

RESEARCH ON CURRENT TRENDS IN BREEDING KARAKUL OF BOTOSANI SHEEP - BLACK AND GREYISH LINE

Alexandru Marian FLOREA¹, Ionică NECHIFOR¹, Ana BOLDIȘOR¹, Ioana ȚURCANU¹,
Bogdan-Ioan NECHIFOR¹, Oana ONCIU¹, Vasile MACIUC^{1,2}, Constantin PASCAL^{1,2}

¹Research and Development Unit for Sheep and Goat Breeding “Popăuți”,
312 Principala Street, Rachiti, Botoșani, Romania

²“Ion Ionescu de la Brad” Iasi University of Life Sciences, 3 Mihail Sadoveanu Alley,
700490, Iași, Romania

Corresponding author email: constantin.pascal@iuls.ro

Abstract

Taking into account the decreasing trend in skin production, Karakul of Botosani sheep breeders have reoriented towards meat production, as the demand for this production is increasing, both in the country and for export, Karakul of Botosani sheep meat being highly appreciated in Arab countries. We want to capture the effect of increased meat production on the quality of the curl, which influences the commercial value of the skin. We will analyze the productive capacity of the Karakul of Botosani breed for both skin production and meat production, and the relationship between them, knowing that when you want to improve one production, you do it at the expense of another, for example improved milk production leads to a lower meat production, or a higher milk production leads to a decrease in milk fat percentage, if we are talking about major changes in the productions, because small changes, or changes up to a certain threshold, called limits of productions, do not have major effects on the other productions.

Key words: body weight, Karakul of Botosani, pelts, production sheep.

INTRODUCTION

Karakul of Botosani breed, is well known for its skin production, production that is influenced by the proper quality of the curl and surface characteristics, or the size of the skin. In this study we will analyze the correlation between the weight at lambing and the specific score from appreciation sheet, respectively the influence of the weight at lambing over the skin quality. The larger the skin surface, the better the degree of coverage will be, i.e. less skins will be used to obtain the finished product (jackets, gloves, vests, hats, etc.).

A study was conducted to investigate whether simple measurements taken on the carcass post-mortem could be used to accurately predict composition and key meat quality traits. (Lamber et al., 2009).

The skin surface is in close correlation with the birth body weight, so as the weight increases, the skin surface is becoming larger.

Body development of the lamb and skin reserves in the flank and neck regions influence the size of the skin surface. When we refer to the surface of the skin, we must consider two

reasons, the total surface and the useful surface, since the useful surface has an important role in establishing the commercial value of the skin (Pascal, 2011; 2015; Pascal et al., 1994).

Recent research shows that lambs from the Black and Greyish lines have higher average birth weights compared to lambs belonging to the other lines within the Karakul of Botosani breed (Crișmaru et al., 2022; Pascal & Nechifor, 2014).

The useful surface is the portion of the total surface covered with curls but excluding the axillary regions, the limbs from the knees and hock and possibly other portions covered with slick hair or wadding. In Karakul of Botosani lambs, the useful surface reaches up to 95% of the total surface (Pascal, 1994).

Climate conditions pay a defining role in sheep production (Sejian et al., 2017; Pascal et al., 2023).

Differences between breeds in the response variable measured were not influenced by diet, sex, or location (Crouse et al., 1981).

A slight influence over the late development of the lambs has the age that they are introduced

at breeding (Florea et al., 2020; Nechifor et al., 2022).

Considering that the curling (i.e. the useful surface) is of the same quality, the skin value is the higher the larger its surface is. The quality of the curl is given by the score value obtained in the appreciation sheet.

MATERIALS AND METHODS

The biological material analyzed was represented by a number of 1378 Karakul of Botosani individuals from Black and Greyish color lines. The entire herd subject to evaluation is included in the Genealogical Register of the breed and is in the character improvement program for skin quality.

The study was carried out during five consecutive years, the lambs being assessed at birth according to the assessment norms of Karakul of Botosani sheep subject to official production control.

The assessment of body weight was carried out with the help of the electronic scale, 24-48 hours after lambing, in the same time with the appreciation sheet.

For the objective assessment of the skin surface, we will focus on the body weight at birth, since the higher the weight of a lamb at birth, the larger the skin surface is and a better later body development.

At birth, each individual, had an appreciation sheet filled in and was weighed, obtained values were grouped according to the color line and according to the individual's destination. The data thus obtained were systematized and processed statistically. The statistics, respectively the parameters, which characterize a normal distribution, are on the one hand the mean or median, and on the other hand the dispersion indices represented by the variant and the standard deviation of the observed character. Statistics are written with Latin letters: arithmetic mean (\bar{X}), variation (s^2), standard deviation (s).

The collected data were processed using the spreadsheet application MsExcel 2013.

RESULTS AND DISCUSSIONS

Depending on the destination of the evaluated products, the data were statistically processed

for lambs kept for reproduction, for those destined for meat and for those for skin production.

According to the data presented in Table 1 both in the Greyish and Black line at the individuals kept for reproduction, the skin quality improved during the analyzed period, thus in the greyish individuals, in 2019, we have individuals with an average score of 513.64 points and an average lambing weight of 3.69 kg and in 2023 the score increases to an average of 529.40 points and an average lambing weight of 5.53 kg. The same aspect can be observed in individuals from the Black line, respectively in 2019 we record an average score of 521.98 points and an average lambing weight of 3.74 kg and in 2023 we obtain an average score of 527.35 points and an average lambing weight of 5.55 kg. In greyish individuals, the highest average value of the score was recorded in 2023, respectively 529.40 points, and the highest value of the average weight at lambing was recorded in 2021, respectively 5.56 kg, a weight close to that one recorded in 2023. At black individuals, the highest average value of the score was recorded in 2023, respectively 527.35 points, and the highest value of the average weight at lambing was recorded in 2021, respectively 5.75 kg, a weight close to that recorded in 2023. Comparing the year 2019 and 2023 the average score, respectively the curl quality, did not show significant differences, instead the average weight at lambing increased by 1.84 kg in the case of greyish individuals and 1.81 kg in the case of black individuals. As the average lambing weight and the curl quality have been improved, it only increases the commercial value of the skins, ie skins of a better quality and with a larger usable area.

The best results were found in 2020, in terms of curl quality with an average score of 516.65 for individuals from the Greyish line and 534.17 points for individuals from the Black line and in terms of average weight at lambing the best values were obtained in 2021, respectively 5.56 kg for individuals from the Greyish line and 5.75 kg for individuals from the Black line. The category of individuals destined for breeding plays a decisive role in the improvement of the breed, as they represent the future generations of parents, and by keeping

the most valuable individuals at the breeding ground, we ensure that in the future we will obtain homogeneous and quality individuals, to achieve a economic efficiency of the unit as high as possible. A not to be neglected production of the Karakul of Botosani breed is

also that of meat, this because recently the buyers interest in skins has decreased, and this has led the Karakul of Botosani sheep breeders to reorient their production towards that of meat, lambs being highly valued in Arab countries.

Table 1. Evaluation of Karakul of Botosani individuals - Greyish line and Black line for reproduction

Year	N (reproduction individuals)	Greyish line									
		Sheet appreciation score					Lambing weight (kg)				
		\bar{X}	s	s ²	Max.	Min.	\bar{X}	S	s ²	Max.	Min.
2019	14	513.64	41.275	1,704	590	455	3.69	0.72	0.52	5.00	2.60
2020	20	516.65	42.751	1,828	610	455	4.94	0.893	0.8	7.10	3.70
2021	39	503.05	38.472	1,480	640	415	5.56	0.81	0.66	7.00	4.00
2022	24	509.71	38.276	1,465	605	430	4.86	0.89	0.79	6.20	2.80
2023	35	529.40	36.631	1,342	610	465	5.53	0.746	0.56	6.90	4.00
Year	N (reproduction individuals)	Black line									
		Sheet appreciation score					Lambing weight (kg)				
		\bar{X}	s	s ²	Max.	Min.	\bar{X}	s	s ²	Max.	Min.
2019	112	521.98	40.382	1,631	610	423	3.74	0.448	0.2	5.00	3.00
2020	116	534.17	54.467	2,967	650	413	5.48	0.946	0.89	9.20	3.50
2021	90	511.77	40.732	1,659	613	445	5.75	1.02	1.05	7.60	3.40
2022	107	501.00	41.489	1,721	635	400	5.23	0.945	0.89	9.50	3.10
2023	83	527.35	34.382	1,182	620	465	5.55	0.899	0.81	7.90	3.30

Table 2. Evaluation of Karakul of Botosani individuals - Greyish line and Black line for meat production

Year	N (individuals for meat)	Greyish line									
		Sheet appreciation score					Lambing weight (kg)				
		\bar{X}	S	s ²	Max.	Min.	\bar{X}	s	s ²	Max.	Min.
2019	12	471.58	36.75	1,351	525	408	3.46	0.431	0.19	4.40	3.00
2020	14	452.42	37.916	1,438	515	375	5.28	0.72	0.52	6.00	3.70
2021	25	514.16	57.369	3,291	598	415	4.67	0.9	0.81	6.80	3.50
2022	13	468.77	41.944	1,759	535	400	4.48	0.997	0.99	6.10	2.30
2023	6	518.33	47.293	2,237	590	475	4.77	0.877	0.77	5.70	3.30
Year	N (individuals for meat)	Black line									
		Sheet appreciation score					Lambing weight (kg)				
		\bar{X}	s	s ²	Max.	Min.	\bar{X}	s	s ²	Max.	Min.
2019	54	494.48	40.224	1,618	595	423	3.50	0.349	0.12	4.20	2.40
2020	32	481.09	40.36	1,629	575	385	5.37	0.988	0.98	6.80	3.00
2021	143	499.43	40.792	1,664	580	405	4.94	0.92	0.84	7.20	3.00
2022	149	469.21	28.885	834	555	310	4.63	0.832	0.69	7.00	2.90
2023	93	495.70	32.87	1,080	575	420	4.70	0.784	0.61	6.40	2.80

In lambs destined for meat, the quality of curling is not a primary objective, this can also be seen in the centralized data in Table 2 where the average score for greyish individuals, in 2019, was 471.58 points, but still improved in 2023 to 518.33 points and for black individuals the average score had similar values in the analyzed period, with 494.48 points in 2019

and 495.70 points in the year 2023. For meat production, the average weight at lambing is important, which influences the further body development of the lamb, so if in 2019 the average weight at lambing of greyish individuals was only 3.46 kg, in 2023 it reached 4.77 kg, recording a difference of 1.31 kg and in 2020 was recorded the highest

average lambing weight, respectively 5.28 kg. In black individuals in 2019 the average lambing weight was only 3.50 kg, in 2023 it reached 4.70 kg, registering a difference of 1.20 kg and in 2020 the highest average lambing weight was recorded, respectively 5.37

kg. By improving the average lambing weight, in addition to the economic efficiency related to meat production, an improvement in the useful area of the skin was ensured if these individuals were directed to the skin production.

Table 3. Evaluation of Karakul of Botosani individuals - Greyish line and Black line for skin production

Year	N (individuals for skin production)	Greyish line									
		Sheet appreciation score					Lambing weight (kg)				
		\bar{X}	s	s ²	Max.	Min.	\bar{X}	s	s ²	Max.	Min.
2019	2	510.00	7.071	50	515	505	4.00	0	0	4.00	4.00
2020	2	460.00	7.071	50	465	455	3.85	0.07	0.005	3.90	3.80
2021	9	490.11	16.929	287	528	470	4.21	0.4	0.16	5.00	3.70
2022	5	476.00	47.88	2,293	535	430	3.24	0.23	0.05	3.60	3.00
2023	2	477.50	53.033	2,813	515	440	3.95	0.636	0.41	4.40	3.50
Year	N (individuals for skin production)	Black line									
		Sheet appreciation score					Lambing weight (kg)				
		\bar{X}	s	s ²	Max.	Min.	\bar{X}	s	s ²	Max.	Min.
2019	22	488.55	35.981	1,295	568	425	3.06	0.412	0.17	3.80	2.20
2020	18	502.35	37.993	1,443	578	440	5.08	1.325	1.76	7.80	2.50
2021	62	500.19	30.469	928	575	375	4.31	0.52	0.27	6.40	3.00
2022	51	465.75	37.083	1,375	610	340	3.47	0.785	0.62	5.60	2.10
2023	24	489.58	36.083	1,301	525	400	4.05	1.25	1.56	6.20	2.30

During the analyzed period, the individuals for skins production came from twin lambings or isolated cases when the lambs had a low birth weight and their mothers do not have enough milk to ensure their latter development. According to the centralized data in Table 3 we can see that in the greyish individuals the skin quality, for the slaughtered products, decreased comparing the year 2019 with 510.00 points to the year 2023 when 477.50 points, but the average weight at lambing does not register significant differences, being 4.00 kg in 2019 and 3.95 kg in 2023. In black individuals, the skin quality did not register significant differences, respectively 488.55 points in 2019 and 489.58 points in 2023, but regarding the average weight at lambing it recorded 3.06 kg in 2019 and 4.05 kg in 2023, with a difference of 1.01 kg and with the highest average weight recorded in 2020, respectively 5.08 kg. If in the greyish individuals the quality of the curl and the useful surface did not undergo major changes, also due to the small number of products sacrificed for the skins, in the black individuals the quality of the curl remained almost unchanged, but the useful surface of the skin increased.

The overall picture regarding the quality of the curl and the average lambing weight of individuals from the Black and Greyish lines, during the analyzed period, is shown in Table 4, Figure 1 and Figure 2.

As we can see in Table 4 in individuals from the Greyish Line, both the curl quality (expressed by the average score from the appreciation sheet) and the average lambing weight improved during the analyzed period, so in 2019 we have an average score of 495.36 points and an average weight of lambing of only 3.61 kg and in 2023 we have an average score of 525.44 points and an average lambing weight of 5.35 kg. In individuals from the Black Line, the quality of the curl did not register significant differences, in 2019 we have 510.17 points and in 2023 we have 508.10 points, instead the average weight at lambing was improved from 3.59 kg in 2019 to 4.97 kg in 2023.

Due to the current trends in the skins market, i.e. a decrease in their demand, Karakul of Botosani sheep breeders tend to reorient themselves towards meat production, this aspect is primarily observed through the prism of the fact that the average weight at calving

had a spectacular jump, i.e. 1.74 kg for individuals from the Greyish line and 1.38 kg for individuals from the Black line. The increase in the average weight at lambing was achieved by the use of male specimens with greater body development. Although the average weight at lambing was much higher in 2023, the quality of the curl did not suffer, on the contrary, in the products from the Greyish line, it even improved, reaching 525.44 points, and in the products from the Black line, they had a value close to the one recorded in 2019.

Contrary to expectations, as it is known that when you improve one production you do it at the expense of another, for example if you improve milk production we will have a lower meat production, in the Karakul of Botosani breed it can be observed that it is still possible to go in parallel with the improvement of two productions, that of meat and that of skins, but the leap from the skin quality does not compare with the leap gained in body development, that is for meat production.

Table 4. Evaluation of Karakul of Botosani individuals - Greyish line and Black line overall

Year	N (total individuals)	Greyish line									
		Sheet appreciation score					Lambing weight (kg)				
		\bar{X}	s	s ²	Max.	Min.	\bar{X}	s	s ²	Max.	Min.
2019	28	495.36	42.577	1,813	590	408	3.61	0.592	0.35	5.00	2.60
2020	36	488.53	50.47	2,547	610	375	5.01	0.857	0.73	7.10	3.70
2021	73	505.26	44.372	1,969	640	415	5.09	0.95	0.91	7.00	3.50
2022	42	493.02	44.105	1,945	605	400	4.55	1.004	1.008	6.20	2.30
2023	43	525.44	39.36	1,549	610	440	5.35	0.848	0.72	6.90	3.30
Year	N (total individuals)	Black line									
		Sheet appreciation score					Lambing weight (kg)				
		\bar{X}	s	s ²	Max.	Min.	\bar{X}	s	s ²	Max.	Min.
2019	188	510.17	42.209	1,782	610	423	3.59	0.471	0.22	5.00	2.20
2020	166	519.57	56.174	3,155	650	350	5.42	0.997	0.99	9.20	2.50
2021	295	503.36	39.112	1,530	613	375	5.05	1.03	1.05	7.60	3.00
2022	307	479.72	38.329	1,469	635	310	4.65	1.046	1.09	9.50	2.10
2023	200	508.10	37.481	1,405	620	400	4.97	1.036	1.07	7.90	2.30

As seen in Figure 1 the average score recorded a tortuous evolution, with relatively close values, the only exception is found in individuals from the Greyish Line who were destined for meat and in which the average score recorded the most different values, respectively with maxima in the years 2021 and 2023 and with lows in 2019, 2020 and 2022.

As seen in Figure 2 the average weight at lambing was improved during the analyzed period, the lowest values were recorded in 2019 with only one exception, respectively in the individuals sacrificed for skins at the Greyish line, where the lowest value was obtained in 2022, respectively 3.24 kg, this fact being due to the very small number of products slaughtered for skins that year.

The influence of rams used in breeding to improve meat production can be seen through the fact that since 2020, both the reproduction individuals and the meat individuals have increased the average birth weight by at least 1 kg.

This fact proves to us that the Karakul of Botosani breed can always manage the trends in the market, i.e. if at the moment meat production is required, then it can be directed towards improving this production, and if the market trend returns to the skin production, surely the Karakul of Botosani sheep can return to improve the quality of the curls and the useful surface, because during the analyzed period this aspect did not suffer a regression but on the contrary had, although insignificant, an improvement.

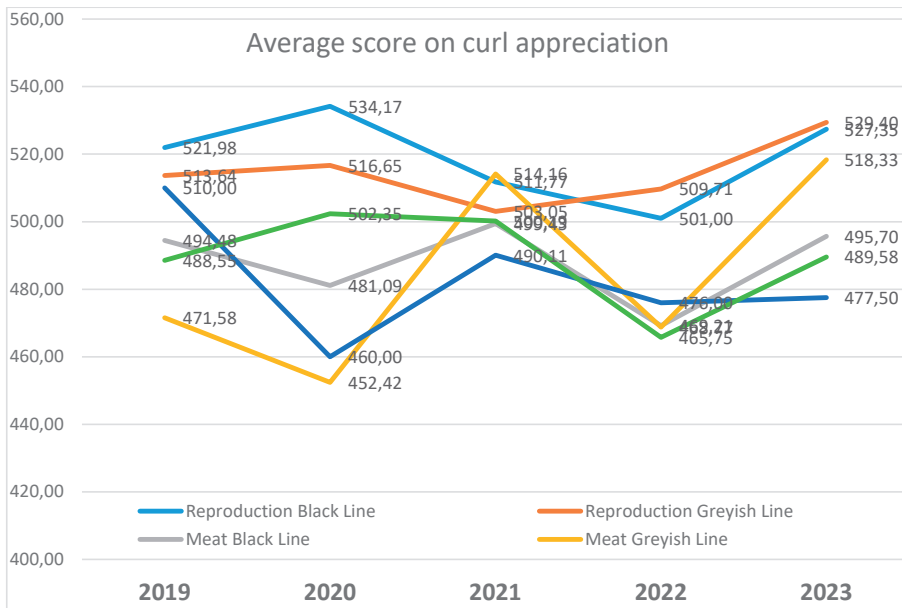


Figure 1. Dynamics of average score for curl appreciation at Black and Greyish lines during the analyzed period

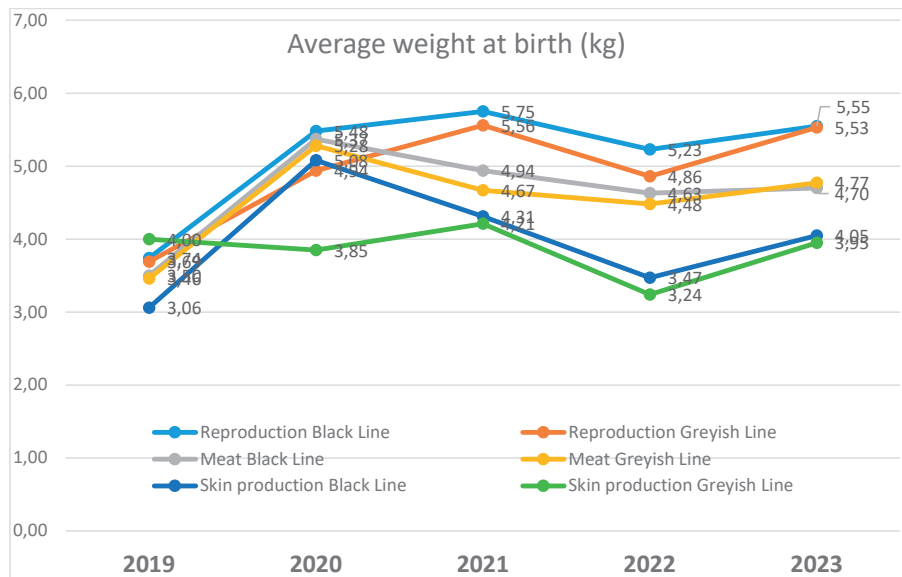


Figure 2. Dynamics of lambs average birth weight for Black and Greyish lines during the analyzed period

CONCLUSIONS

The interest in the skin production is decreasing, so the Karakul of Botosani sheep breeders are oriented towards increasing meat production, by obtaining products that have, from birth, greater weights, a fact that will help them in their latter growth and development.

For the massiveization of individuals from the Black and Greyish Lines, breeders (rams) with a body weight as high as possible are used, and this fact is observed with the assessment of the average weight at lambing, which reaches a maximum of 7.10 kg in 2020, at Greyish lambs and respectively 9.50 kg in 2022 for lambs from the Black line.

Every year, the lambs with a body weight at lambing as high as possible, and a high curl quality were kept for reproduction, in order to have in the following generations valuable parents for both meat and skin production.

The category of lambs slaughtered for skin production was represented by lambs from twin lambs or underdeveloped lambs whose mothers did not have enough milk to ensure their correct development.

The highest average weight at lambing was obtained for the Black variety in 2020, respectively 5.42 kg, and the best average skin quality score was obtained in 2023, for lambs from the Greyish line, respectively 525.44 points.

The Karakul of Botosani breed can always manage the trends in the market, i.e. if at the moment meat production is required, then it can be directed towards improving this production, and if the market trend returns to skin production, with certainty the Karakul sheep of Botosani can return to improve the quality of the curls and the useful surface.

The fact that the individuals with the best score in terms of the quality of skins can be found in those kept for reproduction, shows us the desire of the Karakul of Botosani sheep breeders to continue the activity of raising sheep for skin production in the hope that the demand for this production will return.

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