

## GENOTYPIC ASSESSMENT OF KARAKUL EWES AFTER FURSKIN QUALITIES OF THE PROGENY

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### Abstract

The purpose of the research consists in improving the assessment methodology and technology of the genotypic quality of the Karakul ewe furskin. Research has been done on a flock of Moldovan Corpulent Karakul sheep breed in the flock of Institute of Zootechnics and Veterinary Medicine (village of Maximovca, Anenii Noi district). It has been researched fur skin qualities of new born lambs, descendants of ewes batches of different evaluation classes: elite, class I and class II, similar after the body weight and age, inseminated with same rams. Assessment of fur skin qualities of the lambs was made at 1-2 days after birth, through evaluation, as required by evaluation instructions in force, providing the evaluation of characters value, as much after the terminology system (in words), as after the decimal point system. As a result of the evaluation, the furskin qualities of Karakul lamb at birth are expressed in evaluation class, as an integrated character. Research has shown that Moldovan Karakul ewes, inseminated with the same ram, in all other equal conditions, transmit to descendants, mainly, their furskin qualities. Thus, the elite class sheep, inseminated with same rams, have given birth to lambs of the same class (elite) in the ratio of 43,7-60,0%, first class ewes gave birth to progeny of the same class 49,0-52,3% and second class ewes gave birth to lambs of the same class with 37,91 – 52,9%. At the same time, part of the ewes does not produce progeny in accordance with the settled regularity. This depends on the genotype of ewes after furskin qualities of progeny and is carried out according to the genetic compatibility of mating partners. The presented data confirms that heredity of furskin qualities (class) at Karakul lambs is polygenic and has an intermediate character with a regression trend compared with the average of flock. The manifestation degree of furskin traits of descendant, in all equal conditions, depends on their heritability coefficient of related flock, of genetic compatibility of the parents, the prepotence degree of the rams and suitable ewes for mating. For estimating the genotype value of furskin quality at Moldovan Karakul ewes, was proposed a method of determination using the following formula:

$$G_{cp} = \frac{F_p + F_1 + F_2 + \dots F_n}{n + 1}$$

The formula includes the sum of the lambs-descendants phenotypes, expressed by thus ranking with scoring drives after the decimal system. Taking into account the fact that the phenotype of their own productivity reflects also, in part, hereditary potential of the animal, the genotype value of the ewes after furskin qualities, taken as a whole, can be determined by summing up the own phenotype value with the phenotypes of descendant lambs. This allows the definition of each animal's rank in the flock and deduction of the breeding nucleus with the most valuable females.

**Key words:** evaluation, genotype, Karakul ewe, quality, furskins

### INTRODUCTION

In the karaculture is granted a big importance, as a rule, to genetic value assessment of breeding rams [2, 3, 4, 6], and this fact is natural, because their influence on

the genetic structure changes of sheep population is much larger than that of females. On the background of this evaluation, often, assessment of genotypic value of ewes, after their furskin qualities, is underestimated. At the same time, creating valuable nucleus of breeding females and genetic enhancement of morph-productive characters in flock (population) are

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impossible without an accurate assessment of the genotypic value of females. Revealing the most valuable ewes, which transmit constantly to progeny performance qualities, can be done only through genotypic value evaluation of each ewe in part, from the overall population of the flock. General principles of genotype value assessment of female animals, including sheep, are known from scientific literature (6, 7, 9, 10, 11). At the same time, the methodology and evaluation technique of genotypic value of Karakul ewes after furskin qualities are not known enough. Even in the last assessment instructions of Karakul sheep with principles of improvement, which are in force in Republic of Moldova [1], methodological issues and technical appreciation of ewes genotypic value after their furskin qualities are not completely described.

Given the fact, that the adult ewe has at ears, respective notches, marked at its assessment by the age of lamb, at 1-2 days after birth, indicating the class, the loop size and coloration (at greyish and grey sheep), we can conclude that, the ewe genotypic value after furskin qualities has already been partially assessed, at the first stage, after its own productivity (phenotype). However, this assessment is considered to be prior and partial, because the amount of own phenotypic traits does not guarantee exactly the genotypic value of the animal and does not provide its ability to transmit its phenotypic qualities to the offspring. Therefore, the determination of real genotypic value of the ewe and capacities' determination, as well as the degree of hereditary transmission of furskin characters and properties, can be deduced only by testing them after progeny qualities.

## MATERIAL AND METHOD

Research has been done on the sheep flock of Moldavian Corpulent Karakul breed from the flock of Institute of Zootechnics and Veterinary Medicine (Maximovca village, district of Anenii Noi). There were researched the qualities of furskin qualities of new born lambs, descendants of ewes from different batches in profile of assessment classes: elite class, I class and II class, similar

after body weight and age, inseminated with same rams. Furskin qualities assessment of the lambs was done at 1-2 days after birth, through evaluation, according to evaluation instructions in force [1], which provides for estimating the character value, as after the terminology system (in words), so after the decimal point scoring. As a result of the evaluation, the furskin qualities of the Karakul lamb at birth, is expressed in evaluation class, as an integrated character.

The data obtained in the experiments, were processed statistically using computer software "STATISTICS-6" and appreciated their certainty, according to variational biometric statistics, according to methods of Плохинский Н. А. 1969 [12].

## RESULTS AND DISCUSSIONS

Research has shown (tab. 1) that Moldovan Karakul ewes, inseminated with same rams, in all other equal conditions, transmit to the offspring, mainly, their furskin qualities. Thus, elite class ewes, inseminated with ram No.9085, have given birth to lambs of same elite class in proportion of 43.7%.

At the same time, from the data presented is evident that only a part of the ewes, inseminated with one and the same ram, hereditary transmitted their furskin qualities to offspring. The progeny of elite class ewes, inseminated with ram No.9085, 31.3% of them were I class and 25.0% II class lambs. I class ewes, inseminated with the same ram, have given birth to lambs of the same class (I class) in proportion of 49.0%. In the progeny of these ewes are also 26.5% lambs of elite class and 24.5% lambs II class. The ewes of II class, inseminated with this ram, have produced progeny of the same class in proportion of 52.9%, as well as of elite class-17.7% and I class - 29.4%. Such a tendency is noticed at the ewes, inseminated with ram No.7001. The elite class ewes, in overwhelming majority, gave birth to lambs-descendants of the same class in proportion of 60.0%. I class ewes have given, mainly, to descendants of I class (52.3%).

A similar regularity is noticed at I and II class ewes, inseminated with ram No.2049, who gave birth to the same class progeny in proportion of 48.1 and 37.9%.

Table 1 Moldovan Karakul lamb ranking depending on mother-ewes class

Mother - ewes		Descendant – lambs born unipar					
Class	n	Elite		I class		II class	
		head	%	head	%	head	%
Ram No. 9085, elite class							
Elite	16	7	43,7	5	31,3	4	25,0
I class	49	13	26,5	24	49,0	12	24,5
II class	17	3	17,7	5	29,4	9	52,9
Ram No. 2049, elite class							
Elite	23	4	17,4	13	56,5	6	26,1
I class	79	24	30,4	38	48,1	17	21,5
II class	29	8	27,6	10	34,5	11	37,9
Ram No. 9206, elite class							
Elite	9	3	33,3	6	66,7	-	-
I class	28	11	39,3	10	35,7	7	25,0
II class	12	2	16,7	9	75,0	1	8,3
Ram No. 7001, elite class							
Elite	25	15	60,0	2	8,0	8	32,0
I class	86	22	25,6	45	52,3	19	22,1
II class	46	9	19,6	21	45,6	16	34,8

Therefore, ranking analysis of these rams descendants-lambs, in profile of ewes-mothers class, demonstrates that they (the ewes), transmitted to descendants, mostly, the furskin qualities of their class.

At the same time, taking into account the fact that genotypic value of the character has multiple sources of decisive achievement, so of direct effect of polygenic complex genes, and as gene interactions, which may be allelic and no allelic [8], the ewes genotype after progeny furskin qualities is carried out according to the genetic compatibility of mating partners.

Thus, in the example above, we see that elite class sheep, sawn with ram No.2049, and sheep sawn with ram No.9206, having no

proper genetic compatibility, do not fit within established respective regularities.

The data presented confirm that heredity of furskin qualities (class) at Karakul lambs is polygenic and has an intermediate character with regression tendency toward the average of flock. The manifestation degree of descendant's furskin traits, in all other equal conditions, depends on the heritability coefficient in the flock, on genetic compatibility of parents, on prepotence degree of rams and ewes for mating etc.

Genotypic value of the ewe after the furskin qualities can be determined, more objectively, analysing the descendants qualities over some years (tab. 2).

Table 2 Genotypic quality of furskin value at Moldavian Karakul ewes determined after ranking of descendants-lambs

Mother - ewe		Descendants – lambs, class/score in profil for years					Value of ewe geno-type, score	Rank
Individual No.	Class/score	1999	2000	2001	2002	2003		
7007	el / 9	I / 6	el / 9	el / 9	el / 8	II / 3	7,33	4
7002	el / 8	I / 7	el / 8	I / 7	I / 6	el / 9	7,50	3
7005	I / 6	I / 7	II / 4	II / 3	I / 5	I / 6	5,17	11
7015	I / 7	I / 7	I / 6	II / 4	I / 5	II / 4	5,55	9
7001	el / 8	I / 5	el / 8	I / 7	el / 9	I / 7	7,33	5
7022	I / 6	el / 8	I / 7	I / 7	II / 4	el / 8	6,67	6
7040	II / 4	II / 4	I / 7	I / 7	I / 5	I / 6	5,50	10
7004	el / 9	el / 9	I / 7	el / 9	I / 7	el / 9	8,17	1
7042	I / 7	I / 5	I / 7	I / 6	I / 5	I / 7	6,17	8
7043	II / 3	I / 5	I / 7	II / 4	II / 4	II / 3	4,33	13
7045	I / 6	I / 7	I / 5	el / 9	I / 7	II / 4	6,33	7
7044	I / 7	el / 8	I / 7	el / 8	el / 10	I / 7	7,83	2
7009	I / 6	II / 3	I / 5	II / 4	I / 6	I / 6	5,00	12

Analysing the lambs-descendants ranking, we detect that some ewes, in several births, gave birth to higher classes lambs, which confirms that the genotype of furskin qualities of those is more valuable, and vice versa, ewes which, several years in a row, gave birth to lambs from lower classes, has a less valuable genotype. Therefore, more the ewe has many descendants of higher classes, with both its genotype is more valuable. In this sense, our vision coincides with those of researchers who consider that "the assessment of selection candidate (animal) through several performances equates to evaluation after genotype" [5]

Thus, the ewe genotype after furskin qualities can be determined as a summary of the lamb-descendants phenotypes, expressed by their ranking in the scoring units. Taking into account that, the phenotype of own productivity reflects itself, in part, hereditary potential of the animal, the ewe genotype value after furskin qualities, can be determined by summing the value of own phenotype value with phenotypes of lambs-descendants, according to the following formula:

$$G_{cp} = \frac{F_p + F_1 + F_2 + \dots F_n}{n + 1}$$

where,

$G_{cp}$  / ewe genotype value after the furskin qualities, expressed in points, according to the decimal system;

$F_p$  – the own phenotype of the ewe furskin qualities, expressed by the score of evaluation class;

$F_1$  – the phenotype of furskin qualities of the first lamb, expressed by the score of evaluation class;

$F_2$  – the phenotype of furskin qualities of the second lamb, expressed by the score of evaluation class;

$F_n$  - phenotypes of furskin qualities of other lambs, expressed by the score of evaluation class;

$n$  – number of descendant-lambs of the ewe subjected to testing after the furskin qualities.

According to instruction provisions in force, the evaluation class value of Karakul lamb (or ewe at lamb age) is contained within the limits from 1 to 10 points. Therefore,

according to this formula, the genotype of the ewe after furskin qualities will also be contained within same limits.

For example, the genotype value of ewe No.7007 after the furskin qualities is:

$$G_{cp} nr.7007 = \frac{9+6+9+9+8+3}{5+1} = \frac{44}{6} = 7.33$$

From the data presented in the above table, it is evident that the highest genotype value after furskin qualities has the ewe No.7004. The genotype value of this ewe after the furskin qualities is 8,17 points, placing on first place in the number of ranks of the ewes flock, on this table. Second rank, in this series, has the ewe with individual number 7044, which has the genotype value of this character equal to 7,83 points. Third rank is taken by ewe No.7002 with the genotype value of 7,50 points for furskin qualities.

If the genotype value after furskin qualities is equal at several ewes, their ranking number should be determined according to the number of higher class lambs. In the example above is evident that the ewes with register No.7007 and 7001 have the same genotype value, equal to 7,33 points. At the same time, the progeny of the ewe No.7007 are more elite class lambs (three) than in progeny of the ewe No.7001 (two). Therefore, the first ewe is placed in a higher rank, compared to second ewe.

Within the sheep farm, the genotype of each ewe after the furskin qualities is updated annually and may vary after birth, both increasing and decreasing, according to the ranking of the new born descendant lamb.

Annual selecting for breeding of tribal batch of ewes with genotypic value of high productivity of furskin qualities, giving birth in several generations to descendants with superior qualities of furskin, the selector can achieve the goal of genetic improvement of the flock after these properties.

## CONCLUSIONS

1. Moldavian Karakul ewes, inseminated with one and the same ram, in all other equal conditions, transmit to the descendants, mainly, their furskin qualities.

2. Heredity of furskin qualities (class) at Karakul lambs is polygenic and wearing an intermediate regression tendency toward the average of the flock.

3. The manifestation degree of furskin qualities of descendants, in equal conditions, depends on parents genetic compatibility, the prepotence degree of rams and ewes for mating.

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