

Results of crossing Uzbek fine-wool ewes with Dagestan fine-wool rams

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Abstract. This study evaluated the growth performance of F1 crossbred lambs from Dagestan breed rams crossed with meat-wool ewes, comparing them to purebred meat-wool lambs across all developmental stages. The F1 hybrids demonstrated superior live weight at all measured intervals: birth (4.36 kg vs 4.24 kg), 1 month (14.24 kg vs 13.97 kg), 3 months (25.70 kg vs 24.71 kg), 5 months (35.46 kg vs 33.86 kg), 8 months (37.48 kg vs 35.79 kg), and 12 months (41.59 kg vs 38.59 kg), showing consistent advantages in absolute growth. Body measurements of F1 crossbred rams significantly exceeded purebred counterparts in all parameters: height at withers (66.39 cm vs 65.00 cm), body length (67.89 cm vs 66.72 cm), chest width (28.0 cm vs 27.25 cm), chest depth (31.49 cm vs 31.00 cm), chest circumference (103.35 cm vs 102.18 cm), and rump circumference (8.30 cm vs 8.28 cm). These results demonstrate that Dagestan breed crossbreeding consistently enhances both growth rates and body conformation in meat-wool sheep populations, regardless of gender.

1 Introduction

Today, based on the market demands, the breeding of quick-breeding, non-buttock, semi-soft wool-producing breeds of sheep is carried out, in order to preserve their gene pool, improve the selection characteristics, establish productive breeding herds of the breed, breed high-yielding sheep in terms of meat productivity, and increase the productivity of the offspring obtained from them. One of the urgent tasks is to carry out crossbreeding of meat-wool female sheep using merino rams typical of the world gene pool. A number of scientific and research works have been carried out in our republic and in foreign countries to preserve and increase the gene pool of soft and semi-soft wool-producing sheep and to improve their productivity characteristics, as well as to create highly productive herds, to improve the economic characteristics of the breed using the genetic potential of the breed, and the results obtained have been put into practice. The effectiveness of expanding the range of meat wool sheep and improving their productivity characteristics using various factors has been determined. However, the scientific researches on crossbreeding the meat-wool sheep of Uzbekistan, which gives semi-soft wool, using merino breed rams unique to the world gene pool and increasing the productivity characteristics of their offspring have not been sufficiently studied [1-13].

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Breeding rams are selected according to several characteristics based on current methods, origin from youth and external structure. Wide use of the high-value gene pool in farms in biotechnological methods of herd reproduction, for this purpose, controlling sexual inclination, inseminating sheep twice a year, increasing their fertility, creating a reserve bank of frozen seeds of pedigree rams, and using other selection methods are of great practical importance. As a result of carrying out these works in purebred sheep, it will be enriched with new breeding material, the connection between "genotype-external environment" and the genetic potential of the breed will increase in the breeding areas, and the possibilities of full use of cattle productivity will be expanded. The carrying out of breeding work in herds based on long-term plans determines the economic efficiency in the field. One of the main tasks of breeding work in the farm in recent years should be focused on increasing the wool productivity of merino sheep. It should be aimed to preserve all the positive characteristics of the sheep being fed and at the same time eliminate the deficiencies present in high feeding conditions [1, 6, 7, 9].

Studies on the growth of lambs with different genotypes and its results show that the growth of lambs is influenced by their genetic characteristics and the level of feeding, and it is necessary to regulate and control these factors in order to ensure the growth process of lambs and the achievement of the specified meat and wool productivity. It is important to evaluate pedigree rams according to complex characteristics, based on the requirements set for these breeds in the inspection activities, i.e., on the basis of wooliness, durability, strength of constitution, live weight, wool cut and quality, growth and meat productivity, skin quality, and other characteristics [2, 8, 10, 11, 12].

2 Materials and Methods

The research work is being conducted in 2022-2024 at the breeding farm "Kholtoraev Oybek KHM" in Ohangaron district of Tashkent region. For research experiments, 60 heads of F1 hybrid breeds of $\frac{1}{2}$ Dagestan x $\frac{1}{2}$ meat wool breeds were selected for group I, and 58 heads of pure meat wool breeds were selected for group II.

The external characteristics of experimental sheep were determined by measuring body parts, and body composition indices were determined by the method of Vinniaminov (1977). Live weight, absolute, relative growth and average live weight of lambs are studied using the methods of V.I. Fyodorov (1973) and S.T. Brody (1945). The obtained data were processed using variational statistics methods. In this case, the average indicator (X), its error (Sx), variability (Cv), reliability criteria of comparative indicators (td, P) were determined according to the method of E.K. Mercure (1970).

3 Results and Discussion

The live weight of the lambs, the total body size, is manifested by the enlargement of individual organs, which is called the growth of the body of the lambs and undergoes quantitative changes. Farm animals differ in live weight, size and growth of body parts. In zoo technical practice, the growth of live weight of animals and the growth of body parts are determined based on the measurement of body dimensions obtained from body parts.

Live weight of lambs born from female ewes in the experimental groups was studied at birth, one month, three months and five months of age. We studied the live weight of male and female lambs in the experimental groups, the results of which are presented in Table 1.

Table 1. Live weight indicators of lambs by periods, kg

Breed		Sex						Average live weight of lambs		
		Male			Female			p	$\bar{X} \pm S\bar{x}$	C _v , %
		p	$\bar{X} \pm S\bar{x}$	C _v , %	p	$\bar{X} \pm S\bar{x}$	C _v , %			
At birth										
I	F1 hybrid lambs	3/2	4,59±0,065	8,04	2/8	4,07±0,051	6,59	60	4,36±0,048*	5,94
II	Meaty woolly lambs	3/0	4,47±0,06	7,96	2/8	3,98±0,050	6,68	58	4,24±0,040	5,04
1 month old										
I	F1 hybrid lambs	3/2	14,83±0,103*	3,91	2/8	14,00±0,126*	4,78	60	14,24±0,089*	3,32
II	Meaty woolly lambs	3/0	14,34±0,08	3,10	2/8	13,57±0,113	4,40	58	13,97±0,070	2,69
3 months old										
I	F1 hybrid lambs	3/2	26,71±0,158*	3,34	2/8	24,62±0,133*	2,86	60	25,70±0,110**	2,29
II	Meaty woolly lambs	3/0	25,54±0,13	2,75	2/8	23,83±0,134	2,98	58	24,71±0,108	2,36
5 months old										
I	F1 hybrid lambs	3/2	36,55±0,183*	2,83	2/8	34,22±0,157*	2,43	60	35,46±0,116**	1,76
II	Meaty woolly lambs	3/0	34,83±0,17	2,60	2/8	32,82±0,160	2,58	58	33,86±0,123	1,96
8 months old										
I	F1 hybrid lambs	3/2	38,60±0,243*	3,56	2/8	36,32±0,369*	5,35	60	37,48±0,239**	3,43
II	Meaty woolly lambs	3/0	36,52±0,37	5,49	2/8	35,0±0,228	3,44	58	35,79±0,209	3,14
12 months old										
I	F1 hybrid lambs	3/2	43,85±0,333*	4,30	2/8	39,34±0,322*	4,31	60	41,59±0,304**	3,93
II	Meaty woolly lambs	3/0	40,05±0,40	5,42	2/8	37,03±0,285	4,07	58	38,59±0,295	4,12

Note: *P>0.95; **P>0.999

As can be seen from the table, at the birth of F1 hybrid lambs of ½ Dagestan x ½ meat-wool breed in group I, rams - 4.59 kg, female lambs - 4.07 kg, respectively 0.12 kg compared to pure meat-wool lambs in group II. or 2.68% (P>0.95) and 0.09 kg or (2.26 %) higher.

At the age of 1 month of lambs in the experimental group, the live weight of the F1 crossbred rams of group I was 14.83 kg, and that of F1 females was 14.0 kg, which was 0.49 kg or 3.41% (P>0.999) compared to that of the same crossbreds of group II. In addition, lambs had a higher rate of 0.43 kg or 3.17% (P>0.95).

At the age of 3 months, live weight of F1 crossbred rams of group I was -26.71 kg, crossbred females were -24.62 kg, compared to pure meat wool lambs of group II, rams - 1.17 kg or 4.58%, respectively (P> 0.999) and females-0.79 kg or 3.31% (P>0.999) were found to be higher.

The live weight of experimental group lambs at the age of 5 months was 1.72 kg or 4.93% (P>0.999) compared to the live weight of F1 crossbred rams in group I, 36.55 kg, and F1 crossbred females 34.22 kg. , and female lambs had a higher index of 1.39 kg or 4.26 % (P>0.999).

In the study, the live weight of F1 crossbred rams at 8 months was 38.60 kg and females were 36.52 kg, and these indicators were 2.02 kg (P>0.999) and 1.52 kg (P>0.999) respectively compared to those of purebred woolly horses) was found to be high.

At the age of 12 months, the live weight of F1 crossbred rams of group I was 43.85 kg, the weight of crossbred females was 39.34 kg, compared to pure meat wool lambs of group II, respectively, rams-3.80 kg or 9.5% ($P>0.999$) and females-2.31 kg or 6.2% ($P>0.999$) were found to be higher.

It should be noted that when we analyzed the live weight of lambs in all periods, regardless of their sex, the highest indicators in terms of live weight were achieved by F1 hybrid lambs of Dagestan and meat wool. For example, F1 crossbred lambs have an average live weight of 4.36 kg at birth, 14.24 kg at 1 month of age, 25.70 kg at 3 months of age, 35.46 kg at 5 months of age, 37.48 kg at 8 months of age, and 37.48 kg at 12 months of age. 41.59 kg, 0.12 ($P>0.95$) compared to pure meat lambs; 0.27 ($P>0.95$); 0.99 ($P>0.999$); 1.6 ($P>0.999$); 1.69 ($P>0.999$) and 3.0 kg ($P>0.999$) were found to be higher.

Thus, the data obtained from our research indicate that the live weight of lambs at birth, one month, 3, 5, 8 and 12 months of age depends on their genotype.

We studied the absolute, relative and daily growth rates of lambs with different genotypes (Table 2).

Table 2 shows that the absolute growth of F1 crossbred rams from birth to 1 month was 10.24 kg, which was 0.37 kg or 3.75% higher than pure meat wool rams born in group II, and the average daily growth was 12 grams, and in F1 crossbred female lambs, it was 0.34 kg or 3.55%, 12 g higher, respectively.

Table 2. Daily absolute and relative growth of lambs in the experimental group

Age, month	Group I		Group II	
	Male	Female	Male	Female
Number of heads	32	28	30	28
Absolute growth, kg				
From birth to 1 month	10,24	9,93	9,87	9,59
in 1 - 3 months	11,88	10,62	11,2	10,26
in 3 - 5 months	9,84	9,60	9,29	8,99
in 8 - 8 months	2,05	2,1	1,69	2,18
in 8 - 12 months	5,25	3,02	3,53	2,03
12 months after birth	39,26	35,27	35,58	33,05
Average daily growth, g				
From birth to 1 month	341	331	329	319
in 1 - 3 months	198	177	186	171
in 3 - 5 months	164	160	155	150
in 8 - 8 months	23	23	19	23
in 8 - 12 months	44	25	29	17
12 months after birth	107	96	97	91
Relative growth, %				
From birth to 1 month	105,46	109,9	104,9	109,3
in 1 - 3 months	57,19	54,97	56,17	54,86
in 3 - 5 months	31,11	32,41	30,78	31,74
in 8 - 8 months	5,46	5,98	4,74	6,4
in 8 - 12 months	12,74	8,0	9,22	5,64
12 months after birth	162,2	162,0	161,2	159,8

Compared to the absolute growth of F1 crossbred rams born in group I in experiments from 1 month to 3 months, the absolute growth of rams born in group I was 0.68 kg or 6.07%, the average daily gain was 12 grams higher, the absolute growth of F1 crossbred

ewe lambs born in these periods was higher than in group II 0.36 kg or 3.58%, the average daily growth was 6 grams higher than that of equals.

In the experiments, the absolute growth of F1 crossbred rams for 3 to 5 months in group I was 0.55 kg or 5.92% higher than the absolute growth of pure-meat wool rams in group II by 9 grams, while the absolute growth of F1 crossbred lambs was 0.61 kg or 6.78%, the average daily gain was higher by 10 grams.

In 5-8 months, the absolute growth of F1 crossbred rams in group I was 2.05 kg, compared to 0.36 kg or 21.3% compared to that of equals in group II, in 8-12 months these indicators were 1.72 kg or 48.7%, respectively. 12 months after birth was found to be 3.68 kg or 10.3% higher. It was also found that F1 crossbred ewes had higher absolute growth rates than purebred woolly lambs.

Exterior is the form of the external structure of animals, and when the exterior is evaluated in relation to the animal's physiology and economic useful traits, the requirements for each body part are taken into account and evaluated in terms of sheep productivity.

Chest width and depth indicators of agricultural animals provide an opportunity to predict the development of respiratory organs and metabolic processes in their organism.

Chest girth of animals determines the development of metabolic and respiratory organs in the body, as well as general development of the body, therefore, leg girth is one of the indicators that determine the development of the bone-skeletal system of animals.

In our research, we studied the body size of lambs at 1, 3, 5, 8, and 12 years of age born from F1 hybrid lambs with genotypes of Dagestan and meat-wool breeds and pure meat-wool female sheep. Its results are presented in Table 3.

As can be seen from the data in Table 3, the height of the withers at the age of 1 month is 1.4 cm or 3.3% ($P>0.95$), the height of the withers is 1.47 cm or 3.4% ($P>0.99$), oblique body length 1.32 cm or 3.2% ($P>0.95$), chest width 0.54 cm or 3.8% ($P>0.99$), chest depth 0.58 cm or 3.6% ($P>0.999$), breast circumference was 0.87 cm or 1.6% ($P>0.999$) and leg circumference was found to be 0.06 cm higher. 0.38 in F1 crossbred female lambs for these recorded body sizes at 1 month of age, respectively; 0.41; 0.25; 0.10 ($P>0.99$); 0.30 ($P>0.99$); 0.30 ($P>0.99$) and 0.05 cm were obtained.

At the age of 3 months, the fat height of F1 hybrid rams of Dagestan and meat wool was 1.76 cm or 3.2% ($P>0.999$), rump height was 1.83 cm or 3.2% ($P>0.999$) compared to pure meat wool rams.), body oblique length 1.6 cm or 2.8% ($P>0.99$), chest width 0.74 cm or 4.4% ($P>0.95$), chest depth 0.89 cm or 4, 7% ($P>0.99$), chest circumference was 0.90 cm or 1.4% ($P>0.999$), leg circumference was 0.02 cm ($P>0.95$). Body size at this age was 1.2 cm or 2.2% ($P>0.99$) in F1 crossbred female lambs, respectively; 0.94 cm or 1.71% ($P>0.95$); 0.66 cm or 1.2%; 0.44 cm or 2.7% ($P>0.95$); 0.64 cm or 3.5% ($P>0.95$); 0.64 cm or 1.04%; It was found to be 0.01 cm higher.

Group I F1 rams at the age of 5 months were analyzed according to body dimensions: height of withers 60.4 cm, height of withers 61.96 cm, oblique length of body 63.99 cm, width of chest 23.31 cm, depth of chest 28.03 cm, chest girth was 84.06 cm and leg girth was 8.15 cm, respectively 2.10 cm ($P>0.999$) than that of pure meat woolly equids of group II; 2.02 cm ($P>0.999$); 2.10 cm ($P>0.99$); 1.57 cm ($P>0.99$); 2.3 cm ($P>0.999$); 2.75 cm ($P>0.999$) and 0.10 cm ($P>0.95$) were higher. At 5 months of age, the above-mentioned body dimensions of F1 crossbred female lambs were 2.18 cm ($P>0.999$); 2.04 cm ($P>0.99$); 1.86 cm ($P>0.95$); 1.82 cm ($P>0.999$); 2.57 cm ($P>0.999$); 2.29 cm ($P>0.999$) and 0.14 cm higher.

The height at the withers of 8-month-old Dagestan and meat woolly F1 hybrid rams compared to pure meat woolly rams was 1.51 cm ($P>0.99$), rump height was 1.40 cm ($P>0.99$), body slope length 1.05 cm ($P>0.95$), chest width 1.22 cm ($P>0.999$), chest depth 1.13 cm ($P>0.999$), chest circumference 1.50 cm ($P>0.99$) and 0.03 cm higher in calf

circumference and 1.26 cm in body size at this age in F1 crossbred female lambs, respectively ($P>0.95$); 1.20 cm ($P>0.95$); 1.38 cm ($P>0.95$); 1.17 cm ($P>0.99$); 1.08 cm ($P>0.95$); 1.40 cm ($P>0.99$) and 0.03 cm were characterized by high values.

Table 3. Body dimensions of lambs in the experimental group, p-15

Study indicators	Group I	Group II	Group I	Group II
	½ Dagestan x ½ meat-wool offspring	Offspring born from meat wool ewes	½ Dagestan x ½ meat-wool offspring	Offspring born from meat wool ewes
	Male		Female	
	X+Sx	X+Sx	X+Sx	X+Sx
in 1 month				
The height	43,60±0,484*	42,20±0,262	41,81±0,477	41,43±0,159
Buttock height	45,20±0,470**	43,73±0,263	43,37±0,463	42,96±0,155
The oblique length of the body	42,15± 0,503*	40,83±0,252	40,44±0,509	40,19± 0,238
Chest width	14,55±0,135**	14,01±0,115	13,83±0,184**	13,73±0,147
Chest depth	16,73±0,166***	16,15±0,110	15,87±0,141**	15,57 ±0,100
Chest circumference	55,40±0,109***	54,53±0,200	53,75±0,161**	53,45±0,166
Circle	7,02±0,031	6,96±0,032	6,89±0,030	6,84±0,035
3 months old				
The height	56,36±0,200***	54,60±0,394	54,39±0,335**	53,19±0,340
Buttock height	58,18±0,213***	56,35±0,425	55,74±0,334*	54,80±0,355
The oblique length of the body	57,75±0,324**	56,15±0,455	55,15±0,285	54,49± 0,362
Chest width	17,51±0,177*	16,77±0,287	16,51±0,147	16,07±0,164
Chest depth	19,83±0,130**	18,94±0,258	18,57±0,215*	17,93 ±0,204
Chest circumference	63,18±0,229***	62,28±0,293	61,98±0,257	61,34±0,228
Circle	7,05±0,039*	7,03±0,040	7,01±0,033	7,00±0,031
5 months old				
The height	60,43±0,415***	58,33±0,370	57,71±0,476***	55,53±0,441
Buttock height	61,96±0,409***	59,94±0,377	59,21±0,478**	57,17±0,489
The oblique length of the body	63,99± 0,591**	61,89±0,410	61,26±0,572*	59,40± 0,550
Chest width	23,31±0,267**	21,74±0,524	20,32±0,399***	18,50±0,381
Chest depth	28,03±0,234***	25,73±0,367	24,40±0,379***	21,83 ±0,314
Chest circumference	84,06±0,248***	81,31±0,254	80,02±0,417***	77,73±0,378
Circle	8,15±0,041*	8,05±0,038	7,99±0,046	7,85±0,063
5 months ago				
The height	62,61±0,344**	61,10±0,313	61,09±0,388*	59,83±0,379
Buttock height	64,02±0,352**	62,62±0,321	62,50±0,372*	61,30±0,347
The oblique length of the body	66,48±0,319*	65,43±0,409	65,06±0,397*	63,68± 0,439
Chest width	26,48±0,158***	25,26±0,180	25,12±0,199**	23,95±0,349
Chest depth	30,08±0,196***	28,95±0,287	28,84±0,310**	27,76 ±0,436
Chest circumference	100,54±0,401**	99,04±0,350	98,93±0,315**	97,53±0,409
Circle	8,20±0,040	8,17±0,043	8,14±0,042	8,11±0,034
12 months old				
The height	64,76±0,496*	63,17±0,428	62,88±0,525*	61,57±0,379
Buttock height	66,39±0,480*	65,00±0,422	64,46±0,523*	63,17±0,392
The oblique length of the body	67,89±0,316	66,72±0,511	66,24±0,508	65,22± 0,458
Chest width	28,00±0,277*	27,25±0,239	27,05±0,278	26,55± 0,458

Chest depth	31,49±0,355	31,00±0,327	30,86±0,386	30,43 ±0,362
Chest circumference	103,35±0,303*	102,18±0,475	101,80±0,379*	100,68±0,433
Circle	8,30±0,059	8,28±0,055	8,25±0,045	8,22±0,039

It should be noted that in our research, the analysis of the results of the body size of lambs at the age of 12 months shows that the height of the rams of the I group F1 breed is 64.76 cm, the height of the withers is 66.39 cm, the oblique length of the body is 67.89 cm, the width of the chest is 28 .0 cm, chest depth 31.49 cm, chest girth 103.35 cm and rump girth 8.30, respectively 1.59 cm (P>0.95) than those of pure meat wool rams of group II; 1.39 cm (P>0.95); 1.17 cm; 0.75 cm (P>0.95); 0.49; 1.17 cm (P>0.95) and 0.02 cm higher. At the age of 12 months, the height of crossbred female lambs of F1 breed is 62.88 cm, rump height 64.46 cm, oblique length of body 66.24 cm, chest width 27.05 cm, chest depth 30.86 cm, chest circumference 101.8 cm. and the circumference of the udder is 8.25 cm, 1.31 cm (P>0.95) than that of pure meat wool female lambs of group II; 1.29 cm (P>0.95); 1.02 cm; 0.50 cm; 0.43 cm; 1.12 cm (P>0.95) and 0.03 cm higher.

4 Conclusion

The results obtained from our research show that F1 hybrid lambs obtained by crossing Dagestan breed rams with meat-wool female ewes were characterized by higher indicators compared to meat-wool lambs in terms of live weight, absolute, daily and relative growth indicators, regardless of sex. However, it was found that the fat height, rump height, body oblique length, chest width, chest depth, chest circumference and udder circumference of crossbred lambs of F1 breed were higher than the body dimensions of meat wool lambs. The obtained results indicate that the live weight and body size of meat wool lambs depend on their genotype.

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