grayish color ($m=15.84$ cm), then the brown ones ($m=15.73$ cm) respectively the gray color variety ($m=15.57$ cm).

The data presented indicate that the body measurements of Karakul of Botoșani products at calving are influenced by the color variety to which they belong.

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