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**Research article**

# Age variability of wool productivity of Kazakh fat-tailed sheep with varying degrees of intensity of pigmentation depending on the genetic groups.

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## Summary

Wool productivity and performance of fraction of hair of Kazakh fat-tailed sheep with varying degrees of intensity of pigmentation are studied. Among genetic groups high proportion of wool clip, the length and thickness of hair was observed in the animals of the I st group with the degree of intensity of black pigmentation that surpass analogs of the III d group with weakened degree of black pigmentation on the validity of the value ($P < 0.01$).

**Keywords**: clipped wool, sheep genotypes, melanin, pigmentation intensity, length and tannin coat.

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## Introduction

Kazakh fat-tailed sheep, wool is a biological indicator that is widely used in the wool industry. Coarse wool cloth and coat-board fabrics, carpets, yarns for knitwear are made of it.

Fat-tailed hair refers to the rough wool, which is made up of fibers of various fineness (beard, transition hair and down).

The fineness and fiber length determine industrial grade of wool, according to the scientific and technical classification it belongs to the group III of section IV.

Sheep of Kazakh - fat-tailed breed solidly give a rough wool that is sheared from them twice a year - in spring and autumn. Along with this it is important to send a breeding work on the improvement of the existing sheep breed types with greater productivity and high quality of wool, as well as strengthen the adoption of improved methods of selection and option.

H.F. Kushner (1948), working on issues of acclimatization of fat-tailed sheep in the European part of Russia, drew attention to the fact that the apparent change in the type of sheep are primarily through a change in wool. In the future, this is reflected in the works of M.F. Ivanov (1949), N.P. Chirvinskii (1949), etc.

## Materials and Methods of Research

Research and production experience was carried out in a breeding farm "Seraly" at the Kazakh coarse wool fat-tailed sheep, which studied the content of melanin, that is, the amount and type of pigment, of which the most suitable method is the EPR - spectroscopy (EPR). This method has the great advantage that it is of high-efficiency, for regular mass research and, as a radio-technical in nature does not require the destruction of hair samples.

Therefore, in studying the content of melanin, our fat-tailed sheep are divided into three genetic groups: 1) intense black (10,0%), 2) the normally black (8.5-10.0%), and 3) weakened-black (8,5%).

## Results of the Study

Data obtained from the shearing wool of Kazakh coarse sheep with different genotypes are listed in Table 1.

**Table 1** - wool clip according to the Kazakh coarse sheep with different genotypes, kg (n = 30; Σn = 90).

| **Kinds of wool** | **The genotypes of sheep wools, M ± m** | | |
|---|---|---|---|
| | Group I, Intensely - black | Group II Normal - black | Group III weakened – black |
| Spring | 1,36 ± 0,14 | 1,32 ± 0,22 | 1.23±0.42 |
| Autumn | 0.72 ±0.08 | 0.71±0.05 | 0.71±0.06 |
| 1 st-year. The annual wool clip of 1 sheep | 2.08±0.11 | 2.03±0.20 | 1.94±0.14 |
| Spring | 1.46±0.08 | 1.34±0.09 | 1.28±0.15 |
| Autumn | 0.86±0.06 | 0.82±0.05 | 0.80±0.04 |
| 2 nd - year. The annual wool clip of 1 sheep | 2.32±0.10 | 2.16±0.75 | 2.08±0.14 |
| The annual wool clip of 1 sheep for two years | 4.40±0.36 | 4.20±0.25 | 4.02±0.37 |

The table shows that the resulting annual wool clip in the Kazakh coarse wool sheep was 1.94 -2.08 kg, as well as an increase in wool clip from the age of animals and in the second year of wool yield was 2.08 -2.32 kg.

Variability of wool clip of different genetic groups in a comparative perspective on the seasons is set, spring coat volume was high and amounted to 1.23 -1.36 kg. Volume of autumn shearing wool fell by half to 0.71 - 0.72 kg, apparently, in the short term of pasture maintenance.

Sheep wool yield of different genetic groups is defined, which shows that the highest annual wool yield 2.08 kg obtained in sheep of group I with intensive - black pigmentation, low wool yield 1.94 kg of group III had a sheep with a weakened-black pigmentation, a difference of performance significantly was 0.14 kg ($P < 0.05$). This figure was significantly preserved in the second year and, respectively 2.32 kg and 2.08 kg, a difference of 0.23 kg ($P < 0.01$).

The observed variability in sheep wool clip distinguishing in genotype shows that the volume of spring wool clip was higher compared with the autumn wool clip. Spring wool clip from one sheep was 1.23 -1.36 kg, the rate of autumn hair was 0.71 -0.72 kg.

Volume of the variability of wool fraction produced in different seasons of the year had an average level of variability. Here, a higher level of variability was observed in top hair and down types of wool that accordingly were 7.1% and 6.8%. Among individual groups share the distinction of fractional composition of hair in autumn and spring is on the lower level.

Consider the distribution of the fat-tailed sheep on coarse wool coat length (Table 2).

**Table 2 -** Length of hair of Kazakh fat-tailed sheep differ by genotype, cm (n = 5; Σn = 30).

| **The genotypes of sheep** | **Kinds wools** | **Fractional composition of wool, M ± m** | | |
|---|---|---|---|---|
| | | Top hair | Transition hair | Down |
| Group I, Intensely - black | Spring | 11,48±0,22 | 7,83±0,17 | 6,20±0,08 |
| | Autumn | 10,23±0,24 | 7,62±0,23 | 6,10±0,10 |
| Group II, Normally – black | Spring | 9.42±0.35 | 7.88±0.42 | 5.76±0.18 |
| | Autumn | 8.63±0.33 | 7,41±0.35 | 5,37±0,19 |
| Group III, weakened – black | Spring | 8,35±0.20 | 7,38±0.33 | 5,28±0,26 |
| | Autumn | 8,14±0,38 | 7,23±0,34 | 5,12±0,29 |

The table shows that the longer value of wool 8,35-11,48 mm was observed in of guard hairs and a shorter amount of hair length 5.12 - 6.20 mm had downy hairs. Additional genetic groups of sheep with intensively - black hair pigmentation were 11.48 mm long, and the animals with weak black pigmented short hair were 8.14 mm, 3.34 mm or 29.1% (P <0.001) in favor of sheep intense black pigmentation.

Analysis of the hair length, depending on the length of the season of haircut shows that spring wool was highly significantly longer in length than autumn wool (P <0.001). Named difference of magnitude of length of hair occurs in all types of wool of fractional composition. The high difference of 1.25 mm or 10.9% (P <0.001) was observed at the top hairs, low margin between 0.10 mm was recorded in downy hair.

In the analysis of wool in the genetic composition of the groups cropped in different seasons, a high value of the difference of wool was 1.25 mm or 10.9% (P <0.001) in intensively - black sheep, and a low rate difference 0.21 mm or 2.5% ( P> 0.05) is set in the weakly-black animals. Transient hair of different genetic groups had insignificant difference (P>0.05). Below the thickness of the hair of the fractional composition of the Kazakh fat-tailed sheep is also studied (Table 3).

**Table 3** Thickness of hair of Kazakh fat-tailed sheep differ by genotype, m (n = 5; Σn = 30).

| **Genotypes of sheep** | **Kinds of wool** | **Thickness of hair, M ± m** | | |
|---|---|---|---|---|
| | | Top hair | Transition hair | Downy hair |
| Group I, Intensely - black | Spring | 52,5 ± 0,25 | 32,2±0,34 | 18,8±0,10 |
| | Autumn | 53,4 ± 0,20 | 32,9 ±0,15 | 19,0 ±0,13 |
| Group II, Normally – black | Spring | 50,8 ± 0,31 | 32,3±0,16 | 19,9±0,11 |
| | Autumn | 51,5 ± 0,23 | 33,4 ±0,19 | 20,6 ±0,12 |

| | | | | |
|---|---|---|---|---|
| Group III, weakly – black | Spring | 48,8±0,26 | 32,4±0,25 | 20,3±0,14 |
| | Autumn | 49,7±0,28 | 33,4±0,28 | 21,2±0,18 |

In the result of the study it was found that the thickness of the hair, the fractional composition were different: top hair 48.8 - 53.4 microns, transition hair -33.4 32.4 microns, down 18,8-21,2 mm.

The high thickness of the spine -53.4 52.5 microns was detected in intensively - black sheep, a thinner size 48.8 -49.7 spine was significantly in microns - weakly black females, a difference of 3.7 m or 7.0% (P > 0.01).
The thickness of the transition of hair in all the genetic groups was 32.2 -33.4 m. High thickness of down 20.3 -21.2 m occurs in weakly-black females, and low thickness down 18.8 -19.0 mm is set in intensely - the black sheep.

Analysis of the thickness of a hair in different seasons shows that spring wool had a high thickness of the hair. This trend will continue in the fractional composition of all genetic groups. Some large difference was observed in the guard hairs of genetic groups.

The high thickness of the hair at autumn wool 53.4 microns was observed in animals with intense black pigmentation, the difference compared with the spring coat of 0.9 microns or 1.7% (P>0.05). This tendency was preserved in the normally pigmented group to 0.7 m or 1.4% (P>0.05), while the black band was weakly 0.9 microns or 1.8% (P>0.05).
Data on the morphological composition of Kazakh fat-tailed sheep wool with different degrees of pigmentation hair cover are shown in Table 4.

**Table 4 -** The morphological structure of the Kazakh fat-tailed sheep wool differ by genotype,% (n = 5; Σn = 30).

| **The genotypes of sheep** | **Kinds of wool** | **Fractional composition of wool, M ± m** | | |
|---|---|---|---|---|
| | | Top hair | Transient hair | Downy hair |
| Group I, Intensely – black | Spring | 25,5±1,12 | 37,6±2,20 | 36,9±1,48 |
| | Autumn | 24,3±1,15 | 39,5±2,14 | 36,2±1,62 |
| Group II, Normally – black | Spring | 20,5±1,32 | 39,4±2,17 | 40,1±1,32 |
| | Autumn | 19,0±1,48 | 39,2±1,25 | 41,8±1,42 |
| Group III, weakly – black | Spring | 19,8±1,41 | 37,6±2,05 | 42,6±1,84 |
| | Autumn | 18,4±1,42 | 39,6±1,36 | 43,0±1,94 |

Analysis of the table of the morphological structure of Kazakh fat-tailed sheep wool shows that the percentage of guard hair was 18,4-25,5%, the proportion of transitional hair 37,6-39,6% and fluffy -36,2-43,0%.
Among genetic groups highest top coat 24,3-25,5% was observed in the animals of group I with intense severity of pigmentation, and a low share of 18.4 - 19.8% of top coat is observed in the group III of animals with weakened degree of black pigmentation .

The share of the transitional hair do not differ among themselves 37.6 - 39.6% in all groups. A high proportion of downy hair 42.6 -43.0% was obtained in sheep with weakened degree of black pigmentation at the same time low proportion of downy hair 36.2 - 36.9% was observed in animals with intense severity of black pigmentation.

Thus, it should be said that in general, among the genetic groups of high specific spine, the length and thickness of hair was observed in the animals of group I with the degree of intensity of black pigmentation, and low levels of hair observed in group III of animals with weakened - black degree of pigmentation.

## Conclusion

On the basis of scientific and industrial experiments on the wool clip and indicators of fraction of hair of Kazakh fat-tailed sheep with varying degrees of intensity of pigmentation it is found that among genetic groups high proportion of wool clip, the length and thickness of hair was observed in the animals of group I with the degree of intensity of black pigmentation that surpass the analogs of group III with weakened - black pigmentation on the degree of validity of the value (P> 0.01).

## Literature

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