

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

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Abstract

Research on the influence of color variety on growth intensity and body weight of the lambs of Karakul de Botoșani breed was carried out by determining their body weight from birth, after identifying the products. The assessment of the influence of the color variety of Karakul de Botoșani products on their body weight was made at birth, at 30 days, at 90 days and 180 days.

For the statistical processing of the study data obtained as a result of the assessment of body weight, the Microsoft Excel program was used which allowed planning, collection, access, preparation, data management and presentation of results and version 26 of IBM SPSS (Statistical Product and Service Solutions) software. Continuous variables were analyzed for normality and then expressed by mean \pm standard deviation, minimum and maximum (Popa M, 2008). The Student's *t* test (when comparing 2 groups) and the ANOVA One-Way method (for multiple groups) were used to compare the averages of the parameters between groups. A value of statistical significance coefficient $p < 0.05$ was considered significant.

In order to highlight the results obtained regarding the body weight of Karakul de Botoșani products, they were analyzed both from the point of view of the color variety of which they are part but also from the point of view of their sex.

Following the research on the influence of color variety on the body weight of young sheep of the Karakul de Botoșani breed, the results obtained indicated a statistically significant link between the body weight of the products and the color variety of which they are part. The data obtained indicated higher average body weights in the batches with products of the black varieties (5.35 kg at calving, 13.30 kg at 30 days, 28.40 kg at 90 days and 37.90 kg at 180 days) compared to those obtained from batches of white varieties (4.23 kg at calving, 9.80 kg at 30 days, 17.10 kg at 90 days and 25.80 kg at 180 days).

Key words: growth intensity, body weight, lamb, Karakul de Botoșani

INTRODUCTION

The researches regarding the growth intensity of the lambs from the Karakul of Botoșani breed were carried out in the creative unit of this sheep breed, respectively "Research and Development Station in Sheep and Goat Breeding - Popăuți Botoșani". Due to the current situation in our country regarding sheep breeding, it is necessary to find innovative technical solutions capable of satisfying the requirements of Karakul of Botoșani sheep breeders in order to obtain a replacement youth that corresponds in terms of body development, but also in order to

capitalize for the production of meat products that do not meet the criteria for retention in breeding or in order to slaughter them for the production of skins.

Karakul of Botoșani sheep belong to a specialized breed for the production of skins, but the meat production skills of this breed of sheep should not be neglected due to the well-established characteristics for this production. The current downward trend in market demand for fur production both nationally and internationally leads to the need to introduce in the Karakul de Botoșani breed improvement program specific meat production targets to maintain the local and regional importance of sheep belonging to this breed. It is estimated that the reorientation towards meat production of

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Karakul of Botoșani sheep is a sustainable solution for the current context.

MATERIAL AND METHOD

The biological material studied for the appreciation of the growth intensity of the Karakul of Botoșani sheep breed is represented by the Karakul of Botoșani products obtained within the Research and Development Station in Breeding Sheep and Goats Popăuți Botoșani, creative unit of this breed of sheep. The study group was represented by the products obtained during the calving campaign in 2020. The analysis period for the evolution of the body weight of the products was January 2020-September 2020 composed at the beginning of the study of 667 products belonging to the Karakul of Botoșani breed.

The assessment of the body weight of the products was made with the help of the electronic scale, at different time intervals: at calving, at 30 days, at 90 days and at 180 days according to the experimental protocol. 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 was coded according to the specifics of the analyzed parameters.

Study batches were formed with products from the Karakul of Botoșani breed, the batches being differentiated in terms of the variety of color of which the products are part. The color varieties analyzed for the weighting of the products were from the black variety, the gray variety, the brown variety, the white variety, the pink variety, but also products belonging to color varieties with a smaller number of individuals in within this breed of sheep, respectively the spotted variety, the twig and the halili variety. For the other reference ranges analyzed, products belonging to these color varieties were excluded from the study group.

The formed batches were maintained in similar conditions in terms of technological factors that can directly influence the growth and body development of the products, so as to determine whether there is a significant link between the color variety of Karakul of Botoșani lambs and their body weight. . All assessments were made after a 12-hour fasting

period in which the access of individuals within the study group to food sources was restricted, thus avoiding the occurrence of errors caused by food consumption.

RESULTS AND DISCUSSIONS

Within the Karakul of Botoșani breed, the appreciation of the qualitative qualities of the looping and the appreciation of the body weight are made in the first 24 hours after calving. Based on these results obtained from the evaluation of the properties, the subsequent destination of such products is established: slaughter for the production of skins, restraint for own breeding, retention for breeding, directing to meat production (Pascal C, 2019).

Body weight of farrowing products is influenced by a number of factors such as:

- type of pregnancy: simple, twin
- the physiological condition of the sheep
- type of gestation: primiparous, multiparous;
- sex of the fetus: male, female;
- the degree of improvement of the color variety;
- feeding sheep during pregnancy (Pascal C.2015).

According to the experimental protocol, measurements were performed to assess the body weight of the Karakul of Botoșani lambs during calving. The data obtained as a result of the assessment were centralized and analyzed statistically and are presented in table 1.

To determine whether there is a significant link between birth weight and color variety, we used ANOVA One-Way variance analysis. The analysis of the data presented in table 1 shows that there is a different birth weight of Karakul of Botoșani lambs depending on the color variety of which they are part ($F = 21,281$; $p < 0.001$). The literature indicates an average body weight of Karakul de Botoșani products during calving of 4 -5 kg, the data obtained indicate an average body weight that falls within this breed standard (4.71 kg). The results obtained by the products belonging to the Karakul de Botoșani breed in terms of body weight at calving are superior compared to those of the Țurcană breed where the body weight of the products is 3.60 kg for males and 3.10 kg for females.

Table 1 Body weight at calving of the Karakul of Botoșani

Body weight at calving of the Karakul of Botoșani							
	N	Mean	Standard deviation	Minimum	Maximum	F	p
Black	200	5,35	1,09144	2,50	9,20	21,281	,000
Grayish	36	5,02	,85249	3,60	7,10		
Brown	130	4,43	,95019	2,00	6,50		
Gray	186	4,38	,74381	1,80	6,50		
White	39	4,23	,62414	2,90	5,30		
Pink	45	4,42	,80093	2,50	6,30		
Halili	11	4,55	,68317	3,70	6,10		
Twing	3	5,47	,35119	5,10	5,80		
Spotted	17	3,99	,88910	2,60	5,80		
Total	667	4,71	1,01196	1,80	9,20		

Research to highlight differences in the average calving weight of Karakul of Botoșani individuals by sex is shown in table

2. These indicated an average male weight of 4.87 kg, while the average weight of females was 4.55 kg.

Table 2 Body weight at calving of the Karakul of Botoșani by sex

Body weight at calving of the Karakul of Botoșani						
	Sex	N	Mean	Standard deviation	t	p
Body weight at calvin	Male	327	4,87	1,11853	4,134	,000
	Female	340	4,55	,87084		

To compare the average body weights of the two sexes we used the t test for independent study samples. Assumptions of the t test:

H0: There is no significant difference between the two sexes in terms of average weight.

H1: There is a significant difference between the two sexes in terms of average weight.

Since the significance threshold p was much lower than the threshold value of 0.05 ($p < \alpha$ (0.05)), the hypothesis H1 is accepted, ie there is a statistically significant difference between the two sexes in terms of body weight at calving, males in the analyzed group having a significantly higher weight than females. Thus, the analysis of the presented data confirms the research hypothesis according to which the birth weight of Karakul of Botoșani lambs is influenced by the sex.

The study group was analyzed in terms of body weight at 30 days for each existing color variety within the breed (Table 3).

Table 3 Weight Karakul of Botoșani at 30 days

Color variety	Mean of body weight at 30 days (kg)			
	Male		Female	
	\bar{X}	n	\bar{X}	n
Black	15.00	15	12.80	54
Grayish	14.30	1	11.50	6
Brown	13.20	2	11.50	22
Gray	11.90	10	10.90	27
White	10.80	2	9.60	12
Pink	10.90	1	10.80	8

As we observe the highest value in terms of body weight of the products 30 days after calving, the Karakul of Botoșani breed is registered in the black variety, respectively a value of 15.00 kg for males and 12.80 kg for females. The lowest value in terms of body weight is recorded in the white variety, ie an average weight of 10.80 kg for male products and 9.60 kg for female products.

In order to highlight the influence of color variety on the body weight of Karakul of Botoșani products at the age of 30 days, we used the method of analysis of the Anova One-Way variant. The data obtained are presented in table 4. We observe a higher average body weight in individuals within the

black variety compared to other varieties of color and a significantly lower average body weight in products belonging to the white

variety compared to other varieties existing in within the lot.

Table 4 Body weight Karakul of Botoşani at 30 days

Body weight Karakul of Botoşani at 30 days							
Color variety	N	Mean	Standard deviation	Minimum	Maximum	F	p
Black	69	13,30	1,57967	9,20	17,10	21,406	,000
Grayish	7	11,90	1,73738	8,90	14,40		
Brown	24	11,60	1,34192	9,30	14,30		
Gray	37	11,10	1,29189	8,90	13,70		
White	14	9,80	1,44920	7,20	11,90		
Pink	9	10,80	1,11087	8,70	12,30		
Total	160	12,01	1,86925	7,21	17,13		

The results of the statistical analysis also show that the differences are statistically significant between the different color varieties in terms of body weight of the Karakul of Botoşani products at 30 days ($F = 21,406$; $p < 0.001$) (Table 4).

According to the experimental protocol, the control batches with Karakul of Botoşani lambs were evaluated in terms of body weight at the age of 90 days. According to the specialized literature, the average body weight of the young sheep of the Karakul of Botoşani breed at the time of weaning can reach 18-20 kg. It can be seen that the average body weight of the analyzed products (24.20 kg) is higher than indicated by the literature. Prior to the determinations, the products were subjected to a fasting period, limiting their access to food for a period of 12 hours. Data on the evolution of the average body weight obtained from the products in the study groups are presented in Table 5.

Table 5 Mean of body weight of the Karakul of Botoşani at 90 days

Mean of body weight at 90 days (kg)				
Color variety	Male		Female	
	\bar{X}	n	\bar{X}	n
Black	29.7	15	28.0	54
Grayish	26.7	1	25.6	6
Brown	22.4	2	21.7	22
Gray	22.1	10	21.3	27
White	18.7	2	16.8	12
Pink	23.6	1	20.6	8

By analyzing and interpreting the data on average body weights determined at 90 days after birth, it can be stated that regarding the evolution of body weight in young sheep of the Karakul of Botoşani breed, the highest value was recorded in the black variety, respectively 29, 7 kg for male youth and 28.0 kg for female lambs (Table 5). Regarding the lowest values obtained, they were registered in the white variety with 18.7 kg for male products and 16.8 kg for female products.

In order to highlight the influence of the color variety of the Karakul of Botoşani products on the body weight of the products at the age of 90 days, the analysis of the Anova One-Way variance was applied, the results indicated a semnificative diference regarding that the body weight of products at the age of 90 days ($F = 101.056$; $p < 0.001$). The data obtained from the statistical analysis are presented in Table 6.

As in the case of the body weight of the products of the Karakul of Botoşani breed at 30 days, the highest average is held by individuals from the black variety ($m = 28.40$ kg), followed by those of the grayish color ($m = 25, 80$ kg), then brown ($m = 21.80$ kg), gray ($m = 21.50$ kg), respectively pink ($m = 20.90$), and the white ones having the highest average weight reduced ($m = 17.10$ kg) (Table 6). The data obtained indicate that the body weight of Karakul de Botoşani products at the age of 90 is influenced by the variety of color from which they belong.

Table 6 Body weight Karakul of Botoșani at 90 days

Body weight Karakul of Botoșani at 90 days							
Color variety	N	Mean	Standard deviation	Minimum	Maximum	F	p
Black	69	28,40	2,46267	23,20	33,70	101,056	,000
Grayish	7	25,80	2,48908	21,20	29,00		
Brown	24	21,80	1,81368	18,60	25,00		
Gray	37	21,50	1,75769	18,60	25,40		
White	14	17,10	1,70151	14,50	19,30		
Pink	9	20,90	2,75080	16,80	23,80		
Total	160	24,20	4,46767	14,50	33,70		

The study group with Karakul of Botoșani products was assessed in terms of body weight at the age of 180 days, the data obtained were centralized and analyzed in terms of average body weight, the data are presented in table 7.

Table 7 Mean of body weight of the Karakul of Botoșani at 180 days

Mean of body weight at 180 days (kg)				
Color variety	Male		Female	
	\bar{X}	n	\bar{X}	n
Black	45.40	15	35.90	54
Grayish	41.20	1	29.90	6
Brown	42.50	2	29.20	22
Gray	44.40	10	27.30	27
White	32.10	2	24.80	12
Pink	31.80	1	28.40	8

Following the analysis and interpretation of the data on average body weights determined at the age of 180 days of the young sheep of the Karakul of Botoșani breed, it can be stated that the best results were obtained in the group with products of the black variety, respectively an average body weight of 45.40 kg for male products and a weight of 35.90 kg for female products. The lowest body weight values at the age of 180 days were obtained in the batch with products of the pink variety

with an average body weight of 31.80 kg for males and 24.80 kg for females from within the white variety (Table 7).

According to the experimental protocol, in order to highlight the influence of the color variety of the Karakul of Botoșani lambs on the body weight at the age of 180 days, we applied the method of analysis of the Anova One-Way variant. And in the case of body weight at 180 days, the classification by color varieties is maintained, the differences between them being statistically significant ($F = 16,593$; $p < 0.001$). In table 8. with descriptive statistics the average weight values at 180 days can be tracked depending on the color variety.

As in the case of the body weight of the products of the Karakul of Botoșani breed at 90 days, the highest average is the individuals within the black variety ($m = 37.90$ kg), followed by the gray ones ($m = 31,90$ kg), then the brown ones ($m = 31.50$ kg), brown ($m = 30.30$ kg), respectively pink ($m = 28.80$), and the white ones with the highest average weight reduced ($m = 25.80$ kg) (Table 8). The data obtained indicate that the body weight of the Karakul of Botoșani products at the age of 180 is influenced by the variety of color from which they belong.

Table 8 Body weight Karakul of Botoșani at 180 days

Body weight Karakul of Botoșani at 180 days							
Color variety	N	Mean	Standard deviation	Minimum	Maximum	F	p
Black	66	37,90	4,92486	29,40	50,70	16,593	,000
Grayish	7	31,50	5,52158	23,70	41,20		
Brown	24	30,30	4,81434	23,90	43,20		
Gray	37	31,90	8,00920	23,40	46,20		
White	14	25,80	3,80460	20,40	33,10		
Pink	9	28,80	3,95062	22,70	33,20		
Total	157	33,50	6,98688	20,40	50,70		

CONCLUSIONS

Regarding the weight at calving of the products of the Karakul of Botoșani breed and the variety of their color there is a significant connection, resulting from the application of the ANOVA One-Way test ($F=21,281$; $p < 0.001$). The results indicated significantly higher average body weights at calving in the group with black and grayish products compared to products belonging to the other color varieties.

The calving weight of the Karakul of Botoșani lambs is statistically significantly influenced by the sex of the product. Thus, there is a significant difference between the two sexes in terms of the average birth weight of the products, as the significance threshold p was much lower than the threshold value of 0.05 ($p < \alpha (0.05)$), it was accepted. The research hypothesis that males have a significantly higher body weight at calving than females.

The body weight of the products of the Karakul of Botoșani breed at the age of 30 days is influenced by their color variety, by applying the ANOVA One-Way test it resulted in $F = 21,406$; $p < 0.001$. Therefore, their weight is statistically influenced by the color variety, thus the black variety obtaining a significantly higher body weight, while the products of the white variety obtained low results compared to the other varieties.

Regarding the body weight of the products at the age of 90 days, the result of the analysis of variance indicated the presence of a statistically significant difference ($F = 101,056$; $p < 0.001$). As in the case of the body weight of the Karakul of Botoșani breed products at 30 days, the highest average is the individuals from the black variety ($m = 28.40$ kg), followed by the grayish ($m = 25.80$ kg), then the brown ones ($m = 21.80$ kg), gray ($m = 21.50$ kg), respectively pink ($m = 20.90$), and the white ones having the lowest average weight ($m = 17.10$ kg). The data obtained indicate that the body weight of the Karakul of Botoșani products at the age of 90 is influenced by the variety of color from which they belong.

Statistical processing of data on the weight of the Karakul of Botoșani products at the age of 180 days depending on the variety of color to which they belong showed that the

differences between them being statistically significant ($F = 16,593$; $p < 0.001$). As in the case of the body weight of the products of the Karakul of Botoșani breed at 90 days, the highest average is the individuals within the black variety ($m = 37.90$ kg), followed by the gray ones ($m = 31$, 90 kg), then the grayish ones ($m = 31.50$ kg), brown ($m = 30.30$ kg), respectively pink ($m = 28.80$), and the white ones with the highest average weight reduced ($m = 25.80$ kg). The data obtained indicate that the body weight of the Karakul of Botoșani products at the age of 180 is influenced by the variety of color from which they belong.

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