THE MODEL OF MOLDAVIAN KARAKUL LAMBS OF REQUESTED TYPE

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Abstract

The purpose of researches is to identify the types of Karakul lambs models of requested type and elaboration of their construction method. The analysis was made of Karakul lambs valuation, results in the sheep herd of National Institute of Zootechnic and Veterinary Medicine (Maximovca, county Anenii Noi). Based on the assessment of the analysis results of the characters manifestation degree have been calculated main genetic parameters of Karakul lambs. Genetic parameters were used to develop credible borders, of characters and attributes for the model of requested type of lamb and calculation of prognostic of selection effect. The following models have been defined for individual's selection in batches and breeding cores: the male model for own breeding; the male model for third breeding (breeding for marketing); * female model for own breeding; ** female model for third breeding (breeding for marketing). For each of these animal models have been set optimal parameters of credible borders (minimum requirements, which are very strict for all models of lambs and, maximum permissible, which relates only to some characters and models) of selection characters and properties. Most stringent requirements were set out in model selection for male lamb of own breeding. The minimum acceptable level limits of characters manifestation and morpho-productive features for lambs selection in this batch are: $V_{1,min} \geq M+1,8·σ$. All lambs of this model had to be hornless. The intensity selection of these individuals model is very high and compiles 3-4%. The second model - female model for own breeding includes minimum and easier requirements, compared with the male model, but quite high, characteristic for best part of plus-variants. Their value is: $V_{2,min} \geq M+0.2·σ$. The third model of lambs is the male for third breeding male, it has the level of characters and features manifestation content within following limits: $V_{3,min} \geq M-0,2·σ$ and $V_{3,max} < M+1,8·σ$. In this lambs model were included best part of I class muttons $(V_{3,min} \geq M-0,2·σ)$ and the remaining part (with exception of V_1 mutton) of the upper class (elite). The fourth model of lambs is a female for third breeding, with the level of characters and features manifestation, content within following limits: $V_{4,min}$ = class II and $V_{4,max} < M+0,2·σ$. Ewe lambs of this model are included in breeding batch for genitor material's marketing and it's reproduction at third farms. It was proposed to reduce the number of valuation characters by grouping them into 7 synthetic basic characters, after which would be possible to perform the selection.

Key words: model, selection, lamb, Karakul, characters, synthetic

INTRODUCTION

Construction of animals' models for selection was a continuous preoccupation of researchers, selectors and animal breeders from different countries. Most researches in this domain were made in branches of breeding pigs, cattle, and poultry.

In the sheep breeding branch are known methods of construction and application of models based mainly, on milk production of females.

Thus, Barillet F. and col. [1] have developed and applied to Lacaune race, the animal model, in order to assess the genetic value, on the basis of milk production, measured periodically at first lactation of the ewes.

In the practice of improving genetic populations, selectors are defining more animal models.

For example, Horia Grosu and Pascal A. Oltenacu [3], for predicting the improving value of the animal and selection effect, use a whole string of notions of the animal model such as:

- Individual animal model;

- Individual animal model with genetic groups;

- Breeding male model;

- Reduced animal model;

- Animal model with repeatability;

- Animal model with common environmental effect;

- Model of the control day;

- Animal model with non-additive genetic effects;

- individual animal model for multiple characters

- Animal model with maternal effects.

To determine these animal models, authors are using main genetic parameters and a number of mathematic equations, based on BLUP system (*Best Linear Unbiased Prediction*), which is a combination between the method of most small squares and the theory of selection index.

The Karakul breed, generalizing the results of manifestation degree assessment and multiple characters and features of lambs' qualities variability, the selectors gets to the stage where the main objective of herd's genetic improvement is selection of required type individuals and forming following lambs groups in herd:

● Breeding nucleus for own herd reproduction;

●● Breeding batch for others herds reproduction (marketing breeding);

●●● Lambs batch for furs;

●●●● Lambs batch for growth and fatten for meat.

Researches on finding the animal model of Karakul lamb, in new literature are rarely encountered.

In this context, the purpose of our researches is to identify the model types of Karakul lamb of required type and elaboration of their construction method.

MATERIAL AND METHODS

In order to fulfil our purpose, over several years, has been done the analysis of Karakul lambs valuation results in sheep herd of the National Institute of Zootechnics and Veterinary Medicine (Maximovca, county Anenii Noi). Karakul lambs valuation was done according to methodology developed by us Instructions for Karakul sheep's valuation, with melioration principles from Republic of Moldova, approved by Ministry of Agriculture and Alimentation of 1996 [2].

Based on analysis of characters manifestation degree assessment, were calculated main genetic parameters of the population: n – number of animals from herd or batch, M – arithmetic average of character from animal population, m – arithmetic average error, C – dispersion (diversity) or sum of central deviations squares, σ – average deviation of squares (sigma) or the absolute coefficient of character's variability, C_v - relative coefficient of character's variability, r_{xy} - characters correlation coefficient, R_{xy} - characters regression coefficient, h^2 - characters heritability coefficient. Genetic parameters, calculated on researched sheep population, were used to develop credible borders of characters and features, for the lamb model of requested type and calculation of selection effect prognostic.

Experience data have been processed in accordance with biometric variation statistic, after the methods of Plohinschii N. A. 1969 [7].

RESULTS AND DISCUSSIONS

Taking into account, the main selection objective, and genetic melioration labour to create the Moldavian Karakul sheep type, we defined following models of lambs for individuals' selection in breeding batches and nucleus.

● Male model for own breeding;

●● Male model for third breeding (marketing breeding);

* Female model for own breeding;

** The female model for third breeding (for marketing breeding).

For each of this animal model, have been set optimal parameters of credible borders (minimum requirements, which are very strict for all lambs models and, maximum permissible, which relates only to some characters and models) and selection characters and features (tab. 1).

Table 1 Parameters of credible borders of morpho-productive characters and features *Moldavian Karakul lamb model* depending by its destination

Nr d/o	Character, feature	Credible borders, *point/size*			
		Model for own reproduction		Model for third reproduction	
		Male	Female	Male	Female
1	Race purity	9-10	8-10	8-10	7-10
2	Skull shape	9-10	7-8	6-8	4-8
3	Ears shape	9-10	7-10	7-10	4-8
4	Tail shape	9-10	7-10	7-10	4-9
5	Color and shade	9-10	7-10	6-10	4-10
6	Coloration	9-10	8-10	7-10	5-10
7	Coloration uniformity	8-10	6-10	6-10	4-10
8	Curls share, %	80-100	60-100	50-100	40-70
9	Curls type	9-10	7-10	7-10	6-10
10	Curls size, *mm*	6-12	6-12	4-12	4-12
11	Curls length, *mm*	>40	>30	12-30	7-30
12	Resistance and elasticity	9-10	6-10	5-10	3-5
13	Curling direction	9-10	6-10	5-10	4-10
14	Curling degree	7-9	7-10	5-12	5-12
15	Curls extension	7-10	6-10	5-10	3-10
16	Curls modeling	9-10	7-10	5-10	4-10
17	Modeling type	8-10	7-10	5-10	3-10
18	Fibers density	8-10	8-10	6-10	4-10
19	Fibers length, *mm*	7-12	7-13	7-13	7-15
20	Fibers thickness	7-10	6-10	5-10	3-10
21	Fibers silkiness	9-10	7-10	6-10	3-10
22	Fibers gloss	9-10	7-10	6-10	3-10
23	Skin thickness	7-8	6-8	4-8	3-9
24	Skin density	8-10	6-10	6-10	3-10
25	Skin reserve and flexibility	8-10	6-10	6-10	3-10
26	Body weight, kg	4,8-5,3	4,5-5,3	4,5-5,3	4,0-5,3
27	Body length, cm	35-38	31-36	30-36	27-35
28	Structure	8-10	5-10	5-10	3-10
29	General class	9-10	7-10	5-8	3-6

From presented data, results that most strict requirements are established at selection of male model for own reproduction. The minimum acceptable level limits of morpho- productive characters and features manifestation for lamb's selection in this batch are:

$$V_{1,min} \geq M + 1{,}8 \cdot \sigma$$

Where,

$V_{1,min}$ – characters (features) minimum value for first lambs model – male for own breeding;
M – characters (features) average value in herd;
σ - squares' (sigma) average deviation or absolute coefficient of character's variability;

$1{,}8$ – coefficient calculated by us, depending on individuals frequency at different sigma's intervals towards the average character (feature) of herd and of necessary number to complete the lambs' batch of relative model.

In addition to these characters and features from the table, at selection of male model for own breeding, is taken into consideration also the feature of hornless. All muttons of this model must be without horns. The intensity of individuals' selection of this model is very high and is 3-4%. At the same time, the credible borders variability of selected characters and features values is very restricted and it is up to 8-10 point. All these, allow efficiency and difference

increase of selection, and also a high level of heredity consolidation of selected characters and features manifestation.

Female model for own breeding includes less and easier requirements, compared with male model, but quite high, proper for a bigger part of plus-variants. Their value is:

$$V_{2,min} \geq M+0,2\cdot\sigma$$

Third lambs model is the male for third breeding, which has a characters and features manifestation content within next limits:

$$V_{3,min} \geq M-0,2\cdot\sigma$$
$$V_{3,max} < M+1,8\cdot\sigma$$

In this lambs model is included the bigger part of first class mutton ($V_{3,min} \geq M-0,2\cdot\sigma$) and the rest part, with exception of superior class muttons (elite) $V_{1,min} \geq M+1,8\cdot\sigma$.

Mutton of first class, which are not included in minimal limit ($V_{3,min} \geq M-0,2\cdot\sigma$), and all other muttons from second class are sacrificed (at 1-3 days after birth) to get their fur.

Forth lambs model is the female for third reproduction, which has a characters and features limits content within next limits:

$$V_{4,min} = \text{class II}$$
$$V_{4,max} < M+0,2\cdot\sigma$$

Ewe-lambs of this model are included into breeding batch for genitor materials marketing and its reproduction in third farms.

All lambs, both males and females, which do not correspond with minimum requirements of second class, are left to grow and fatten for meat, because their fur does not have competitive commercial value.

Analyzing all these characters and features of Karakul lambs valuation, we can conclude that it is quite large number (29), which makes complicate the selection process, because the increase of characters number, by which the selection is made, leads to proportional decrease of its melioration rhythm.

Rhythm decreasing of each character's genetic melioration, in case of simultaneous selection after further characters, is equal to one, divided by square root of selected characters number. Therefore, the selection efficiency after further characters is reverse proportional to the number of selected characters, and in other conditions decreases $1/\sqrt{n}$ times, compared to selection after a single character [4, 5, 6].

In this context, reduction of characters number by which is made the selection, takes a particular importance in improving the selection efficiency.

Given that, researches described in the table above, have shown that some groups of morpho productive characters and features of Moldavian Karakul lambs correlates closely with each other, makes it possible to reduce their number by grouping them in some synthetic characters, after which the selection could be performed. Synthetic characters (features) are appreciated detailed by selector at valuation, and in register will be written the symbol and the score note (for quality features), or the number in measure units (for quantitative characters).

Most morpho-productive characters and detailed features can be grouped into following synthetic characters (features).

1. *Race manifestation* - assess the racial purity, skull, ears and tail shapes. The manifestation degree of this feature can be: excellent, appropriate, weak and insufficient. In valuation register will be written the assessment with relative symbols and score note, content within 1 to 10 points.

2. *Colour and shade* – contents assessment of colour, shade, coloration, and uniformity of it. In valuation register will be described with some words (symbols), which will show the colour, coloration, their uniformity and manifestation degree by: excellent, appropriate, weak and insufficient, accompanied with relative score note from 1 to 10. For example: n.int.exc-9; br.albăst.potr-6; gold-grey.sl-4; etc.

3. *Curls type and quality* - content assessments of different types and shapes of curls, their category, size, length, resistance, flexibility, curling direction, extension and modelling, type of modelling. In valuation register, this feature will be noted by the symbol of curls type and other features manifestation degree with: excellent, appropriate, weak and insufficient,

accompanied with relative score note from 1 to 10. For example: jac.exc-9, cost.potr-7, kauk.red-3, brac.ins-1.

4. *Fibbers quality* – contents assessment of density, thickness, silkiness, and gloss of fibbers, noted with: excellent, appropriate, weak and insufficient, accompanied with relative score note from 1 to 10. For example: exc-10, potr-5, sl-3, ins-2.

5. *Fibbers length*– is a very important quantity character. Will be determined individually at the lamb's valuation, with a millimetre ruler, according to method of Union Institute of Scientific Researches for Kara culture (ВНИИК, 1963) and will be written in valuation register in millimetres.

6. *Fur quality* – contents assessment of fur thickness, density, reserve and flexibility, expressed by words: excellent, appropriate, weak and insufficient. In valuation register will be written these words symbols, accompanied with relative score note from 1 to 10. For example: exc-9, potr-7, sl-4, and ins-2.

7. *Body length* – contents, by correlation connections, lamb's body appearance and its weight. Given that, body length at the valuation shows more accurately the lamb general body development at birth, and has a low variability (C_v = 4 - 9%), so it's more hereditary consolidated. We have included this character into valuation instructions as basic and efficient. Lambs selection at birth, after body length, can successfully substitute the selection after body weight, at valuation; weight is much influenced by the quantity of lambs mother's milk at first suck. This has a big variability (C_v = 15 - 25%), and it does not reflect accurately the general genotypic development of the lamb.

8. *Lamb's general class at valuation* – contents a synthesis of first 7 characters and is determined according to methods described in Instructions [2]. So, the lamb's summary class (general) at valuation is a selection index in its essence, but the principal difference consists is that ordinary summary assessment of the class, depending on selected characters and features number, does not reflect the economic share of each character and lambs' quality features at valuation.

CONCLUSIONS

1. For Moldavian Karakul lambs breeding have been defined four lambs' models of requested type: male model for own breeding, male lamb for third breeding, female model for own breeding and female model for third breeding.

2. Reduction of characters (features) number, according to which, at valuation, are selected Karakul lambs (from 29 to 7), leads to higher selection efficiency and allows the construction of compact selection models.

3. To build the Karakul lamb's model of requested type, besides the class as a synthetic character, is required additional information of at least 7 synthetic basic characters used in selection.

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