External characteristics and live weight of fleshy and woolly sheep breed of Uzbekistan

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Abstract. This article describes the beneficial economic characteristics-productivity, exterior characteristics and growth and development of offspring of fleshy-woolly sheep of Uzbekistan in different breeding periods. In terms of wool yield, fleshy-woolly ewes outperformed native breed ewes. In this case, the amount of wool at shearing is 1.26 kg (49.6%), the weight of wool after washing is 0.97 kg (67.8%), and the length of wool is 2.13 cm (19.2%) higher. Lambs obtained from ewes in the experimental groups were determined at birth, 30 days, and 3 months of age. Ewes inseminated early from September 1 to September 20 had higher live weight, body size and wool productivity than those inseminated later, from October 20 to November 10. At the same time, it made it possible to introduce artificial insemination of fleshy-woolly ewes with frozen seeds of rams belonging to the global semi-soft woolly gene pool in the meat-wool direction. The live weight of lambs obtained from them was higher by at birth - 0.4 kg (9.3%), at 10 days - 0.5 kg (6.8%) and at 3 months - 0.4 kg (1.3%) compared to the live weight of lambs obtained from natural insemination of fleshy-woolly ewes with rams.

Keywords. Breed groups, live weight, wool, sheep, genotype, productivity.

1 Introduction

The development of animal husbandry, one of the agricultural branches, is the main factor in improving the food supply of the world's population and increasing the efficiency of agricultural production [1]. Creation of productive breeds in sheep breeding, creation of a frozen seed reserve bank of purebred rams, creation of gene pool flocks of fleshy-woolly sheep in mountain and sub-mountain regions is considered one of the urgent tasks.

Effective use of selection methods is important in creating and improving high-yielding flocks of sheep. In this case, it is appropriate to carry out breeding work in sheep flocks, to consistently select the best sheep for breeding, to remove unfit ones from the flock, and to carry out targeted mating of sheep that give quality products in order to strengthen their genetic characteristics [2]. Along with selection methods, the role of purebred breeding and cross-breeding methods is extremely important. Also, in the formation of such flocks, improving the productivity characteristics of sheep using the method of insemination in

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different periods is of urgent importance in the development of the industry and increasing its efficiency [3].

Stavropol Territory is one of the optimal regions for sheep breeding, which is important for creating new breeding achievements. All conditions are sufficient for the development of sheep breeding in the country, there is a large area of pasture land with natural grasses and the possibility of highly intensive production of agricultural products. Breeds bred in the country are breeds with high genetic potential for breeding in various natural climatic conditions, adaptability to external environmental conditions, and productivity. Nevertheless, today sheep farming in the country is going through a difficult period, as a result of the cultivation of agricultural crops, the area of pasture land is reduced, and the number of sheep is decreasing. In the Stavropol region, high-quality gene funds with a breeding base of soft and semi-soft wool sheep breeds are preserved, which will later provide opportunities for improving the breeding and productivity qualities of sheep in this area of productivity not only in the region, but also in the Russian Federation [4-6].

Live weight and body size of Fleshy-woolly were slightly lower than those of purebred, but they showed higher genetic potential for wool productivity. Incomplete use of the genetic potential of fleshy-woolly sheep, unplanned breeding and lack of attention to the breed led to a decrease in the number of sheep and, in turn, to a decrease in their genetic potential [7]. Further breeding work was carried out using various breeding and cross-breeding methods, taking advantage of the high-value biological characteristics and genetic potential of these sheep. It should be aimed at preserving the gene pool of sheep, increasing the number of sheep, and at the same time, expanding the range of sheep in mountainous and sub-mountainous regions is desirable and economically effective.

By introducing effective selection methods, increasing the productivity of sheep, the efficiency of using their genetics, improving the quality of products, and ultimately raising the living standards of the people of the desert region are among the important issues of the industry. There is enough scope in the industry to achieve this level [8]. First of all, selection methods that allow sufficient use of the potential of sheep can be selected by forming groups of animals with high genetic characteristics and carrying out appropriate mating and evaluating several generations obtained from them. Secondly, it is to use the potential of highly productive plant types of Karakol sheep created at the breed level in the direction of specialization. From the mentioned results, it can be concluded that the high use of effective selection methods allows to achieve the desired efficiency.

In order to increase competitiveness in sheep breeding, the breed rams specific to the world gene pool were used. Breed groups of fleshy-woolly sheep with high meat and wool productivity were created in 1976 by scientists of the Animal Husbandry-Scientific Research Institute of Uzbekistan [9, 10]. These sheep are called fleshy-woolly sheep of Uzbekistan.

The Downy Merino breed of sheep was created in the Republic of South Africa [4]. The new breed is distinguished by its high quality of wool and meat, as well as its competitiveness to market requirements. These sheep quickly became popular among sheep breeders, breeding flocks increased in areas where the new breed was bred, and the South African Association of this breed was established.

The use of artificial insemination method in sheep breeding significantly increases the use of genetic potential of high-value cattle. Compared to natural insemination, artificial insemination of sheep allows to inseminate more than a hundred ewes from the seeds of breeding rams in one lambing season [11]. During the breeding season, 500-700 ewes correspond to one breeding ram during artificial insemination. It is possible to artificially inseminate 5-6 thousand sheep in one season with the seeds of well-known rams with high breeding value. In case of natural insemination, it is possible to breed 40-50 sheep with one ram.

The live weight of native sheep was 2.3 kg (4.5%) higher than the live weight of fleshy-woolly sheep. Also the height of the withers-3.5 cm (4.9%), the height of the loin-3.8 cm (5.2), the oblique length of the body-4.3 cm (5.8%), the circumference of the chest-1, 9 cm (2.0%) and chest depth -2.2 cm (6.9%) was higher. These data are important for carrying out selection work on preserving and increasing the gene pool of fleshy-woolly sheep, improving the number and quality of these sheep, and improving the selection characteristics of these breeds in the future.

2 Materials and methods

Research was carried out in 2019-2021 at the "Kholtoraev Oybek-KHM" breeding farm in the Ohangaron district of the Tashkent region of Uzbekistan. The live weight of lambs at birth, one month and three months of age was studied by methods generally accepted in zootechnics. The external parameters of the sheep in the experimental groups were calculated by measuring the body parts, and body composition indices were calculated according to the methods of Veniaminov, Buylov and Khamitsaev [5-9].

Characteristics of wool productivity of sheep were studied by the method of Kalinin. Correlation coefficients between the main breeding traits of sheep were calculated according to the formula of Schiller, Wahal, and Winsch. The live weight of sheep, wool productivity was studied by comparison with the requirements of the 1st class minimum standard of fleshy-woolly sheep. The obtained data were processed by the method of Merkureva [6-11].

Studies were performed on fleshy-woolly sheep that were similar in origin, breed, breed and age. Two-year-old ewes that lambed for the first time from 50 heads were selected for both groups, in experimental group 1 - September 1-20 and in control group 2 - October 10-30.

3 Results and discussion

Fleshy-woolly sheep raised on pastures in the mountainous and sub-mountainous regions of Uzbekistan do not feel a shortage of food when they are sufficiently provided with pastures during the hot days of the summer season. During cold winter days, lactating ewes do not lose weight when ewes are fed full value through supplementary feeding. When lambs are separated from their mother, their live weight reaches 32-36 kilograms. This will be of great importance in creating productive herds and improving existing breeds in the future.

Fleshy-woolly sheep are distinguished from other sheep breeds by their resistance to external environmental conditions, fast aging, multiple generations, soft, loose and juicy meat, and high wool productivity. However, in the following years, scientific researches were not carried out to improve the breeding characteristics of these sheep and especially to study the effect of different lambing periods on the productivity characteristics of the offspring.

In the researches, feeding of experimental ewes and new-born ewes was carried out according to a strict plan. They were fed in the pasture, 1.5-2.0 kg of high-quality alfalfa or natural grass hay, 300-400 grams of soft fodder and mineral feed, salts, i.e. 1.4-1.5 feed units, were fed in the morning and evening.

It is important to study the external parameters of the ewes in the experimental groups in order to determine the effect of different breeding periods on the productivity characteristics of the ewes (Table 1).

Table 1. External indicators of ewes in experimental groups.

Indicators	Unit	Group 1 (n-50)		Group 2 (n-50)	
		$\overline{X} \pm S_{\overline{x}}$	Cv, %	$\overline{X} \pm S_{\overline{x}}$	Cv, %
Withers height	cm	68.45±0.341	3.52	68.15±0.287	2.98
Loin height		70.4±0.307	3.08	70.21±0.375	3.77
Oblique body length		71.7±0.580	5.72	71.05±0.659	6.55
Chest width		28.65±0.402	9.91	26.8±0.345	9.10
Chest depth		32.25±0.532	11.66	31.5±0.394	9.79
Chest circumference		100.2±0.462	3.26	97.3±0.515	3.74
Head circumference		8.5±0.068	5.65	8.46±0.068	5.67

As can be seen from Table 1, the exterior indicators of early inseminated group I ewes were characterized by slightly higher indicators than those of group II ewes. In particular, in group I, these indicators are 0.3 cm withers height, 0.19 cm loin height, 0.65 cm (0.91%), chest width 1.85 cm (6.9%) compared to group II, chest depth was 3.75 cm (13.16%), chest circumference was 2.9 cm (3.0%). Thus, it was found that the external indicators of group I ewes are slightly higher than those of group II equals, which indicates that ewes with a high body structure come to the tune early.

The proportional development of the body structure of sheep can be assessed by analyzing the body indices of sheep (Table 2).

Table 2. Body indices of mature ewes, %.

Body indices	Groups	
	I	II
Population	50	50
Long-leggedness	52.9	53.7
Stretchability	104.7	104.3
Chestiness	88.8	85.0
Compactness	139.7	136.9
Bony	12.4	12.4

As can be seen from Table 2, sheep of group I have a somewhat large body, which is also confirmed by their index of long legs, which is 0.8% lower than that of their counterparts in group II. At the same time, in group I, elasticity is 0.4 more than in group II; breast size-3.8; density was higher by 2.6%.

The results of the research show that the body of ewes in all groups is proportionally developed, the chest is well developed, and the sheep have an elastic body and meat type.

We examined the live weight and wool productivity of fleshy-woolly ewes and native-bred ewes in our studies (Table 3).

Table 3. Live weight and wool productivity of ewes.

Indicators	Unit	Native ewe n-100		Fleshy-woolly ewe n-100	
		$\overline{X} \pm S_{\overline{x}}$	Cv, %	$\overline{X} \pm S_{\overline{x}}$	Cv ,%
Live weight	kg	58.3±1.23	21.1	52.5±1.06	20.2
Wool yield		2.54±0.072	12.75	3.8±0.126	14.78
Post-washing wool weight		1.43±0.04	12.37	2.4±0.051	9.54
Wool length	cm	11.07±0.163	6.59	13.2±0.034	10.14

Table 3 shows that the live weight of native breed ewes was 5.8 kg (11.0%) higher than the live weight of fleshy-woolly ewes. In terms of wool productivity, fleshy-woolly sheep achieved higher results than native breed ewes: the amount of wool at shearing was 1.26 kg (49.6%); weight after washing-0.97 kg (67.8%); wool length - 2.13 cm (19.2%) higher result was noted. It is worth noting that these sheep were found to be higher than the minimum standards of the breed in terms of wool productivity of mature sheep in this fleshy-woolly direction. This indicates that the fleshy-woolly sheep have fully preserved their genetic potential for wool productivity.

Newborn lambs need an average of 5 kg of mother's milk to gain each kilogram of extra weight, and at the age of 2.0-2.5 months, they need to suck 1.2-1.5 liters of mother's milk per day in order to gain an average of 250-300 grams of weight per day. By mid-lactation, mother's milk supply gradually declines and lambs' demand for nutritious feed increases. That's why lambs are trained on concentrate, hay and juicy feeds from 15-20 days of age. Among the best fodder for lambs are oats, barley; Juicy feeds include crushed root vegetables and high-quality alfalfa hay.

We studied the live weight of lambs born in 2020 from ewes in experimental groups at birth, 30 days and 3 months of age (Table 4).

Table 4. Live weight indicators of lambs, kg.

Age	Sex	Native lamb			Fleshy-woolly lamb		
		I			II		
		n	$\overline{X} \pm S_{\overline{x}}$	Cv, %	n	$\overline{X} \pm S_{\overline{x}}$	Cv, %
Newborn	Ram lamb	26	5.3±0.17	16.8	24	5.0±0.08	8.4
	Ewe lamb	24	4.9±0.04	4.08	26	4.7±0.07	8.1
30 days	Ram lamb	26	17.7±0.263	7.57	24	17.2±0.357	10.2
	Ewe lamb	24	17.2±0.54	15.4	26	17.0±0.322	9.7
3 months	Ram lamb	26	34.0±0.45	6.73	24	32.5±0.694	10.5
	Ewe lamb	24	31.6±0.577	8.95	26	31.2±0.314	5.13

The analysis of tabular data showed that the live weight at birth of lambs born from pure native breed ewes in group I was 0.3 kg (6.0%) of ram lambs (6.0%) and 0.2 kg (4.3%) of ewe lambs compared to that of equals in group II. At the age of 30 days, ram lambs-0.5 kg (2.9%) and ewe lambs-0.2 kg (1.18%), at the age of 3 months ram lambs-1.5 (4.6%) and ewe lambs 0 .4 kg (1.28%) was higher. These data indicate that lambs born from pure native breed ewes have higher live weight than their counterparts.

We used the practice of artificial insemination of fleshy-woolly ewes with the frozen semen of rams typical of the world gene pool, and this year we obtained offspring from them. Table 5 describes the difference between artificial insemination and natural insemination of ewes.

Table 5. Live weight of lambs from artificial insemination, kg.

Age	Lambs from artificial insemination			Lambs from natural insemination		
	n	$\overline{X} \pm S_{\overline{x}}$	Cv, %	n	$\overline{X} \pm S_{\overline{x}}$	Cv, %
Newborn	10	4.7±0.134	9.44	10	4.3±0.125	9.16
10 days	10	7.8±0.238	9.65	10	7.3±0.153	6.62
3 months	10	32.8±0.513	5.09	10	31.4±0.592	5.95

From the analysis of the data in Table 5, it can be seen that the live weight of lambs obtained from artificial insemination of ewes with frozen seeds of pedigree rams compared to the live weight of lambs obtained from natural insemination of ewes with pedigree rams at birth - 0.4 kg (9.3%), at 10 days - 0.5 kg (6.8%) and at the age of 3 months - 1.4 kg (4.5%) had higher indicators. This shows that introduction of artificial insemination method with frozen seeds of rams typical of the world gene pool is an effective method.

The study of correlation indicators between the main selection traits of lambs obtained from artificial insemination and the planned selection of positive correlation coefficients are of great practical importance in improving their selection traits. We studied the correlation coefficients between the selection traits of lambs (Table 6).

Table 6. Correlation coefficients between selection traits of lambs.

Variables	**Lambs from artificial insemination**	**Lambs from natural insemination**
Groups	I	II
Live weight at birth and live weight at 10 days	0.699	0.724
Live weight at birth and live weight at 3 months	0.486	0.646
Live weight at 10 days and live weight at 3 months	0.526	0.591

As can be seen from Table 6, highly positive correlation coefficients were found between the live weight at birth, the live weight at 10 days and 3 months of age, and the live weight at 10 days and the live weight at 3 months of age of lambs obtained from artificial insemination in group I and from natural insemination in group II. These data showed that carrying out selection work on the positive correlation coefficients determined between the selection traits of lambs increases the selection efficiency.

4 Conclusions

Live weight and body size of early-fertilized ewes in the study were slightly higher than those of late-fertilized ewes, indicating that ewes in all groups had proportionately developed bodies, well-developed udders, and ewes with a supple body and meat type. These data indicated that the resulting insemination of ewes with good live weight and exterior characteristics was effective.

Fleshy-woolly ewes achieved higher results than native breed ewes: the amount of wool at shearing was 1.26 kg (49.6%); weight after washing-0.97 kg (67.8%); wool length - 2.13 cm (19.2%) higher result was recorded. This creates breeding flocks of high-quality woolly sheep in fleshy-woolly sheep, improves the breed, and provides high efficiency in growing raw wool for the textile industry.

The live weight of lambs obtained from artificial insemination of Fleshy-woolly sheep compared to the live weight of lambs obtained from natural insemination with rams at birth - 0.4 kg (9.3%), at 10 days - 0.5 kg (6.8%) and at 3 months at the age of 1.4 kg (4.5%) they had higher indicators. This showed that the introduction of artificial insemination with frozen seeds of rams typical of the world gene pool in ewes is an effective method.

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