

MORPHO-PRODUCTION AND REPRODUCTION TRAITS OF THE COLOUR VARIETIES BELONGING TO THE BOTOȘANI KARAKUL BREED

CARACTERISTICILE MORFO-PRODUCTIVE ȘI DE REPRODUCȚIE ALE VARIETĂȚILOR DE CULOARE DIN RASA KARAKUL DE BOTOȘANI

FECIORU ELENA

Station of Research and Development for Sheep, Popăuți-Botoșani, Romania

To achieve this experiment, the biological material was represented by the Botoșani Karakul sheep, ewes and rams of different age categories and of different colour varieties (black, greyish, brown, grey, pink and white). The animals proceeded both from the elite farm of the R.D.S.S. Popăuți and from the production and private farms from the breeding area of this breed. The Karakul breed is specialized for the lamb pelt production. The classical colours are black and greyish. The genetic base of creation of new colour varieties was represented by black and greyish sheep which constitute a continue source of numerical and qualitative increase of these varieties applying adequate reproduction and selection technologies. The main morpho-production traits of sheep were mentioned, as follows: the qualitative features of lamb pelts, the body growth, the body conformation and constitution, reproduction aptitudes, milk production, framing in the specific parameters of the Botoșani Karakul breed.

Key words: Karakul sheep, reproduction, selection, colour varieties.

Introduction

The Botoșani Karakul sheep breed is specialized for the lamb pelt production. The classic colour of Karakul lamb pelts are black and greyish. But, by technological systems of selection, reproduction and improvement, in the Botoșani Karakul breed other colours were obtained too: brown, grey, pink and white; also, each colour presents more colour shades. The main trend in the Karakul sheep breeding is the diversification of colours and of their shades of lamb pelts (1, 2, 3). Therefore, this study has in view the inheritance modalities of the hair fibre colours by homogeneous and heterogeneous matings.

Materials and methods

The biological material was represented by ewes and rams of different colour varieties belonging to the Botoșani Karakul breed.

The identification and individualisation of the Karakul sheep populations

of brown, grey, pink and white colours, as well as the establishing of their improvement degree were important phases to achieve the proposed objectives.

The qualitative features of lamb pelts were analysed by the estimation method.

The mating nominalization: to pursue the inheritance of the hair fibre colour, as well as the main qualitative morphologic features of lamb pelts, from parents to their offspring, two types of mating were practiced, depending on the colour of couple partners: homogeneous and heterogeneous. The mating couples were formed of ewes of all six colours (black, greyish, brown, grey, pink and white) on the one hand, and brown, grey, pink and white rams, on the other hand.

Results and Discussions

The sheep of Karakul type are characterized by a specific arrangement of hair fibres in shape of curls in lambs; the curl moulding occurs in intrauterine phase. This shape of curls lasts the first 3 days of their life. This peculiarity is determined especially by genetic factors (different genes) but also by non-genetic factors (pregnant ewe nourishment) (2, 3).

The colour of lamb pelt is generated by the pigment concentration of different colours contained in the hair fibre structure. The pigments are in shape of granules and their type and concentration are controlled by certain genes which epistatically and complementary interact among them. The activity of these genes is influenced by modifying genes and non-genetic factors too.

The modifying genes are able to influence positively intensifying the action of main gene or negatively repressing this action. There are more modifying gene pairs because the variability of colours and of their shades is very ample. These genes have additive action and can be accumulated in population by controlled selection.

The populations of black and greyish Karakul constituted the genetic base for the setting up of the colour varieties. At the same time, these populations represent an important source of numeric and qualitative increase, applying adequate reproduction and selection techniques.

The breed parameters are:

- curls in shape of cylinder tube, grain, flat tube, rib, with parallel drawing;
- lamb pelts framed in the zootechnical classes Elite and Record: 80-85%;
- average surface of lamb pelt: 1500-1600 cm²;
- average lamb body weight at birth: 3.8-4 Kg;
- body weight of adult sheep: 40-45 Kg (ewes) and 60-80 Kg (rams);
- total milk production on a milking season: 60-80 l;
- wool production: 3 Kg (ewes) and 4.5 Kg (rams);
- fecundity: 95-97%; birth rate: 102-104%; prolificacy: 105-108%;
- typical body conformation: dolicomorph;

-high viability and increased natural resistance, as well as a perfect adaptability at the environment conditions of the north-eastern Moldavian areas;

The population of brown Karakul is characterized by brown monochromatic hair fibres. The pigment is uniformly arranged on the whole

surface of hair fibres, the lamb pelts having an emphasized lustre and a silken quality. The colour shades varies from dark chocolate till beige.

The grey Karakul sheep represent a special variety of this breed. The characteristic pigmentation of hair fibres is dark at the fibre base and light at their top. The shades of grey colour depend on the proportion and contrast of colour between base and top of hair fibre, the length of light of fibre, the opening degree of curls and on the pigment nature. These shades could be: silvery, golden, tanned, peroxidized, amber, cinnamon. The hair fibres which make up the curls are heterochromatic, the melanocytes being situated at the hair fibre base.

In the pink variety, the colour is expressed by the combination of white and brown fibres, the brown pigmentation intensity of fibres and by the concentration and disposing of pigment. The shades of pink colour vary from pale-pink to dark brick-coloured. The white variety appeared as a result of a genetic mutation which was strengthened in population by selection and crossing. The white colour is owing to presence of white melanistic pigment which is uniformly distributed on the whole surface of hair fibre. The shades of this colour as, pure-white (ermine), yellowish and dirty-white, are expressed depending on the pigment concentration.

The most important way for the quantitative and qualitative increase of brown Karakul is the homogeneous mating (78%). Also, other brown individuals result from heterogeneous mating between brown rams and grey and white ewes (35%) but especially with pink ewes (50%). No brown lambs results from mating of brown rams with greyish females (tab. 1). The brown offspring resulted from homogeneous matings have uniform colour, curls in shape of flat rib (75%), silky hair (59.4%) and good lustre (59.4%). The combined curls in shape of tube-grain (25%) are present too. The lambs resulted from heterogeneous mating present curls in shape of flat rib (62.5%), elastic-silky hair (87.5%) and intense lustre (62.5%). From these matings, the ram being brown, there are also resulted more important samples of black lambs when the ewes were black, greyish or grey, greyish lambs when the ewes were pink, grey lambs when the ewes were grey and white lambs when the ewes were white. The frequencies of these lambs resulted from the other matings is lower or null.

Table 1

Combinative effect of the homogeneous and heterogeneous matings between brown rams and ewes of different colour varieties in the Botoşani Karakul breed

Brown rams <i>X</i> ewes	Offspring (%)					
	Black	Greyish	Brown	Grey	Pink	White
Black	85.6	2.9	7.7	0.9	-	2.9
Greyish	88.9	-	-	-	11.1	-
Brown	2.4	4.9	78.0	9.8	-	4.9
Grey	40.0	-	35.0	25.0	-	-
Pink	-	50.0	50.0	-	-	-
White	14.3	-	35.7	17.9	-	32.1

The segregation ratio of grey colour from matings between grey rams and

females of different colours is very variable. Many pink lambs result from homogeneous mating (55.2%), but as well from heterogeneous mating of grey rams with pink ewes (40%). The other mating types have a lower contribution to the grey lamb birth (tab. 2). The grey lambs have curls in shape of flat tube and rib (80-83%), emphasized silken quality of hair fibre (90%) and intense lustre (62.5%). The offspring framing in the Record class is 93.5% grey lambs resulted from homogeneous matings and 40-45% grey lambs resulted from heterogeneous matings. From these matings, the ram being grey, there are also resulted more important samples of black lambs when the ewes were black or greyish, greyish lambs when the ewes were greyish, brown lambs when the ewes were brown, white or grey, pink lambs when the ewes were pink or greyish and white lambs when the ewes were white. The frequencies of these lambs resulted from the other matings is lower or null.

Table 2

Combinative effect of the homogeneous and heterogeneous matings between grey rams and ewes of different colour varieties in the Botoşani Karakul breed

Grey rams <i>X</i> ewes	Offspring (%)					
	Black	Greyish	Brown	Grey	Pink	White
Black	77.3	3.5	14.2	4.3	-	0.7
Greyish	28.7	33.3	4.8	9.5	23.7	-
Brown	3.7	1.9	57.4	24.1	3.7	9.2
Grey	17.2	-	27.6	55.2	-	-
Pink	-	-	-	40.0	60.0	-
White	9.1	-	54.5	13.6	4.5	18.3

The pink lambs result in relatively balanced proportions from all matings between pink males and ewes of different colour varieties. However, most pink lambs derive from homogeneous matings (43.3%), as well as from heterogeneous mating of pink rams with grey (40%) and brown females (36.4) (tab. 3). The predominant curls

Table 3

Combinative effect of the homogeneous and heterogeneous matings between pink rams and ewes of different colour varieties in the Botoşani Karakul breed

Pink rams <i>X</i> ewes	Offspring (%)					
	Black	Greyish	Brown	Grey	Pink	White
Black	37.7	36.2	5.8	8.7	11.6	-
Greyish	24.5	44.9	4.8	-	23.8	2.0
Brown	18.2	8.5	22.7	13.6	36.4	4.5
Grey	-	-	20.0	40.0	40.0	-
Pink	16.7	13.3	13.3	6.7	43.3	6.7
White	-	-	26.7	6.6	26.7	40.0

are mixed in shape of rib and flat tube, the hair is normal and silky and the lustre is good or very good. The frequency of these features varies between 60% and 80%. The proportion of pink lambs resulted from these mating types which belong to the Record class is 60%. From these matings, the ram being pink, there also resulted more important samples of black lambs when the ewes were black or greyish, greyish lambs when the ewes were greyish or black, brown lambs when the ewes were white, brown or grey, grey lambs when the ewes were grey and white lambs when the ewes were white. The frequencies of these lambs resulted from the other matings is lower or null.

Only black, greyish, brown and white ewes were used in the mating case with white rams. The homogeneous matings create 89% white lambs. An important contribution for the increase of white lamb population has the heterogeneous mating between pink males and greyish females (66.7%). The other two mating types produce less white lambs (tab. 4). 75% lambs have a pure-white shade. The curls

Table 4

Combinative effect of the homogeneous and heterogeneous matings between white rams and ewes of different colour varieties in the Botoşani Karakul breed

White rams <i>X</i> ewes	Offspring (%)					
	Black	Greyish	Brown	Grey	Pink	White
Black	56.3	6.3	9.3	-	3.1	25.0
Greyish	33.3	-	-	-	-	66.7
Brown	20.0	-	40.0	20.0	-	20.0
White	5.3	2.1	0.5	0.5	2.6	89.0

are in shape of open grain (over 90%) and have middle and big size (80%), the hair quality is normal and soft (50-60%) and the hair lustre is good (57%). Most white lambs are framed in the Ist class (61.4%) and 38% in the Elite class. The significant percentage of white lambs framed in the Ist class is caused by the big and open curls, long and soft hair and absence of a certain curl modelling. Therefore, the improvement objectives of this variety are shortening the hair fibre and curl uniformity. From these matings, the ram being white, there also resulted more important samples of black lambs when the ewes were black, greyish or brown, brown lambs when the ewes were brown, grey lambs when the ewes were grey and white lambs when the ewes were white, greyish, black or brown. The frequencies of these lambs resulted from the other matings is lower or null.

Conclusions

1. The paper analyses the acquirement ways of coloured lambs (brown, grey, pink and white) belonging to the Botoşani Karakul breed depending on the mating types, the mating couple being formed of brown, grey, pink and white rams and black, greyish, brown, grey, pink and white ewes.

2. The surest modality to obtain lambs of a certain colour is represented by

homogeneous matings, the two mating couple partners having the same colour, similar the one of their offspring. In this way, most of lambs of this colour variety are obtained; the other lamb lot results from heterogeneous matings in which the ram has the same colour with the one of its offspring and the ewes can belong to the other five colour varieties. The contribution of the heterogeneous matings is variable depending on some colour peculiarities of ewes and on the colour segregation modalities.

3. Beside the targeted colour from a certain mating type, lambs with other colours can appear from each mating type either homogeneous or heterogeneous.

3. Also, beside coloured lambs, different percents of black (more) and greyish (less) lambs can result from heterogeneous matings.

4. The accuracy of mating nominalization is the most important condition to obtain coloured lambs of the Botoșani Karakul breed with valuable zoo-economic features of lamb pelts.

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FECIORU ELENA

Stațiunea de Cercetare Dezvoltare pentru Ovine Popăuți –Botoșani

Pentru realizarea acestui experiment materialul biologic a fost reprezentat de ovine Karakul, oi și berbeci de diferite categorii de vârstă și de diferite varietăți de culoare (neagră, brumărie, maro, sur, roz și albă). Animalele au provenit atât din ferma de elită a SCDO Popăuți, cât și din fermele de producție și private din zona de creștere a acestei rase. Rasa Karakul este specializată pentru producția de pielicele. Culorile clasice sunt neagră și brumărie.. Baza genetică de creare a noilor varietăți de culoare a fost reprezentată de oi negre și brumării care constituie o sursă de sporire numerică și calitativă a acestor varietăți prin aplicarea unor tehnologii adecvate de reproducție și selecție. Au fost menționate principalele trăsături morfo-productive ale ovinelor, după cum urmează: însușirile calitative ale pielicelelor, greutatea corporală, conformația și constituția corporală, aptitudinile de reproducție, producția de lapte, încadrarea în parametrii specifici ai acestei rase.

Cuvinte cheie: oaie Karakul, reproducție, selecție, varietăți de culoare.