

DETERMINING CURRENT STAGE OF COLOR UNIFORMITY IMPROVEMENT FOR SKINS OBTAINED FROM KARAKUL OF BOTOȘANI BREED

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Abstract

The purpose of the researches was to carry out a complex study in order to evaluate the current stage of improvement for the type of color and uniformity in the main color varieties formed within the Karakul of Botoșani breed. The biological material subjected to the assessments was represented by the pure-bred Karakul de Botoșani lambs belonging to all the varieties of color obtained over the course of three successive generations, originating from breeding seasons that took place in 2013, 2014 and 2015. The method applied in the assessment of the objectives 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 specifying the aspects based on which the official production control of pelts is carried out.

The data obtained as a result of the genetic progress evaluation obtained on each generation show that the proportion of lambs in which the desired type of color was found, that is to say, a black one, uniform and with nuances of blue, is increasing, thus confirming that among the generations of lambs appreciated in the three seasons the applied improvement process is efficient. However, if we compare these values with those obtained in season 2005, we find that in the 2013 generation, the proportion of lambs presenting a color close to the desired type was less than 1.17%. However, by judiciously matching the breeders, in 2014 and 2015, it shows an increase of 0.27% and 0.55% of the lambs, which expressed a very good degree of the intensity of the color and the desired nuances.

Key words: pelts, Karakul sheep, breeding, characters

INTRODUCTION

The economic value of the obtained skins depends on many characters, but, from them total, some have a very special influence, referring to color and uniformity. If, in the other sheep breeds, the color desired is often white, because it offers an increased possibility of using paint in skins and wool, on sheep breeds specialized on pelt production the variation of the basic color and nuances is an important attribute of quality and a major goal of improvement.

The black color in the Karakul sheep contains two genotypes, one of which is

dominated and the other of a recessive type. Following research conducted in Karakul in our country, it was found that these two types differ phenotypically in that the recessive one also results from the cross between brown and gray parents [8].

In other studies, it was also pointed out that black, specific to the Karakul and Țurcană breeds, is of a dominant type compared to the white from Merinos and Țigaie [Teodoreanu, 1955; Paraschivescu 1969; Taftă, 1983 quoted by Ursu Elena, 1997]. Knowing to mode the colors are transmitted has a practical and theoretical importance because, through the intervention in the reproduction of Karakul, other nuances or even other varieties of color can be obtained.

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The color importance is primordial as it is associated with other characters depending on the quality of the skin, the covering fibers and the type of curls. This also explains the fact that the black variety is found in the standard of all types of sheep raised for skins, regardless of the growth centers in the world.

MATERIAL AND WORKING METHOD

The biological material submitted to the research belongs to the Karakul of Botosani breed, of known origin, included in one of the specific forms of production performance control, respectively based on PP system evaluation (own performance) and control based on OP type evaluation (origin and productivity). More specifically, the biological material analyzed was represented by the pure-bred Karakul of Botosani lambs belonging to all varieties of color, obtained over the course of three successive generations, originating from breeding seasons that took place in 2013, 2014 and 2015.

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 specifying the aspects according to which the official Production control of the skins is performed [6].

Statistical processing of data was based on the use of the computer software S.A.V.C. (Statistical Analysis of Variance and Covariance 2003). To test the statistical significance of the differences between the

averages of the studied parameters values and the correlations between them, the variables Analysis (ANOVA Single Factor) and the Pearson Correlation were used, both included in the computer program used.

RESULTS AND DISCUSSIONS

Because the average score was obtained by the statistical processing of the data that came from a greater number of individuals, from different varieties, it makes the final results have an accepted degree of accuracy, placed closer to the real values. Table 1 presents a centralization of the average data obtained for the color varieties that provided more than 100 lambs for the evaluation of these characters each season.

For the black color the desired type is associated with both a high intensity of the basic color and the appearance of intense reflexes, the most appreciated being the intense black with blue reflections. Being a priority character in expressing the quality but also in improving the sheep for evaluation, only 100 points are awarded when an aspect similar to the one described above is obtained.

For cases where the basic color is normal black, but also when associated with reddish tones, according to the specifications of the **Origin certificate and production value**, maximum 75 and 25 points are granted. The statistical processing of the data obtained from the appreciation of the color and color nuances of the lambs of the black variety shows that the improvement for this character is at a high level since the average score obtained was 91.42 ± 0.21 .

Table 1 Statistic estimators determined for the color type of the pelts

Color variety	n	$\bar{X} \pm s_{\bar{x}}$	V%	% with thick curls				the difference \pm 2005/2015 (%)	
				005	013	014	015	total	generation
Black	1158	91.42 \pm 0.21	4.71	2.35	91.18	92.62	92.90	0.55	0.055
Grayish	1184	89.03 \pm 0.33	12.28	5.77	73.39	76.92	78.91	3.14	0.314
Brown	431	67.07 \pm 0.61	19.03	1.41	80.76	62.37	75.70	14.29	1.429
Gray	533	105.61 \pm 0.4	9.88	3.87	67.57	75.12	78.82	14.95	1.495
Pink	106	81.12 \pm 2.0	26.15	-	61.90	52.63	53.84	-	-

In order to estimate the genetic progress obtained for each analyzed generation, was determined the proportion of lambs at which the desired type was found, that is, of a uniform black color and with nuances of blue. If we compare these values with those obtained in the 2005 season we find that in the 2013 generation, the proportion of lambs that presented a color close to the desired type was less than 1.17%.

Subsequently, by judicious matching of the breeders in 2014 and 2015, an increase of 0.27% and respectively 0.55% of the lambs were expressed, which had a very good degree color and the desired nuances intensity.

Obviously, these values do not express a signifying evolution of the degree of improvement for this character, however, the tendency of growth of the individuals to which the color approaches the desired type confirms that the improvement is in progress.

However, by the fact that for the three successive generations, the average score is lower by only 8.58 points compared to the maximum assigned for this character, it can be stated that the current stage of improvement is high and that by applying a

progressive directional selection, it will also register a steady growth of lambs with a desired type of color. Also, the fact that the level of evaluation is placed to the maximum limit is due, in large part, to the genetic stability specific to the black variety, an aspect that has induced a good genetic consolidation for this character.

The statistical processing of the data and the determination of the degree of significance indicates that signifying differences for $p < 0.01$ are recorded between the average values obtained when evaluating the color type.

The difference and the significance of the differences between the average of the scores resulting from the evaluation of the color type is shown in table 2. Although the data analysis shows differences of the average values less than 20 points, the statistical significance indicates a degree of confidence of 99%. The results obtained in other researches carried out on the black variety of the Karakul de Botoșani breed show that the intense type of color, associated with a luster with obvious tints towards blue, was identified in only 18.0% of cases [4].

Table 2 The difference and significance of difference for the score obtained in the evaluation for the color type

Character1	Character 2	The difference of the average	Meaning of difference	Significance threshold
Gray	Grayish	11.59	signifying	0.01
Gray	Brown	38.62	signifying	0.01
Gray	Black	6.19	signifying	0.01
Gray	Pink	24.5	signifying	0.01
Pink	Grayish	12.91	signifying	0.01
Pink	Brown	14.12	signifying	0.01
Pink	Black	18.31	signifying	0.01
Black	Grayish	5.40	signifying	0.01
Black	Brown	32.43	signifying	0.01
Brown	Grayish	27.03	signifying	0.01

If we compare these data with those obtained when evaluating this character in current generations, we find that the type of color and nuance desired was identified at over 90% of the total number of lambs evaluated after 2005. Based on this finding it can be said that the improvement of the color, to the black variety, is evident also that by intensifying the selection corroborated

with a correct nomination of the reproducers the favorable expression of the desired type can be accentuated.

In the grayish variety, the applied selection implies a knowledge not only in terms of color transmission but also in the nuances and color uniformity within a population.

In some research conducted in our country, it is noted that the uniformity of

color increases when homogeneous pairings are applied, but the promotion of breeders with lighter nuances, dominated by white fibers, could lead to an increase of lambs that may have anomalies at the level of the prestomachs.

The efficiency of color enhancement in the practice of homogeneous mating is quantifiable when working with smaller groups or subpopulations, to whom valuable breeders are assigned with features expressed at least in the animals of the respective group [Pipernea, 1974, cited by Creangă, 2007].

After processing the data obtained based on the evaluation of this character, it is found that the average score obtained on the three generations of lambs is 89.03 ± 0.336 and corresponds to a good degree of expression for this character. Also, the data obtained highlights the fact that the desired type for the grayish variety was identified in a relatively high proportion of the individuals in the population.

Compared with the appreciation of this character in the generation obtained in the 2005 season, the proportion of lambs who received maximum score at assessment was lower by 2.38% in 2013 and higher by 1.15% and 3.14% respectively in the evaluations that took place in the generations that followed. The evaluation purpose of the situation recorded for the total score obtained at the assessments made can be found summarized in fig. 1.

For the brown variety, the average score obtained in the population of lambs from the three generations was 67.07 ± 0.617 , being well below the maximum level that can be obtained, respectively a total of 75 points. Also, the share of lambs that received maximum rating is at a low level, but higher than the proportion of lambs who received maximum rating at the assessments made in 2005 (fig. 1).

The high percentage of variability for this character ($V = 19.03\%$) indicates a high degree of heterogeneity and suggests that an improvement in expression cannot be achieved without a more careful evaluation and an increase in demand in breeding selection, corroborated with a judicious match of the respective parents. For the most part, the existence of this situation can be a consequence of the fact that this variety of color was homologated in 2010 and the improvement is in full process.

For the gray and pink varieties of color, the formation process has not ended so that in order to meet an important objective for a future approval for increasing the number of individuals in the population, an applied selection is moderate of the breeders. This is also the explanation of the fact that the average score is reduced by more than 18 points in both varieties of color, indicating a reduced stage of improvement for this character.

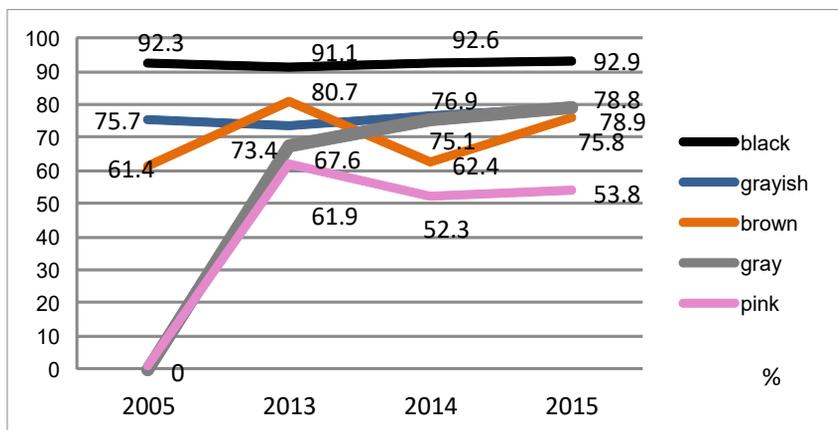


Fig. 1. Diagram of distribution of lambs in relation to the total score of the generation (%)

Once all the objectives of the respective stage have been achieved, a more rigorous selection will be possible in order to really improve the basic characters of the skin production.

The data obtained confirm the efficiency of the breeding program applied to the Karakul of Botoșani breed, and the current level of most characters, including the type of color and their uniformity are at a higher level compared to other data quoted in the literature [2], [3], [5], [7].

CONCLUSIONS

1. The improvement of the color type to the black variety is obvious, and through the intensification of the selection and a better nomination of the reproducers it is possible to accentuate a higher phenotypic expression to a greater number of individuals obtained in the following generations.

2. By the value of the average score of 89.03 ± 0.336 obtained on the three successive generations of lambs within the grayish variety, it can be concluded that the improvement process is obvious and is at higher parameters.

3. Compared with the appreciation of this character in the generation obtained in the 2005 season, the proportion of lambs that received maximum score at assessment was lower by 2.38% in 2013 and higher by 1.15% and 3.14% respectively in the assessments that took place in the other two seasons of lambing.

4. When assessing the color and its uniformity in the Komor (brown) lamb, it is found that the average score for the three generations was 67.07 ± 0.617 , with more than 10% compared to the maximum level allowed for evaluation of this character.

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