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Influence of Sexual Dimorphism onto Wool's Diameter.

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ABSTRACT

This manuscript presented the study influence the sex of animals to the wool's diameter in different periods of time. It was studied that at the age of two months to 1 year coarsening of wool of ewes and rams was at the same rate, and the difference between them doesn't in most cases was 0.2- 0.5 µm. The conclusion is drawn that the nature of the difference in the diameter of the wool between adult rams and uterus is not genetically predetermined, but is primarily the result of different physiological loads, conditions of feeding and maintenance.

Keywords: wool, diameter, coefficient of variation, quadratic deviation, crimp of fiber, sexual dimorphism

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INTRODUCTION

The diameter of the wool, being one of the most important physical and technical properties of wool and being a pedigree, varies considerably in the staple and along the length of the fiber, and also in the rune under the influence of a variety of factors, including the season, the level of feeding, the physiological state, age, individual characteristics of the organism, as well as the sex of animals and other factors. The impact of these factors is ambiguous, sometimes they act simultaneously, sometimes in isolation depending on the specific situation.

Changes in the diameter of the coat at different age periods are explained by changes in the functional state of the skin, as well as by the intensity of the physiological processes taking place in it. Age changes in the basic wool qualities, including the diameter of the wool - a selection factor, so their study is of considerable interest from various points of view [1].

Some patterns of age-related changes in the diameter of wool on merino sheep are reduced to the fact that in the postembryonic period the diameter of the wool fibers does not remain constant: it increases from birth to 3-5 years and then decreases. Similar age patterns of changes in the diameter of the wool lead many researchers.

It is also known that wool of rams usually is 2-4 microns thicker than in females. On the other hand, this situation is the result of different conditions for the maintenance and feeding of rams and queens, but partly as a result of selection, because breeders have formed the idea of "binding" producers to have coarser wool than that of queens. However, from the analysis of the works available to us, devoted to the study of age-related changes in the diameter of short fibers, it cannot be concluded from what age the sexual differentiation of animals begins in tonic and which factors thus have a decisive influence on the formation of diameter-genetic or environmental factors. To find out this, studies were carried out on the ewesly colored and burrs of the Stavropol breed [2, 6].

MATERIAL AND METHODS

SPK breeding plant "Path of Lenin" and SEC "Plemzavod Second Five-Year Plan" are located in the north-eastern part of Stavropol and are characterized by natural conditions suitable for breeding fine-fleece sheep. The scheme of the experiments carried out in them is shown in Table 1.

Table 1: Scheme of the experiment to determine influence sexual dimorphism onto wool's diameter

Principle of groups formation	Amount		Age to determination wool's diameter, months				
	rams	ewes					
Only of twins	SPK breeding plant "The Way of Lenin"						
	20	20	2	4	6	8	12
Regardless of type at birth	SEC "Plemzavod Second Five-Year Plan"						
	50	50	2	4	6	8	12

In the SPK breeding plant "Path of Lenin", studies were carried out on the birches and sheep received in the number of twins, in SEC "Plemzavod Second Five-Year Plan" - on lambs of both sexes, regardless of whether they were received in the number of twins or individuals. The results of only those sheep that survived to the age of one year were taken into account [4].

In both farms, before the beating, the animals were kept in one flock, after weaning from the mothers, in different flocks in typical feeding and maintenance conditions for the farm. Samples of wool were

taken from all animals on the side and thigh, determination of the diameter and its associated characteristics (mean square deviation, coefficient of variation (Cv), comfort factor (CF), fiber bending angle) was carried out by the OFDA method on an optical analyzer of the diameter of woolen fibers. The processing of the data was carried out using the Meswin software [5, 7].

RESULTS AND DISCUSSION

As a working hypothesis, it was suggested that differences in the diameter of the wool of fir and burr should appear with the onset of puberty of young sheep and after their weaning from the queens when the animals begin to be kept in different flocks. But this hypothesis has not been confirmed.

In studies, the similarity was found for the parameters characterizing the diameter of the wool, its balance, and tortuosity in young animals of both sexes aged from 2 to 12 months, as well as the dynamics of their changes.

So, in the SPK breeding plant "Path of Lenin" wool on its side was ewes at 2 months, even thicker than the sheep, at 1.97% with an unreliable difference. At the same time, the minimum diameter of wool was ewes, 18.25 µm, and the maximum - 22.08 µm. The oscillation interval was 3.83 µm. The same indicators were found in rams: 18.12 µm, 21.51 µm and 3.39 µm.

The fur on the thigh of animals of both sexes was rougher than on the side, and the difference in the diameter of the wool fibers between the ewes and the sheep is larger and also with the advantage of ewes by 0.62 microns or 2.97%. The minimum diameter of the wool on the thigh was 18.12 m, the maximum - 23.59 m, the interval of oscillation - 5.47 m; for sheep: 18.87; 24.39 and 5.52 m.

The wool of the sheep of two months was unequal: the average square deviation of the diameter on the side was ewes, 5.16 with a range of variation from 4.62 to 5.75 microns; for rams, these parameters were 5.00; 4,12-6,90 µm. The coefficient of variation of wool in diameter in average in the ewes was 25.70% with fluctuations from 24.37 to 28.72%; in rams - 25.35% with fluctuations from 20.89 to 33.79%. Even greater coefficients of variation were on the thigh of the sheep - 26.51 and 27.55% - ewes, while the maximum coefficient of the ratio in burrs was 42.51%.

Similar results were obtained for two-month-old sheep "Plemzavod Second Five-Year Plan" - there were no significant discrepancies in diameter and its characteristics in the benches and sheep barrels. A slight difference was on the level of differences and in that the coarser coat was in the sheep and on the side, and on the thigh: by 1.43 and 2.84%.

It should be noted that the animal hair of SPK "Plemzavod Second Five-Year Plan" was thinner and more equal in diameter to the fibers in the staple than in the sheep of the SPK breeding plant "Path of Lenin". These differences are explained by the level and direction of selection and breeding work in the farms and the genetic peculiarities of the sheep bred in them. In general, as follows from the above analysis, all the studied characteristics of fleece yarns and sheep at the age of two months differed insignificantly, which indicates the genetic similarity of these indices in animals of both sexes.

Minor differences in the diameter of the wool and its characteristics between animals of different sexes in the farms were preserved in all age periods, the changes that occurred with this occurred simultaneously and approximately by an equal amount. So, with age, there was thickening of the wool, but the difference in diameter of the fibers of wool of sheep and ewes in both farms remained insignificant. At the age of four months, the differences in the diameter of the wool on the side of the sheep of different sex of the SPK of the breeding plant "Path of Lenin" amounted to 1.55%, on the thigh - 2.70%; in SEC "Plemzavod Second Five-Year Plan" - 0.90 and 3.32%. It should be noted only that the difference in the diameter of the fur on the thigh between the ewes and the sheep was higher than on the side of the animals of both farms. Most likely, this indicates the lack of sufficient attention when selecting sheep to the equation for the diameter of the wool along the rune.

The comfort factor showed a small dynamic to growth both on the side and on the thigh of animals of both farms, except for the ram cakes "Plemzavod Second Five-Year Plan", in which there was a slight decrease

in the index. The comfort factor is formed under the influence of two opposite processes. On the one hand, a part of coarsened woolen fibers falls out, which leads to a decrease in the average diameter, a decrease in the fiber variation in tint and an increase in the comfort factor, on the other, these changes are compensated for by the age-thickening of the wool.

Therefore, it was not possible to detect the patterns in the oscillations of these two indices. At the same time, both coarse staple fibers and thin fibers increase in thickness almost the same, causing a difference in their diameter with age, but in a rather narrow range. Some deviation from this dynamic was observed in the Sheep SPK "Plemzavod Second Five-Year Plan" in the age interval from 6 to 12 months.

By the age of four months, there was a slight increase in the equalization of the diameter of the fibers in the staple and the tortuosity of the wool (with the exception of the twisting of the fibers on the side of the Sheep Plemzavod Second Five-Year Sheep). In the future, such dynamics remained until the end of the research.

After weaning, the lambs were kept in different flocks and received general economic rations balanced by nutrients and energy in accordance with gender, age and live weight. In the absence of a differentiating factor in their content and feeding, the coarsening of the fibers in sheep of different sex occurred at approximately the same rate, so the level and direction of differences between them at six and eight months were preserved.

In the SPK breeding plant "Path of Lenin" ewes still exceeded the diameter of the wool on the side and the thigh of the sheep at the age of 6 months by 0.6% and 1.17%; at the age of 8 months - by 0.2% and 0.83%, with an unreliable difference. The differences were even smaller, which led to an even closer convergence of the diameter of the wool from the sheep of different sexes. Well expressed is the increase in the equalization of fibers along the diameter of the wool and on the side, and on the thigh [8, 9].

The tortuosity has grown a little at rams and ewes on a side, on a thigh almost has not changed. The difference in the diameter of the wool on the side and the thigh of the six-month old sheep and ewes of the SPK "Plemzavod Second Five-Year Plan" amounted to 1.34 and 3.67% in favor of the first; at the age of 8 months - 1.22 and 3.91%.

Consequently, the diameter of the wool fibers of the young sheep of different sexes varies insignificantly. The appearance of differences in the diameter of the wool of adult rams and uterus can be explained by the appearance of new differentiating factors that were absent in the studies, namely, the presence of different physiological loads (from the uterus are given offspring), different conditions of content and feeding, and the selection factor. Selection is traditionally carried out on live weight, cutting and length of wool, therefore, due to phenotypic correlations, preference is given to coarser coarse producers. In addition, the evaluation of the diameter during selection is carried out with an eye and is not always correct.

CONCLUSION

The conducted researches show that in the age interval from two months to 1 year the coarsening of the wool of the ewesly and the sheep fell at the same rate, the difference in diameter between them did not exceed 1 μm (that is, it was within the statistical error), and in most cases was 0.2 -0.5 microns (greater was only the difference in the diameter of the wool on the thigh in the sheep SEC "Plemzavod Second Five-Year Plan"). Consequently, the existing differences in the diameter of the wool between adult rams and uterine sheep are not genetically predetermined but are primarily a function of selection and the result of different physiological loads. In some cases, they may be the result of different conditions of feeding and maintenance.

From the last statement it follows that the difference in the diameter of the wool of the uterine part of the herd and the rams producing the genetic basis laid down in the instructions for the boning of fine-fleeced breeds of sheep in the Russian Federation does not have a genetic basis, but reflects and shapes the selection priorities aimed at coarsening the wool. This breeding philosophy has dominated the practice of breeding for many years and is the basis of most agricultural enterprises that breed fine-fleece sheep at the present time.

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