Meat productivity of sheep in Uzbekistan and its relationship with different factors

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Abstract. More than 20.1 million hectares of the territory of the Republic of Uzbekistan are pastures, of which 16-17 million hectares are located in the desert region. Karakol sheep, unlike other farm animals, have very valuable biological properties, they are able to breed in very harsh continental desert climates, sparsely vegetated, saline, arid pastures, without consuming absolutely green fodder in summer, autumn and winter has the ability to provide very valuable products (astrakhan leather, meat, wool, fur and milk), while maintaining the characteristics of rapid growth and development. This article provides information on the meat yield, live weight, external indicators, feeding rations of grazing and karakul sheep of different ethological types, their fattening characteristics, meat productivity, slaughter weight, slaughter output, internal fat, moisture content, chemical composition of meat.

1 Introduction

Karakul sheep is bred in more than 40 countries around the world. Among these countries, Uzbekistan, Kazakhstan, Turkmenistan, the Republic of South Africa, Namibia and Afghanistan are the most developed. In these countries, special attention is paid to extensive research on the enrichment of the karakul breed with new genetic traits [1-3].

More than 20.1 million hectares of the territory of the Republic of Uzbekistan are pastures, of which 16-17 million hectares are located in the desert region. Karakol sheep, unlike other farm animals, have very valuable biological properties, they are able to breed in very harsh continental desert climates, sparsely vegetated, saline, arid pastures, without consuming absolutely green fodder in summer, autumn and winter has the ability to provide very valuable products (astrakhan leather, meat, wool, fur and milk), while maintaining the characteristics of rapid growth and development. Breeding of karakul sheep can lead to efficient use of pastures, employment of people living in the desert, improvement of their living standards and production of karakul products [2, 4].

Normalized feeding was used to determine the feed requirement of sheep of different sexes and ages by season. This allows for increased efficiency in revealing the genetic

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potential of sheep. Normalized nutrition was carried out in 2009-2011 in accordance with the standard developed by the Department of Nutrition and Conservation of the Research Institute of Karakul and Desert Ecology [1, 4].

Standards and composition of supplementary feeding of sheep of different sexes and ages [5]. The nutritional value of fodder is determined by the chemical composition of the pasture ration according to the seasons. Nutritional productivity is determined by the unit of conditional nutrient protein.

2 Materials and methods

Pasture capacity, the number of sheep per hectare of pasture in a given period is determined by the following equation (1) [6, 7]:

$$N = U / D_x T \quad (1)$$

Where, N –1 number of sheep per pasture; U– productivity of forage consumed from pasture in a certain period (green or dry mass, feed unit, kg, exchange energy.J); D - daily need of a head of sheep for food and energy; and, T - duration of pasture use, days.

Commonly accepted methods were used to classify experimental sheep into ethological types [2].

To study the chemical composition of the meat, samples of minced meat were taken for slaughter and skin analysis for chemical analysis in accordance with generally accepted methods [2]. Methods were used to determine the chemical composition of meat [8-10].

This equation was used to determine the moisture content of the meat (2) [10]:

$$x = (P1-P2) \times 100 / P \quad (2)$$

Where, P1-weight of minced meat before drying; P2-weight of minced meat after drying; and, P-weight of minced meat.

The obtained results were performed by biometric processing [11]. Meat productivity of animals also depends in many ways on the influence of a number of paratypical factors, such as nutrition, feed quality, behavior and other factors.

Ensuring food security is one of today's global challenges. In this regard, meat production in karakul farming in extreme desert conditions is of great importance in meeting the demand for meat of the desert population and improving their lifestyle.

It was found that hybrids obtained by industrial crossbreeding of Trans-Baikal soft wool breeds with New Zealand corridel rams have higher slaughter costs and meat quality than their purebred peers [12-14].

It has been found that the rapid rearing of soft-wooled lambs during lactation and a significant increase in live weight during weaning and subsequent fattening allow them to obtain high-quality meat [14].

3 Results and discussion

According to the results of the fattening, according to the slaughter indicators, the amount of lahm in the body was higher in black karakul rams than in red rams. In both groups, Caucasian barra-type lambs were observed to have higher rates of meat quality in fattening [2].

In hybrid offspring obtained from crossbreeding of purebred Soviet merino sheep with Australian rams, meat productivity was found to be higher than that of purebred peers [1-4].

The effect of the ethological characteristics of sheep on their meat productivity, as well as the fattening characteristics of rams and their slaughter rates, are studied, and the results obtained in the study are presented in Table 1.

Table 1. Dynamics of live weight of rams in fattening (60 days of fattening).

Indicators	**In generations of ethological type 1 (n = 3)**	**In generations of ethological type 2 (n = 3)**	**In generations of ethological type 3 (n = 3)**
Live weight, kg:			
At the beginning of fattening	32.9±0.60	31.2±0.40	31.4±0.50
At the end of fattening	41.5±0.42	39.6±0.40	39.3±0.50
Absolute growth, kg	8.6	8.4	7.9
Daily average growth, g	143.33	140.0	131.67
Feed consumption for 1 kg live weight gain:			
Feed unit	8.82	8.82	8.82
Digestible protein	808.8	808.8	808.8

Data on the fattening characteristics of rams indicate that certain differences occur between generations derived from sheep with different ethological characteristics. According to the results obtained, the highest daily growth and absolute growth of live weight (143.33 grams and 8.6 kg, respectively) were observed in the offspring of sheep of the first ethological type under the same feed consumption conditions. This situation indicates that the first group of rams have better absorption of nutrients than the second and third group of rams, which should be used in the selection of animals for fattening.

The predominance of the first group of rams can also be seen from the results of studies in the field of study of meat productivity indicators of fattened rams.

Table 2. Meat productivity of Karakalpak rams after fattening.

Indicators	In generations of ethological type 1 (n = 3)	In generations of ethological type 2 (n = 3)	In generations of ethological type 3 (n = 3)
Number of rams, head	3	3	3
Slaughter received live weight, kg	41.5±0.42	39.6±0.51	39.3±0.46
Live weight after 24 hours, kg	39.6±0.46	37.8±0.40	37.3±0.50
Chop weight, kg	18.6±0.29	17.9±0.34	17.5±0.25
Weight of internal fats, kg	1.04±0.09	0.39±0.05	0.32±0.03
Slaughter weight, kg	19.6±0.40	18.3±0.48	17.8±0.27
Slaughter expenses,%	49.5	48.4	47.7

The first group had the highest slaughter weight (19.6 ± 0.40) and slaughter expenditure (49.5%), which were 1.3 kg and 1.1% higher than the second group of rams, respectively, and 1 kg higher than the third group of rams. , 8 kg and 1.8% higher.

Live weight and external indicators of sheep slaughtered for karakul. It is important to study the meat productivity of karakul sheep, and among the meat contingent, lambs intended for the production of adult karakul occupy a significant place. In this regard, their use is important in increasing mutton production. In this direction, the live weight and important external indicators of the sheep before slaughtering the karakul were studied and the data are given in Table 3.

Table 3. Live weight and external indicators of sheep slaughtered for karakul.

Indicators	n	X±Sx	Cv
Live weight, kg	30	45.38±0.57	6.83
Slope length of the body, cm	30	52.96±0.48	4.95
Elevation height, cm	30	57.68±0.45	4.25
Chest circumference, cm	30	88.19±0.39	2.14

According to Table 3, older sheep intended for pre-slaughter karakul had a high live weight, with an average live weight of 45.38 ± 0.57 kg, and in some sheep 52.7 kg. It can be concluded that this figure was achieved due to the high external performance of sheep. The results of the study can be used effectively to increase meat production.

Features of fattening of karakul and local sheep breeds. Sheep are given for indoor feeding - late-born ewes with various defects and emaciated ewes, ewes of all ages, ewes born late and, if necessary, ewes unfit for breeding.

The highest growth of muscle tissue occurs in the first 4-6 months of sheep life. Fat tissue develops intensively from the age of one and therefore the quality of the meat deteriorates. Therefore, the number of lamb farms producing winter and early spring lambs for meat at 8-10 months of age is growing.

Feeding of karakul sheep is based on farm-produced fodder, the main part of which is coarse fodder, flax, sorghum, wormwood, straw, alfalfa, industrial waste husks. From concentrated feeds feed barley, technical waste of cotton, shrot. Feed briquettes, which are cost-effective, use feed blocks. To date, technologies for the preparation of feed blocks and recipes for fattening young lambs and sheep that are considered unfit for age have been developed [2].

The method of early separation of lambs from their mothers has the peculiarities of selling young lambs for meat by feeding and fattening. To accelerate herd turnover and ensure intensive management of the industry, selling young lambs for meat at 9 months of age is cost-effective and ensures high production profitability [1].

When studying the effectiveness of insemination of beef cattle and fine-wool sheep in the desert zone of Saratov region, analyzing the dynamics of live weight in terms of average conditional cattle from birth to 12 months of age, Kazakh white meat breed 259.6 kg, sheep 285.0 kg live weight, daily live noted that weight gain would be 711.2 and 748.4 g, respectively [5-8].

A study of the taste quality of mutton of different origins suggests that this figure is better in purebred animals than in hybrids.

The weight of the body is correlated with the amount of fat in it, and the heavier the body, the greater the amount of fat in it. For this reason, in developed countries such as England, Australia and New Zealand, heavy meat is underestimated and demand for it is negligible [3].

Medium-fat sheep can be fattened intensively for 50-60 days, while low-fat sheep and young cattle can be fattened for 90-120 days to achieve high daily growth rates and obesity. The organization of fattening at different times prevents the interruption of the process of slaughtering animals.

Animal fattening is done in three-walled naves. The buildings are equipped with mangers at the rate of 40 cm per head, 20 cm on both sides. Stables for water and salt will also be installed. The following feeds are used for fattening: cotton waste, concentrates, barley, mixed fodder, kunjara, feed industry bale.

The following types of feed are provided in large quantities for inpatient fattening:

1) increase the amount of concentrated feed, reducing the weight of bulk feed from the beginning to the end of fattening;

2) increase in demand for feed and concentrated feed in young cattle, increasing the daily growth of adult animals;

3) reduce feeding with cotton waste at the end of fattening in order to improve the taste qualities of meat.

The daily feed composition and consumption per head of sheep are as follows: Karakol sheep for 90 days during the fattening period per 1 head: barley-65 kg; omuxta em-22.5; cotton waste - 135 kg. In the breed of sheep - 90 kg of barley; omuxta em-22.5; cotton waste - 153 kg.

According to the results of taking into account the productivity and feed consumption of older sheep of the Karakul and Local breeds, the feed consumption of Local sheep was 16.2% higher.

The average daily growth was higher in sheep belonging to Jaydar breed, therefore, the feed consumption per 1 kg of growth in Karakul sheep was higher, it was 11.6 feed units in Karakul sheep and 6.8 feed units in Jaydar sheep (Table 4).

Table 4. Changes in the live weight of older ewes during fattening and feed consumption.

Indicators	Groups	
	Karakul	**Local**
Live mass at the beginning of fattening, kg	34.1	42.0
At the end of the fattening	48.2	65.2
Feed consumption per day, kg	2.450	2.950
Average daily growth, g	156.7	255.6
Absolute growth during the experiment, kg (90 days)	14.1	23.0
Feed unit consumption per 1 kg increase	11.6	6.8

In 90 days of fattening rams born in 2019, kept in a separate section of the fattening area, the feed consumption per fattening was 90 kg of barley, 22.5 kg of mixed fodder, 153 kg of cotton waste. Feed consumption for ewes and changes in their live weight are given in Table 5.

Table 5. Changes in live weight and feed consumption of fattening rams during fattening.

Indicators	Groups	
	Karakul	**Karakul**
Live mass at the beginning of fattening, kg	30,1	65,5
At the end of the fattening	43,0	91,8
Feed consumption per day, kg	2,450	2,950
Average daily growth, g	143,3	292,2
Absolute growth during the experiment, kg (90 days)	12,9	26,3
Feed unit consumption per 1 kg increase	9,3	4,6

According to the results of feed consumption and productivity, the average daily growth of rams belonging to the breed of local was 292.2 grams, and in the karakul breed - 493% less than 143.7 grams.

Meat productivity of fattened karakul and local sheep breeds. Meat productivity of sheep means the amount of meat in the carcass of a slaughtered animal. The main indicator of meat productivity is the weight of the half, the greater the economic efficiency of the breeding animal if a larger body is obtained during a relatively short period of growth. The purpose of this study is to study the meat yield of older ewes and sable rams belonging to the karakul and local sheep breeds.

The animals are kept hungry for 24 hours before slaughter. Live weight loss depends on the age and breed of the animal. Older ewes fed under the same feeding and storage conditions lose less weight than younger cattle (Table 6).

Table 6. Old sheep of Karakul and Local breeds control slaughter results.

Indicators	**Groups**	
	Karakul n=3	**Local** n=3
Live weight: In pre-slaughter storage, kg	48.2	65.2
Slaughtered, kg	46.2	61.9
Weight loss; kg	2.0	3.2
%	4.1	5.0
Slaughter results:		
Chop mass	23.0	31.8
Internal fat mass	0.5	0.7
Slaughter cost, kg	23.5	32.5
Slaughter expenses,%	48.0	49.0

Older ewes, which have a relatively low rate of metabolic processes, accumulate more internal fat than rams. In turn, 0.65-0.70 kg more fat is accumulated in ewes.

An objective indicator of meat productivity is the slaughter expenditure, which includes the ratio of the mass of fat and internal fat to the live weight before slaughter. Slaughter expenditure of old ewes and rams was 48.0-49.0% in the karakul breed and 49.0-50.0% in the Local breed (Table 7).

Table 7. Results of control slaughter of rams of Karakul and Jaydari breeds.

Indicators	**Groups**	
	Karakul (n=3)	**Karakul** (n=3)
Live weight: In pre-slaughter storage, kg	43.3	91.8
Slaughtered, kg	40.8	87.2
Weight loss; kg	2.5	4.6
%	5.7	5.0
Slaughter results:		
Chop mass	21.0	45.9
Internal fat mass	0.35	0.65
Slaughter cost, kg	21.3	46.5
Slaughter expenses,%	49.0	50.0

Old and young rams belonging to the karakul sheep breed had lower rates of slaughter than the Jaidari sheep breed.

Chemical composition of rams of Karakul and Local breeds. In almost all countries of the world, mutton is obtained from lambs under one year of age. The main reason for this is that the production of a unit of product in the period up to one year of age is the most efficient, and the quality of the meat grown is high. At this age, the process of protein formation in the body accelerates. In later life, the increase in body weight of sheep occurs mainly due to the accumulation of adipose tissue. This, in turn, reduces the biological value of meat and the economic efficiency of its cultivation.

One of the main tasks facing the sheep industry today is to increase the production of young lamb and improve its quality.

The quality of meat products largely depends on the chemical composition of muscle tissue, the weight of which is 75% of body weight. Muscle tissue is characterized by a complex chemical composition. It contains many labile substances, the amount and properties of which can vary significantly depending on many factors. The biological value of meat is mainly determined by the composition and ratio of the main nutrients in it: protein, fat and carbohydrates.

By examining meat samples taken from the control carcass of 4.5-month-old lambs in a chemical laboratory, the ratio of substances in the meat was determined.

The chemical composition of the meat obtained from the control carcass was determined and the data obtained are given in Table 8.

Table 8. Chemical composition and energy value of meat, %.

Indicators	**Groups**	
	Karakul n=3	**Karakul** n=3
Contents: Protein	17.8±0.71	17.7±0.69
Fat	20.6±0.68	17.8±0.7
Humidity	60.1±0.7	63.1±0.61
Ash	0.6±0.02	0.6±0.02
Carbohydrates	0.6±0.01	0.6±0.01
Energy value of 1 kg of lax meat, kcal	260.1±13.4	231.1±11.1
KDj	1080.1±63.3	972.4±42.3

The analysis of the data presented in the table shows that the composition of lamb meat of different origins differs from each other in terms of basic chemical components.

Karakul lambs were found to have higher moisture content (3.0%) than minced meat, while fattened lambs were found to have higher fat content (2.8%). The amounts of protein and carbohydrates in meat were almost the same in both groups. The energy value of 1 kg of lakh meat was 107.4 KDj higher in lamb than in karakul lambs. Such a difference is explained by the fact that lambs of the ewe breed accumulate fat in the body from the lactation period, and they have a lower caloric content of meat than karakul lambs.

4 Conclusions

1. It turns out that rams obtained from sheep of the first ethological type have the ability to produce not only high growth characteristics, but also high slaughter rates by consuming the same feed as their peers. This indicates the high ability of the first type of offspring to convert food into products.

2. Older sheep intended for pre-slaughter karakul have a high condition in terms of live weight, and their average live weight can range from 45.38 kg to 52.7 kg.

3. When studying the productivity and feed consumption of karakul and Jaydari older sheep, the average daily growth was 162% higher in Jaydari sheep, 292.2 grams higher in Jaydari sheep and 49.2% lower in Karakol 143, It weighed 7 grams.

One of the main indicators of meat productivity was the slaughter of 48.0-49.0% and 49.0-50.0% of karakul and rams, respectively, and rams.

Chemical analysis of lamb meat shows that lambs are able to produce meat that is juicy, rich in protein and low in fat during the early slaughter period.

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