

DETERMINING THE CURRENT STATE OF CURL SIZE IMPROVEMENT ON KARAKUL OF BOTOSANI BREED

I. Nechifor¹, A.M. Florea¹, A. Crîșmaru², C. Pascal^{1,2*}

¹Research and Development Unit for Sheep and Goat Breeding, Popăuți-Botoșani, Romania

²Iasi University of Life Sciences, Faculty of Food and Animal Sciences, Iasi, Romania

Abstract

The research carried out had as main objective the evaluation of the current level at which the degree of improvement of the Karakul of Botosani lambs curl size is found.

The biological material was represented by the lambs of the color varieties consolidated within the breed, respectively: black, grayish, brown, gray and pink. In order to obtain concrete results, the researches were performed on the generations of lambs resulting in lambing seasons from 2017, 2018 and 2019, respectively. The working method applied in the evaluation of the character represented by the size of the curl was the one presented in the official technical norms, specified in Section 1.4 and 1.5 of the MADR Order no. 22 / 20.01.2006.

The data obtained were subjected to a statistical processing process using the computer program S.A.V.C. (Statistics Analysis of Variance and Covariance 2003). To test the statistical significance of the differences between the averages of the values of the studied parameters as well as the correlations between them, the algorithms Analysis of Variables (ANOVA Single Factor) and the Pirson Correlation were used.

Given the fact that in the classic varieties, represented by black and grayish lambs, the average score is less than 7% compared to the maximum level that can be granted for this character, we can say that the improvement is in an advanced process. Among the colored varieties analyzed, the average score has a higher value in gray (23.11 ± 0.11), lower in pink (21.50 ± 0.50) and intermediate in brown (21.83 ± 0.19). Based on the results obtained, it can be stated that the improvement is in progress, and by directing reproduction and applying a sustained selection program, a shift in the desired direction of the expression of this character can be induced, with a direct beneficial effect on improving genetic structure.

Key words: pelts curl size, improvement, sheep, Karakul of Botosani

INTRODUCTION

The character represented by the size of the curl is extremely important in expressing a favorable quality of the skin because it is dependent on the ratio between the width and height of the curls. From this point of view, the skins on the surface of which the length and height of the curls have close dimensions in value are appreciated. In this case, the size is considered medium and the maximum score, meaning 25 points, is awarded when evaluating that character. If the curls with higher height dominate, this character is expressed as predominantly high shapes which are associated with a weaker

expression of the strength, gloss and degree of arching of the fibers.

Also, the existence of an inverse ratio is not desirable because it favors the appearance of a low, rough curl, with diminished reflection for gloss, but also with an indefinite modeling. The evaluation of the character expression represented by the size of the curl was analyzed based on the average score obtained following the evaluations that took place in the three generations of Karakul of Botosani lambs.

MATERIAL AND WORKING METHOD

The purpose of the research was to perform an objective analysis on the level of the process of improving the size of the curl on the surface of the Karakul of Botosani

*Corresponding author: pascalc61@yahoo.com

The manuscript was received: 24.09.2021

Accepted for publication: 25.01.2022

skins. In order to achieve the objectives analyzed during the research, several activities accepted by the experimental technique and suitable for the production of skins were performed.

The biological material subject to research belongs to the Karakul of Botosani breed, with known origin, included in one of the specific forms of production performance control, namely that based on evaluation in PP system (own performance) and control based on OP type evaluation (origin and productivity) obtained in three successive lambing seasons.

The working method used to assess the characters followed was based on the technical norms specified in Section 1.4 and 1.5 of the MADR Order no. 22 / 20.01.2006, published in the Official Gazette of Romania no. 146 of 15.02.2006 and in which are specified the aspects on how the control of skins production is performed.

Statistical data processing was based on the use of the computer program S.A.V.C. (Statistics Analysis of Variance and Covariance 2003). To test the statistical significance of the differences between the means of the values of the studied parameters as well as the correlations between them, the algorithms Analysis of Variables (ANOVA Single Factor) and the Pirson Correlation were used, both included in the computer program used.

RESULTS AND DISCUSSIONS

Considering the fact that in the breed Karakul of Botosani structure there are several varieties of color, the character represented by the size of the curls was analyzed for each of them and for each generation of lambs obtained in that time.

In the black variety, the average score obtained from more than 1500 lambs that were subjected to the assessments indicates different average values for each generation of lambs taken into account (Table 1).

Considering the fact that for the classic varieties, represented by black or grayish lambs, the average score is below 7% compared to the maximum level, being 23.40 ± 0.159 for black and 23.11 ± 0.09 for grayish lambs, we can say that the improvement for this character is certain and is found at a level close to the maximum desired threshold in improvement.

However, if the black variety recorded an increase of 0.283% in each of the three successive generations, the grayish variety, in 2019 generation, was obtained a decrease of 3.2% of individuals who were assessed with a maximum score compared to 2005. The main cause of this decrease is the increase in assessment requirements, the purpose being the desire of breeders to favor the emergence in new genotypes of individuals in which the uniformity of the curl to record new valences.

Table 1 Average score resulting from the assessment of the size of curls

Color variety	n	$\bar{X} \pm s_{\bar{X}}$	V%	% with dens curls				difference \pm 2005/2019 (%)	
				2005	2017	2018	2019	total	generation
Black	1501	23.40 \pm 0.15	14.83	71.55	77.40	74.32	74.38	2.83	0.283
Grayish	1181	23.11 \pm 0.09	13.65	70.32	69.73	66.86	67.05	- 3.2	-
Brown	428	21.83 \pm 0.19	18.12	48.25	44.62	48.95	55.15	6.90	0.69
Gray	103	22.60 \pm 0.15	15.27	49.17	60.07	60.18	55.62	6.45	0.645
Pink	530	21.50 \pm 0.50	23.66	46.22	50.01	57.90	56.01	9.79	0.979

Highlighting the effectiveness of long selection and identifying the current level of improvement of this character can be deduced from the comparison of current values with others obtained in different formation and growth stages of his breed. Thus, Marin, based on a study carried out in 1974 and 1977 respectively on lambs of the

same varieties specified that at 3.3% the curls were large, at 6.6% of medium-large type, at 13.6% medium small, at 60.9% of medium size and at 15.6% the curls were small.

In other research conducted by Hrinca et al. [1991, vol. VII, p 51] it is specified that in 48.23% of cases the curls were of medium size, in 34.02% of medium-small type, in

14.2% small and in only 3.55% in some cases the curls were large. Also, in other studies performed on the same breed the results obtained converge as meaning [1, 4, 5, 6].

Among the colored varieties analyzed, the average score has a higher value in the gray - being 23.11 ± 0.11 , lower in pink (21.50 ± 0.50) and intermediate in the brown variety (21.83 ± 0.19). Even at this level, it can be said that the improvement is supported by an efficient selection of breeders, and by directing the reproduction

can be induced a constant shift, the average score, to the maximum threshold of 25 points, in which case the highest proportion of lambs would also have a mostly medium-sized curl.

From the presentation of data on the proportion of individuals, by generation and variety of color, it can be seen that the black variety and grayish are close, but the trend is to increase the total number of lambs with a medium size of curls (table 2 and Fig. 1).

Table 2 The share of individuals with middle-size curls in relation to the variety of color

Color variety	n	Points		V%	% with maximum points			
		Maximum	$\bar{X} \pm s_{\bar{x}}$		2005	2017	2018	2019
Black	1158	100	91.42 ± 0.214	4.71	92.35	91.18	92.62	92.90
Grayish	1184	100	89.03 ± 0.336	12.28	75.77	73.39	76.92	78.91
Brown	431	75	67.07 ± 0.617	19.03	61.41	80.76	62.37	75.70
Gray	533	125	105.61 ± 0.45	9.88	57.40	67.57	75.12	78.82
Pink	106	100	81.12 ± 2.09	26.15	60.3	61.90	52.63	53.84

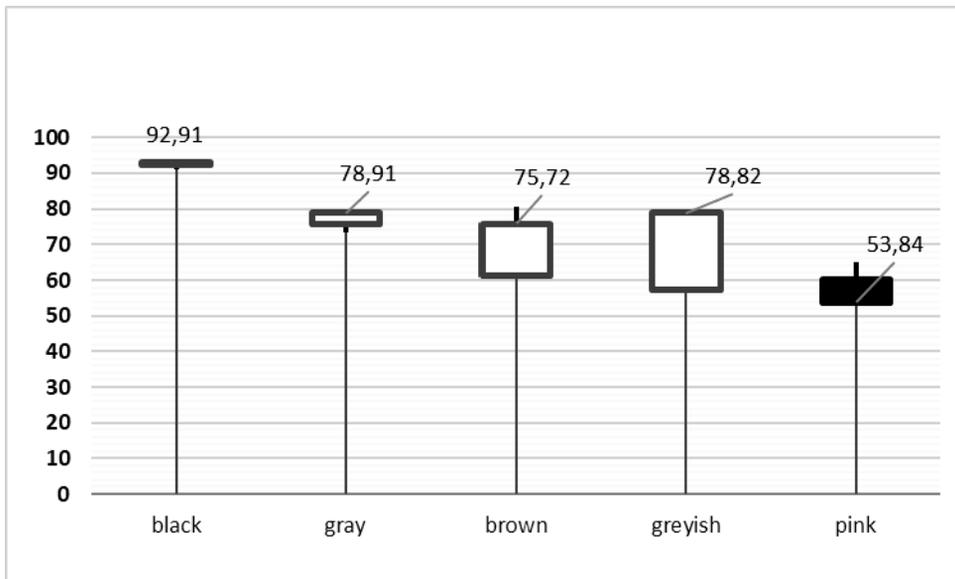


Fig. 1 The frequency of the desired type of curl size in relation with the color variety in 2019 (%)

In the case of colored varieties, this character was determined in a smaller proportion of the total number of lambs subjected to appreciation in each growing season. Compared to 2005, when the Genealogical Register of the Karakul of Botosani breed was established, the

proportion of lambs with medium-sized curls increased progressively from 61.41% to 75.7% in 2019 with a maximum threshold of 80.76% registered in the case assessments made in 2013.

In lambs belonging to the gray variety, the situation found indicates a directional

progressive evolution of the proportion of those who had a medium-sized curl from 57.4% in 2005 to 78.82% in 2019, the increase being about 27% in about 10 generations of lambs. The data obtained confirm the efficiency of the selection for this character, constituting a favorable support for improving the quality of the skins.

At pink variety, the fact that the main objective of this stage is represented by the increase of population size attracted a regression of the proportion of lambs that had medium curls, but by intensifying the selection it will be possible to induce a reversal of the expression of this character, improvement should be supported by a

higher proportion of individuals with this size of curls.

Statistical data processing highlights the appearance of different differences as a threshold of significance between the average score given to the assessment of this character in the five color varieties (Table 3).

In the case of the average score obtained in the analysis of the size of the gray curls, the difference was significant only in comparison with the data obtained in the analysis of the same character in lambs of the pink variety. In this case, the difference was significant for $p < 0.05$ which attracts a high degree of confidence in the case of selection applied to these varieties to improve the degree of curl size.

Table 3 The difference and significance of difference for the score obtained in the assessing of the size of the curls

Character 1	Character 2	Average difference	The meaning difference	Significance threshold
Gray	Grayish	0,50	insignificant	-
Gray	Brown	0,77	insignificant	-
Gray	Black	0,80	insignificant	-
Gray	Pink	1,10	significant	0,05
Pink	Grayish	1,60	significant	0,01
Pink	Brown	0,33	insignificant	-
Pink	Black	1,89	significant	0,01
Black	Grayish	0,29	insignificant	-
Black	Brown	1,57	significant	0,01
Brown	Grayish	1,27	significant	0,01

Also, the difference found between the average score obtained when evaluating this character in the varieties pink with grayish, pink with black, brown with black and brown with brown respectively were significant for $p < 0.05$.

CONCLUSIONS

1. The character represented by the size of the curls, at the lambs from the black and grey varieties, had an average score of just 7% above the maximum level, being of $23,40 \pm 0,159$ at black and respectively $23,11 \pm 0,092$ at grey, aspect which lead us to affirm that the improvement is certain and it is situated at a close level from the desired maximum threshold.

2. By the fact that at the colored varieties the average score, for the size of the curls, has

a higher value at grayish (23.11 ± 0.119), smaller at pink (21.50 ± 0.501) and intermediary at the brown variety (21.83 ± 0.191) it can be said that the improvement is at different levels and in order to obtain the desired type of character, to many individuals is imposed a greater selection and more careful assessment of the breeding animals.

3. If the case of the grayish color, the difference was significant only in comparison with the data obtained from the analysis of this character from the lambs of pink variety, being significant for $p < 0.05$ indicating a higher degree of confidence in case of selection applied to these varieties of color.

4. The difference between the average score obtained in the assessment of the size of the curls at the varieties pink - grey, pink - black, brown - black and brown - grey was significant for $p < 0.05$.

REFERENCES

- [1] Buzu I., 2016 – Creșterea ovinelor și ameliorarea rasei Karakul (lucrare de sinteză). Academia de Știință a Republicii Moldova, Chișinău.
- [2] Marin I., Niga V., 1974 – Principalele caracteristici ale pielicelelor la liniile create în populația de ovine Karakul de la SCZ Popăuți. *Lucrări Științifice ale Stațiunii Centrale de Cercetări pentru Creșterea Ovinelor, Palas – Constanța*, vol II, pag. 99-108.
- [3] Marin I., 1977 – Rezultate privind calitatea pielicelelor la metișii F₁ Karakul negru x Țurcană albă. *Lucrări Științifice ICDCOC Pala*, vol. III, p 245-255.
- [4] Pascal C., 2011 - Researches regarding quality of sheep skin obtained from Karakul Botosani sheep, *Biotechnology in Animal Husbandry Belgrad*, ISSN 1450-9156, vol 27, p 1123-1131.
- [5] Pascal C., Ivancia M., Hrință Ghe., Chiorescu I., 2010 - Researches regarding quality of sheep skins obtained from Karakul from Botosani sheep, al XX-lea Congres Internațional al Asociației Maghiară de Buiatrie, ISBN 978-963-87942-3-9, p 204-209.
- [6] Ursu E., Romanescu M., 1997 - Rezultate din activitatea științifică și ameliorarea ovinelor de pielicele Karakul de Botoșani. *Conferința Jubiliară INZVM, Chișinău*, p 75.