

Article

Changes in the Dynamics of Living Weight and Growth of Sur Karakul Sheep by Etological Types in the Conditions of Northern Karakalpakstan

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Abstract: This article examines the live weight and growth dynamics of Sur Karakul sheep raised in the extreme natural and climatic conditions of Northern Karakalpakstan, broken down by ethological types. During the study, the live weight indicators of sheep from birth until the separation of lambs and the lambing period, as well as the characteristics of absolute, relative, and daily growth, were analyzed. The results showed that sheep of the 1st ethological type prevailed in terms of live weight and growth indicators across all periods, and this advantage was found to be statistically significant. It was also observed that the growth rate of the live weight of the sheep varied depending on the physiological periods, i.e., growth accelerated in the period following the separation of the lambs. Based on the results obtained, it was substantiated that it is possible to increase the productivity of Karakul sheep by improving selection and breeding work based on ethological types.

Keywords: Karakul sheep, ethological type, live weight, growth dynamics, absolute growth, relative growth, daily growth, selection, productivity, Northern Karakalpakstan.

Introduction

The ecological regions where Karakul sheep are raised differ significantly from one another in terms of climatic conditions and the grazing and fodder base. These differences directly affect the manifestation of selection traits in them. Particularly in desert and semi-desert regions, certain phenotypic and genetic changes occur in the genotype of Karakul sheep under the influence of the external environment.

This variability allows for the assessment of the genetic stability of traits under the conditions of each ecological region, and its in-depth study is of great scientific and practical importance for the Karakul sheep breeding industry [1], [2].

Today, increasing the meat productivity of agricultural animals, including Karakul sheep, in various natural conditions, determining its optimal and upper limits for each region, and planning production volumes on this basis is considered an important factor in ensuring food security.

It is known that the live weight and meat productivity of Karakul sheep are relatively low. Therefore, searching for ways to effectively utilize existing potential is one of the urgent tasks. In this case, the color of the sheep also plays a certain role, and there is a difference in their live weight and, accordingly, in meat productivity indicators.

From this perspective, research aimed at studying the live weight of Karakul sheep in various ecological regions, its dynamics depending on age, as well as daily, absolute, and relative growth indicators, is of particular importance [3], [4], [5].

In scientific research, including the work of R.U.Turganbayev, it was established that under the conditions of southern Karakalpakstan, the live weight of Karakul lambs of various colors at birth ranges from 3.4–3.7 kg, and this difference persists until 5 months, reaching a certain level at 12 months [6].

Additionally, under the conditions of the Nurata adyrs, the live weight of Karakul lambs according to ethological types was approximately 4.01–4.52 kg, and this indicator was observed to persist until the age of 18 months. [7], [8], [9].

At the same time, the analysis of available data shows that studies on the study of live weight, which is one of the important indicators of Karakul sheep, have not been sufficiently conducted in the conditions of Northern Karakalpakstan. Therefore, conducting scientific research in this direction in this region is one of the most pressing issues today [10], [11], [12].

Purpose of the research. The main goal of this study is to analyze the dynamics of changes in the live weight of sur karakul sheep under the conditions of Northern Karakalpakstan, as well as their daily, relative, and absolute growth indicators.

Research methods

The research was conducted on Karakalpak Sur Karakul sheep raised at the "Karakulchilik va ilmiy-naslchilik tajriba stansiyasi," located in the Takhtakupir district of the Republic of Karakalpakstan. During the experiment, the live weight of lambs obtained as a result of mating sheep according to ethological types in various variants was measured on electronic scales. Additionally, their daily, relative, and absolute growth rates were determined based on existing methodologies. Mathematical processing of the obtained data was carried out using methods of variational statistics [13], [14], [15].

Results

During the research, the dynamics of changes in live weight from birth to separation from the mother, as well as daily, relative, and absolute growth indicators of offspring obtained as a result of mating sur Karakul sheep in various variants according to ethological types in the northern region of Karakalpakstan, characterized by severe extreme conditions, were studied.

The main goal of studying these indicators under these conditions is to determine the significance of live weight in assessing the subsequent viability and productivity of the lambs. This is because live weight directly affects the formation of the constitutional characteristics of lambs. The strength of the Constitution, in turn, ensures high vitality and productivity.

The results of the research conducted in this direction are summarized in Table 1.

Table 1. Dynamics of live weight of sheep by season.

Ethological type of sheep	Live weight, kg								
	After giving birth			After the lambs are weaned			Before the miscarriage		
	n	X±Sx	Cv	n	X±Sx	Cv	n	X±Sx	Cv
I	30	36,85±0,43	6,28	30	39,95±0,50	6,65	30	41,88±0,52	6,72

II	30	35,45±0,42 ^x	6,37	30	38,60±0,48 ^x	6,68	30	40,25±0,50 ^x	6,70
III	30	33,10±0,47 ^x	6,83	30	36,40±0,50 ^{x)}	7,40	30	38,80±0,51 ^{x)}	7,05

X-P<0,05; X)-P<0,001

As can be seen from the data, sheep of the 1st ethological type have a predominance in live weight across all seasons. At birth, their live weight was 36.85±0.43 kg; according to this indicator, Type 1 sheep outperformed Type 2 sheep by 1.36 kg (P<0.05) and Type 3 sheep by 3.73 kg (P<0.001).

The live weight indicator during the separation of lambs from sheep was 39.95 ± 0.50 kg in sheep of the 1st ethological type, 38.60±0.48 kg in the 2nd ethological type, and 36.40±0.50 kg in the 3rd ethological type. The predominance of type 1 in this indicator was 1.3 kg (P<0.05) compared to type 2 and 3.58 kg (P<0.001) compared to type 3.

A further increase in live weight was observed by the weaning period; meanwhile, sheep of ethological type 1 were statistically significant compared to sheep of the second and third types (P<0.05; P<0.001) with a high indicator of live weight.

To increase the live weight of sheep in a stable and proportional manner, it is important to clearly understand the characteristics of the inter-period growth of this indicator. Based on this data, it is possible to effectively organize the grazing of sheep at different periods and on pastures, resulting in increased productivity and faster achievement of the expected goal.

Furthermore, this indicator allows for the fattening of sheep that lost live weight during the winter season in subsequent periods and determines in which period this process will be effective. As a result, the live weight can be maximized before the lambing period and the sheep can be prepared for the season. In sheep with a high level of fatness, mating and fertilization activities increase, serving to improve future productivity.

From this perspective, the study examined the characteristics of absolute, interperiodic, relative, and daily live weight growth in sheep of various ethological types from calving to mating. The results obtained are summarized in Table 2.

Table 2. Dynamics of absolute, relative, and daily growth in live weight in sheep of various ethological types.

Ethologic al type of sheep	n	Live weight									
		Relative growth				Daily growth					
		Absolute growth		From birth until the lambs are separated		A short distance from when the lambs were separated as		From birth until the lambs are separated		With separated lambs from to	
		kg	%	kg	%	kg	%	g	g		
I	30	5,27	14,42	2,25	6,13	3,02	7,80	18,60	40,01		
II	30	5,03	14,30	2,31	6,50	2,71	7,24	19,00	36,00		
III	30	3,95	11,60	1,40	4,10	2,53	7,20	11,6	33,8		

An analysis of the research conducted in this direction revealed a number of specific features and patterns. Firstly, the increase in live weight varies to a certain extent according to ethological types. The highest absolute growth was observed in sheep of the 1st ethological type (5.27 kg), in sheep of the 2nd type (5.03 kg), and in sheep of the 3rd type (3.95 kg).

Relative and daily growth indicators also prevail in sheep of the 1st ethological type. From birth to the separation of lambs, their growth was 2.25 kg, while in type 3 sheep; this indicator was much lower at 1.40 kg. It was observed that this advantage persists from the time the lambs are separated until the lambing period.

Discussion

Secondly, regardless of the ethological type, it was observed that live weight gain in sheep significantly accelerated during the period from lambing to separation compared to the period from birth to separation.

First, during the 120–125 days of the period, the increase in live weight was 2.25 kg in ethological type 1, 2.31 kg in ethological type 2, and 1.40 kg in ethological type 3; the daily increase was 18.6; 19.00 and 11.6 grams.

During the 75-day period of the second period, the relative increase in live weight in sheep of ethological types 1, 2, and 3 was 3.02; 2.71 and 2.53 kg, while the daily increase was 40.01; 36.00 and 33.8 grams.

The slow growth of live weight in the first period can be explained by the fact that the bulk of the sheep's feed energy is directed toward feeding the lambs. In the second period, after the separation of the lambs, a significant increase in live weight is observed in the ewes, which indicates the importance of efficient feed use.

Conclusions

According to the results of the conducted research, it was established that the live weight indicators of Sur Karakul sheep differ significantly depending on ethological types. It was statistically and reliably confirmed that in all observation periods, sheep of ethological type 1 had superiority in terms of live weight, as well as absolute, relative, and daily growth indicators.

The analysis showed that the growth rate of live weight in sheep varies depending on the physiological state: while growth occurs relatively slowly from birth to the separation of lambs, it accelerates significantly in the post-separation period. This situation is explained by the unequal distribution of energy and food resources. Furthermore, the high growth rates of sheep of ethological type 1 indicate their constitutional strength, vitality, and high productivity potential.

The results obtained show that in the conditions of northern Karakalpakstan, there are opportunities to increase the productivity of Karakul sheep through breeding and selection based on ethological types. This plays an important role in organizing highly efficient breeding work in practice.

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