

ESTABLISHMENT OF PRODUCTIVE TRAITS OF CROSSBRED (TSIGAI X ASKANIAN CROSS) F₁ YOUNG SHEEP WITH DIFFERENT DIET FORMULATIONS

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This paper presents data on the establishment and development of productive traits of crossbred (Tsigai x Askanian Cross) F₁ young sheep fed by different diet formulations. It is shown that feeding crossbred young sheep with diets excessive in concentrates and deficient in succulent feeds results in dietary nutritional, mineral and vitamin imbalances, which cause the weight loss by 11.6-18.3% ($P>0.999$), decrease in staple length by 21.2% ($P>0.999$) and in fleece weight by 7.6% in sheep at 15 months of age.

Key words: hybrids, young sheep, diet, succulent feeds, concentrates, live weight, wool.

Sheep production can be successfully developed under market conditions and ensure supply of a sufficient quantity of lamb meat, wool and other types of products [4]. The fleece was always the main product in fine wool and semi-fine wool production; however, in recent years the wool prices have decreased, and the demand for wool and woolen goods has fallen that resulted in reduction in the number of sheep and decline in sheep farming. Therefore, to improve the competitiveness of sheep farming it became necessary to redirect producing from wool to meat-wool production purpose.

The transition of sheep industry to lamb production requires availability of breeds that are distinguished by high meat productivity; and when establishing meat production, the main procedure is to cross local sheep breeds with the best breeds of domestic genofond [2]. These requirements are best met by meat and dual-purpose breeds kept for both meat and wool production [1]. For this purpose in different regions of Ukraine they use stud rams of Askanian meat-wool breed with crossbred wool.

The research goal was to study the establishment of productive traits and characteristics of crossbred F₁ young sheep resulting from crossing Tsigai ewes with stud rams of Askanian meat-wool breed with crossbred wool when fed different diet formulations during the rearing period from birth to 15 months of age.

Materials and methods The studies were conducted in two groups of young F₁ sheep resulting from crossing Tsigai ewes with stud rams of Askanian meat-wool breed with crossbred wool (Askanian crossbred – AC), consisting of 50 heads in each, from their birth and up to 15 months of age. Up to the age of 4 months the lambs were raised under the same conditions in total confinement. The weaning of lambs was carried out at 4 months of age.

From 4 to 15 months of age the lambs were fed structurally different diets. The diet for animals in the first group contained 41% less succulent feeds and 40% more concentrates than the control diet.

The diet for animals in the second group was 19% lower in succulent feeds and 9.0% higher in concentrates comparing to the control diet. Total nutrient value of the diets for both groups was 0.99-1.0 feed units.

The offspring resulted from this cross showed high weight gain rates, fleece weight, staple length, wool fineness, fibre soundness and skin thickness measured using common methods.

The study results were processed using the method of variation statistics developed by N.A. Plokhinskiy (1969) [3].

Results. Direct young-stock breeding is one of the main lines of selection and breeding activities aimed to qualitative improvement of livestock as individual specific characteristics of conformation, temperament, viability and performance are acquired by animals during their growth.

The ontogenetic development of animals is the result of complex interaction of inherited basic traits and specific environmental conditions. The weight gains of crossbred lambs, which were fed diets with different percentage of succulent feeds and concentrates, from their birth to the age of 15 months, were somewhat different (see Table 1).

Having examined the data from Table 1 it should be noted that the development of neonatal lambs during fetal life was not abnormal. Lambs were born healthy and viable with similar body weights typical for young female and male lambs. They had good body covering.

Sexual dimorphism in male lambs relative to female lambs showed as live weight increase by 90 g or 2.2% in the first group lambs and by 330 g or 8.3% in the second group lambs.

1. Age-related live weight change in lambs and yearlings (kg)

Age, Months	Groups of sheep					
	First group			Second group		
	$x \pm Sx$	$\pm \delta$	$\hat{C}_V, \%$	$x \pm Sx$	$\pm \delta$	$\hat{C}_V, \%$
Female lambs (n = 25 in each group)						
At birth	3,95±0,15	0,72	18,2	3,96±0,27	1,32	33,3
4	23,02±0,20	0,97	4,2	23,79±0,72	3,54	14,9
15	34,16±0,29	1,46	4,3	38,14±0,93***	4,58	12,0
Male lambs (n = 25 in each group)						
At birth	4,04±0,15	0,73	18,0	4,29±0,28	1,41	32,8
4	25,55±0,9 ^{^^^}	1,91	7,4	26,73±0,37 ^{^^^} *	1,83	6,8
15	42,11±0,73 ^{^^^}	3,58	8,5	49,81±0,86*** ^{^^^}	4,24	8,5

Notes: 1) P-value for the differences between sex groups: *- $P \geq 0,95$; ***- $P \geq 0,999$; 2) P-value for the differences between lambs of different sex within one age-group: ^{^^^} $P \geq 0,999$.

Interaction of morphophysiological characteristics specifies appearance of animals and norm of body reaction to the environmental impact. The exterior, which is one of the characteristics of constitution, health status and performance, was studied by measuring external body parts with description of body organization. The most important body sizes which define the body organization and development of lambs are withers height, chest depth, chest width, heart girth and body length. The body sizes of lambs at the age of 4 months indicate that the lambs have elongated barrel-shaped bodies, deep chest of average width, well-developed loin, rump and back, and strong, but not coarse frame. Their heads are not large, slightly oblong with sufficient head wool. Male and female lambs are polled. The neck is of average length, well-muscled without body wrinkles. Legs are strong and wide-set.

There was no significant difference in live weights of lambs at 4 months of age either between groups or within each group. However, the live weights of lambs in the second group

have already come to tend to increase. For instance, the live weight of ewe lambs in the second group was 0.77 kg or 3.3% higher than those in the first group while the live weights of male lambs in the second group were 1.18 kg or 4.6% ($P > 0.95$) than those in the first group. Sexual dimorphism in body weight was 2.53 kg or 10.9% ($P > 0.999$) in the first group and 2.94 kg or 12.3% ($P > 0.999$) in the second group. Such a slight difference in body weight between female and male lambs within each group is caused by the fact that all lambs stayed with their dams up to the weaning, and hence, they received the most protective feed – mother's milk, had good growth rates and showed only biologically specified sexual dimorphism.

After weaning at the age of 4 months lambs get in new nutrition and housing conditions, which appear to be stress factors for them. Their adaptability to those conditions is shown in their viability, health status and performance. Hence, during this period they demand particular attention and more comfortable environment. The interval from 4 to 15 months of age covers both summer and winter periods. During summer lambs were grazed on pasture without concentrate creep feeds; and in winter they were fed diets containing roughage, succulent, concentrated feeds, as well as mineral and vitamin supplements. The ration for young stock in both groups differed in formulation though the diet for the second group was better balanced which resulted in higher weight gains. In particular, the body weight of 15-months ewe lambs in the second group was 3.9 kg or 11.6% ($P > 0.999$) higher and that of male lambs was 7.7 kg or 18.3% ($P > 0.999$) higher than body weight of animals in the first group, respectively. Sexual dimorphism showed to the utmost at this age; in particular, sexual dimorphism in body weight of ewe lambs in the first group was 7.95 kg or 23.2% ($P > 0.999$) while that of male lambs was 11.67 kg or 30.5% ($P > 0.999$). Apart from merely biological characteristics of sexual dimorphism, that is likely to be caused by different diet formulations. It is known that excessive level of concentrates reduces digestibility and utilization of green and succulent feeds that affects the dietary nutrient mineral ratio and causes metabolic disorders, which eventually result in slowing down weight gains.

During the study of physical and mechanical properties of wool of crossbred ewe lambs it was found out that their fleece is semi fine, with rather smooth fibre fineness in individual staples and in fleece. Particularly, the wool fineness for ewe lambs in both groups varied from 48 to 58 grades, but in the second group there was 2.3 times more lambs with wool of 48/50 grades than in the first group. There was almost similar quantity of ewe lambs with wool of 56/58 grades in both groups. Wool soundness corresponded to the standards of semi-fine wool; the break length of the wool of ewe lambs in the second group was 0.9 cm or 11.2% greater than that one in the first group.

The study reported some difference in the staple length and fleece weight in experimental ewe lambs (see Table 2).

2. Fleece weight and staple lengths of 15 months old ewe lambs

Traits	Ewe lamb group					
	First group (n = 25)			Second group (n = 25)		
	$\bar{x} \pm S_x$	$\pm \delta$	$\hat{C}_V, \%$	$\bar{x} \pm S_x$	$\pm \delta$	$\hat{C}_V, \%$
Fleece weight, kg	3,91 \pm 0,11	0,52	13,3	4,21 \pm 0,11	0,56	13,3
Staple length, cm	11,45 \pm 0,35	1,71	14,9	13,88 \pm 0,52***	2,56	18,4

Notes: P-value for the difference between groups: *** - $P \geq 0,999$.

Deviations from the desired diet formulation in levels and types of feedstuffs resulted in different wool productivity. For instance, the fleece weight in ewe lambs in the second group, which were fed with better formulated diet with higher level of succulent feeds and standard level of concentrates relative to the ewe lambs in the first group, was 0.3 kg or 7.6% higher while the staple length was 2.43 cm or 21.2% ($P > 0,999$) greater.

Conclusion

Feeding crossbred (Tsigai x Askanian Cross) young sheep diets excessive in concentrates and extremely deficient in succulent feeds resulted in parameters per head below target ones at the age of 15 months, namely weight gains were 3.9 kg or 11.6% ($P > 0,999$) lower in ewe lambs and 7.70 kg or 18.3% ($P > 0,999$) lower in male lambs; fleece weight – 0.3 kg or 7.6% and staple length – 2.43 cm or 21.2% ($P > 0,999$) lower, respectively.

Therefore, the diet formulation has a certain impact on the establishment and development of productive traits of crossbred (Tsigai x Askanian Cross) young sheep.

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А. П. Китаева. Формирование продуктивных качеств помесного F_1 (Ц х АК) молодняка овец при различной структуре рациона.

Приведены данные о формировании и развитии продуктивных качеств помесного (Ц х АК) молодняка овец F_1 , при кормлении рационами с различной структурой. Установлено, что чрезмерно большое количество концентрированных и существенный недостаток сочных кормов приводит к нарушению баланса питательных, минеральных веществ и витаминов в рационах, что также приводит к снижению живой массы животных в 15- мес. возрасте на 11,6–18,3% ($P > 0,999$), длины шерсти – на 21,2% ($P > 0,999$) и настрига шерсти в физической массе – на 7,6%.

Ключевые слова: помеси, ягнята, молодняк, рацион, сочные корма.

А. П. Китаєва. Формування продуктивних якостей помісного F₁ (Ц х АК) молодняку овець за різної структури раціону.

Наведено дані щодо формування і розвитку продуктивних якостей помісного (Ц х АК) молодняку F₁ при годівлі за різною структурою раціону. Встановлено, що годівля помісного молодняку овець раціонами з надмірною кількістю концентрованих і надто недостатньою соковитих кормів зумовлює порушення балансу поживних, мінеральних речовин та вітамінів в раціонах, що призводить до зменшення живої маси тварин у 15-міс.віці на 11,6- 18,3% (P>0,999), довжини вовни - на 21,2% (P>0,999) та настригу вовни у фізичній масі – на 7,6%.

Ключові слова: помісі, молодняк, раціон, соковиті корми.