

EVALUATING THE CURRENT IMPROVEMENT STAGE OF THE PREDOMINANT SKINS MODELING OBTAINED FROM KARAKUL OF BOTOSANI BREED

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Abstract

The purpose of the research was to carry out a real analysis of the degree of improvement for the traits that influence the quality of skins obtained from Karakul of Botosani lambs. The biological material was represented by lambs of both sexes obtained from adult sheep belonging to the respective breed. In order to evaluate the improvement of the modeling degree, assessments were made on several generations of lambs, starting with those from 2007 when the current Improvement Program is applied, those from 2015, 2020 and respectively from 2022. The working methods used are accepted by the experimental technique and the evaluation of the type of model was made based on the technical norms and in which it is specified that 50 points are awarded for very good modeling; for good modeling, only 25 are assigned, and for situations in which the modeling is satisfactory, only 10 points are given. Following the statistical processing of the data, it is found that the improvement process is more advanced in black variety lambs because an average score of 32.38 was obtained and from the total number of lambs evaluated in 2022, the proportion of those that were also associated with a valuable modeling was 66.8%.

Key words: Botosani Karakul, color variety, pelts, skin.

INTRODUCTION

The modeling is an overall property rendered by the placement of the curls between them and their distribution on the skins surface. This characteristic is primarily dependent on the clarity, contouring and relief of curls with the same rolling direction and with a similar degree of closure.

This character is determined in expression by the arrangement of the majority of curls on the surface of the skin. Ideally, on the surface of the skin there should be a uniformity of the curls in terms of length, width and height, but also in terms of their position on the surface of the skin.

That is why breeding work is a long-term process, and in each generation the genetic gain obtained can be very small. In reality the variability is very high because all of this is the result of complex interactions between several characteristics that contribute positively or negatively to obtaining a certain model (Anonymous, 1982, cited by Greeff et al., 1993; Schoeman, 1992).

The complexity of improving the traits related to skin for this characteristic is also attributed to the fact that the overall curling, along with other basic features of the curl, is influenced by the characteristics of the skin and hair follicles (Nel, 1965; Hugo, 1982; Dreyer et al., 1983; Ylmaz et al. 2013).

Analyzing this aspect, Hornitscek (1938), cited by Schoeman in 1998, found great differences in the follicular distribution and in the way the curls are arranged on the surface of the skin and, implicitly, in the pattern described by them.

In the case of selection applied to the brown and grayish variety the overall quality of the skins depends on some additional characteristics becoming important, while others, such as the predominant pattern, become less important (Gouws, 1974).

Lourens et al. (1999) demonstrated the importance of directing mating activities to ensure an intermediate color that promotes expression in the new genotype, as well as the desired pattern and fiber quality contributing to a better expression of the aesthetic and commercial value of the skins.

Other studies on light varieties demonstrate that while light shades have a weaker expression for pattern type, they are associated with better fiber quality. Other studies suggest that darker shades give more clearly defined patterns even when fiber quality is poorer.

MATERIALS AND METHODS

The biological material subjected to research belongs to several color varieties within the Karakul of Botoșani breed. All lambs evaluated are of known origin and are subject to production performance control, respectively that based on the evaluation in the PP system (own performance) and the control based on the OP type evaluation (origin and productivity).

Through applied research, the aim was to conduct a real analysis of the stage of improvement in the curling quality of Karakul Botoșani Sheep Breed lambs. Considering that the improvement process takes time, and the effect of selection is quantified at a low level in each generation, to objectively assess the degree of improvement for that trait, the values obtained in the evaluation season of 2022 were compared with the performances achieved in other seasons, namely 2007, 2015, and 2020.

Given that the quality of curling represents a complex trait, multiple features, including the pattern described by the arrangement of the curls on the skin surface, were assessed in each evaluation season. In essence, the purpose of the research was to conduct a current and objective analysis of the level at which the improvement process stands for the trait represented by the arrangement of the majority of curls on the skin surface and the pattern they exhibit through this positioning.

In order to obtain real data on the objectives analyzed during the research, several activities accepted by the experimental technique and suitable for the production of skins were carried out.

The working method used to assess the sought-after characters was based on the technical norms specified in Section 1.4 and 1.5 of MADR Order no. 22/20.01.2006, published in the Official Gazette of Romania no. 146 of 15.02.2006, which stipulates the aspects on the basis of which the Official Control of the production of skins is carried out in Karakul

lambs of the Botosani and Metis breeds. During the assessment of the quality of the skins, the shaping of the curls can be very good and 50 points are awarded; for good modeling only 25 points are awarded and for situations where the modeling is satisfactory only 10 points are awarded.

In each season all assessments were performed by a minimum of two experienced technicians. If clear differences of opinion were recorded, each aspect invoked was discussed in detail until a consensus was reached.

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

RESULTS AND DISCUSSIONS

The modeling of the curl is given by the curls arrangement on the skin surface but also by the position of some in relation to others. It is a character under the direct influence of several factors, the most important of which are: the way the fibers are positioned in the curl, the degree of closure of the curls, the thickness, the direction of rolling as well as the shape, size, uniformity and distance between the curls.

In the qualitative evaluation of skins as modeling types, the most common are:

- lyre - when the curls are arranged perpendicular to the spine and with the sides oblique or forward;
- Christmas tree shape (when the curls are arranged on the sides, being quite straight, oriented backwards and with the longitudinal axis of the curls oblique to the upper line);
- mixed modeling or nut core is encountered when the curls have undefined arrangement and orientation between them, sinuous and with different directions (they are acceptable only if the clarity of the curls is good);
- rosette shape (when the curls diverge from a common point in all directions);

- wild modeling is when curls of different shapes are found on the surface of the skins, placed irregularly (they are worthless).

Modeling is assessed by examining several groups of curls, from different regions, and the qualifications are given as appropriate: very good, good, satisfactory, poor.

When the distance between the curls is small, the delimitation given by their contour is not clearly highlighted and, consequently, the modeling will be poor.

As the most common types of modeling, the skins obtained from lambs of the Karakul of Botosani breed are in the shape of a lyre, with fir, rosette, walnut core, mixed.

Although there is also a great variability of this character, the most appreciated are the pelts that express a correct contour of the curls, with a frequent arrangement in orderly formations arranged concentrically or parallel and with an intense luster.

For the black variety, after the evaluation of this character, a higher score was obtained compared to the one obtained for other color varieties, the average score being 32.38 points (Table 1). This level indicates that improvement must be intensified because the current expression of this character is 17.62 points away from the maximum score allowed in the evaluation.

However, obtaining an average score of 32.38 ± 0.53 indicates that the improvement process in this variety is at a higher level compared to other types of color. Also, from the data analysis it can be seen that in the black variety the proportion of lambs that obtained the maximum score in the analysis of the pattern type registered an increase from 19.60% in 2007 to 21.28% in the generation of the evaluation season of 2022. Also for this variety, it should be highlighted that the analysis of the predominant model recorded in the evaluation of this trait in lambs belonging to the generation of 2022 at a proportion of 66.8% of the total of 555 evaluated lambs shows that the curls have a predominantly concentric and parallel arrangement, an aspect that claims that improvement is proceeding in the desired direction and at a high degree of intensity. In research carried out on lambs belonging to the black variety from line 5 and 1557 of the same breed, Marin et al. (1974 and 1977) found that

modeling was very good and good in about 70% of the population analyzed. Later, in 1977, the same group of authors found that in 71.10% of the lambs belonging to this breed, the modeling was good to very good, in another proportion of 24.60% it was of medium type and in 4.30% it was satisfactory.

In other researches carried out more recently, it is found that the improvement of this trait is increasing, positive and supported not only by the selection intensity but also by the mating management plan used in each breeding season (Buzu, 2023; Pascal, 2011; Nechifor, 2017; Nechifor et al., 2022).

Comparing these results with those determined in the current generations could be considered as inferior, and in this case, instead of genetic progress, there was a regression, which is not true because all the results presented in Table 1 refer only to individuals with a modeling of the desired type and only to those who received maximum points in the evaluation of this character.

Also, in the assessment of the current state of improvement, the information regarding the frequency of individuals in the population who also had a well-expressed modeling can be used (Figure 1). In the case of this variety, out of the total number of evaluated lambs, a concentric-parallel pattern was found at 66.80%. But the fact that individuals with a less desirable phenotypic expression, of mixed and undefined type, represent a total proportion of 2.8% indicates a good genetic consolidation but also a good degree of hereditary transmission and a higher efficiency of the selection process.

In the grayish variety, the average score was 27.16 ± 0.21 and the difference of 5.22 points compared to the average score determined in the black variety is significant for $p < 0.01$ (Figure 1 and Table 2).

The improvement of modeling and the definition of a better contoured pattern, which participates in a substantial increase in the aesthetic and commercial value of skins, is a process in which genetic progress is quite difficult to achieve. This aspect confirmed by the fact that the proportion of lambs that obtained a higher score in the modeling evaluation increased by only 2.78% in 2015 compared to 2007 and by only 1.43% in 2022 compared to 2015.

Table 1. Statistical Parameters for Curl Modeling Types

Color variety	Total evaluated lambs (n)				$\bar{X} \pm s \bar{x}$	V%	Very good modeling (%)				Predominant pattern in lambs evaluated in 2022 (%)			
	2007	2015	2020	2022			2007	2015	2020	2022	cp*	p*	m*	u*
Black	774	815	885	555	32.38±0.53	35.76	19.60	19.85	20.44	21.28	66.8	30.4	2.5	0.3
Grayish	348	410	422	440	27.16±0.21	27.56	10.85	12.20	13.50	13.63	68.7	30.1	0.9	0.3
Brown	225	185	198	210	26.38±0.39	30.88	9.13	10.36	11.07	8.75	19.9	72.1	7.1	0.9
Grey	103	122	130	155	27.63±0.42	35.32	11.25	12.32	12.85	13.05	18.7	72.3	7.7	1.3
Pink	230	198	201	230	26.41±1.13	43.75	9.05	9.26	9.52	9.55	16.1	59.2	22	2.7

*: cp = concentric-parallel; p = parallel; a = mixed; n = undefined

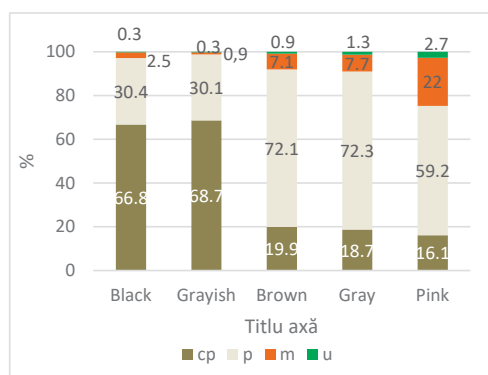


Figure 1. Model Type Quality Classes 2022 Generation (%)

Table 2. The Difference and Significance of Difference for Curl Shaping

Character 1	Character 2	Mean difference	The meaning of the difference	Threshold of significance
Gray	Grayish	0.47	ns	-
Gray	Brown	1.25	ns	-
Gray	Black	4.75	**	0.01
Gray	Pink	1.22	ns	-
Pink	Grayish	0.76	ns	-
Pink	Brown	0.03	ns	-
Pink	Black	5.98	**	0.01
Black	Grayish	5.22	**	0.01
Black	Brown	6.01	**	0.01

The analysis of this trait indicates a higher incidence of the expression of a pattern accepted in breeding because the proportion of those with a concentric-parallel pattern is higher by more than 50% compared to other types of patterning, and the presence of a lower proportion of 1.2% of lambs with undesirable patterning highlights the effectiveness of selection.

At brown lambs, an average score of 26.38 was obtained for the assessment of the type of model. The difference compared to the average values obtained for the other four varieties is not statistically significant. The analysis of the proportion of lambs that were appreciated with maximum points shows an increase in 2015 compared to 2005 as the proportion of lambs with higher scores was 11.07% in 2015 compared to 10.36% in 2005.

In the generation of brown lambs evaluated in 2022, it is observed that compared to 2020, the proportion of lambs that obtained a higher score is reduced from 11.07% to 8.75% (Figure 2).

For this variety, the continuation of the improvement of this trait requires a reevaluation of the selection criteria and increased attention in directing the pairings so

that the predominant model manifested is predominantly the concentric-parallel type. When evaluating the type and model of the curl in lambs belonging to the grey variety, the average score obtained in lambs evaluated in 2022 was 27.63 ± 0.42 points. Based on this score, we can appreciate that the arrangement of the curls on the surface of the skin is uneven and does not express a clear and well-defined outline. Regarding the number of lambs that obtained a higher score, their proportion increases from 11.25% in 2007 to 13.05% in 2022. When evaluating the type of modeling in lambs belonging to the pink variety, the proportion of those who obtained a higher score is kept constant and has not exceeded 10% since the year in which the Improvement Program of the Karakul Botosani sheep breeding breed was developed and applied, respectively 2007. Based on these data, we can appreciate the fact that in lambs of the sour and pink variety, although the process of improvement of the characters on which the quality of the skins depends is in the initial stages, the average score higher than 25 points shows a good expression of the modeling in the current generations.

The prevailing model in both varieties is represented by the parallel arrangement of the curls, however, the objective of the improvement is represented by moving the frequency in the area of the desired type.

Between the average score obtained for the variety grey x black and pink x black the differences are significant for $p < 0.01$, indicating a high degree of confidence.

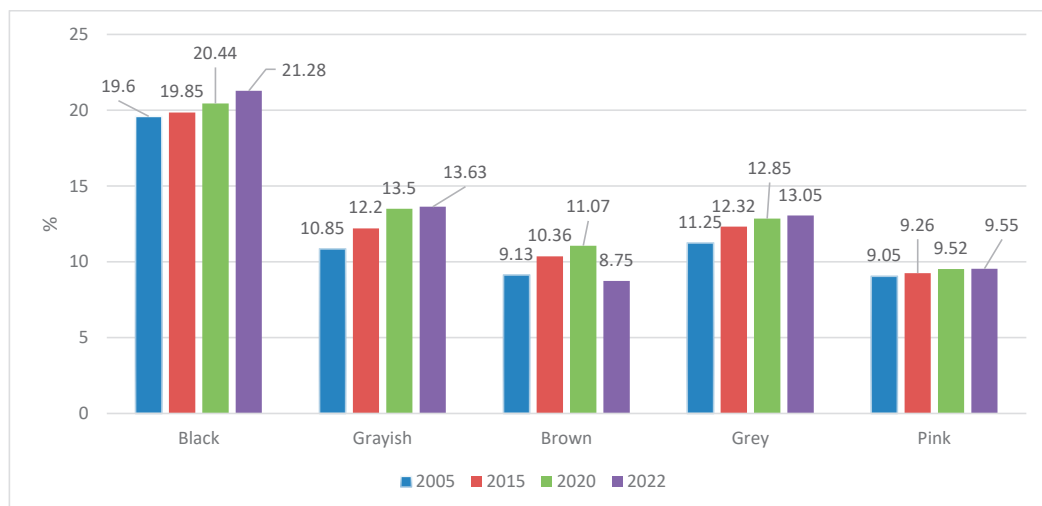


Figure 2. Proportion of lambs that had very good shaping

CONCLUSIONS

Following the evaluation of the degree of modeling, a great variability of this character is found and in order to continue the improvement process, the activities that can induce a correct contour of the curls, an intense shine and an arrangement of the curls in concentric or parallel pattern must be intensified.

For the black variety, improvement efforts to enhance modeling need to be intensified as the average score is slightly above 30 points. By increasing rigor in the selection process, the proportion of lambs with undesirable expression is expected to be well below the current 20%.

When assessing the degree of modeling in the Grayish variety, the score based on the average score obtained, we can say that the applied selection and management of breeders contribute to increasing the proportion of lambs that obtain a higher score.

Based on these data, it can be recommended that the selection at grayish should focus on intermediate color types, because this type is associated with an acceptable model but also with a better fiber quality.

The analysis of the proportion represented by the brown lambs that were appreciated with the maximum points shows a decrease, in 2015 compared to 2007, at 0.38%, the probable cause being represented by certain inconsistencies between the criteria that were the basis for drawing up the routing list of pairings.

For the gray and pink varieties, the results show an insignificant increase in lambs that had a score characteristic of the desired pattern when evaluating the type of pattern.

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