# Efficiency of grazing for adult culled sheep in the southern regions of Kyrgyzstan

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**Abstract.** This article provides an analysis of the fattening of adult cull ewes of the Gissar and Gissar-Kyrgyz breeds, and provides research results. In Kyrgyzstan, sheep meat, especially fat-tailed sheep, is very popular among the local population. It is important to note that a breeding system is used there, which is based on year-round transhumance and pasture keeping of sheep. This allows you to achieve several goals: firstly, to produce relatively inexpensive products; secondly, to effectively use mountain and foothill pastures for grazing sheep; and, finally, to ensure the production of environmentally friendly lamb meat and fat tail fat for traditional medicine. Sheep feeding plays an important role in increasing the volume and improving the quality of lamb production. In solving the problems of increasing meat production in the Kyrgyz Republic, the leading place belongs to sheep breeds for meat and fat production. Fat-tailed sheep have high meat and fat productivity and early maturity. These qualities make them valuable for replenishing meat resources and ensuring high meat and fat qualities.



## 1 Introduction

The work presents data on the post-embryonic period of ontogenesis of fat-tailed sheep, biological patterns of growth and development that form meat and fat productivity, quality and nutritional value of lamb depending on the breed, feeding qualities, level of feeding, and also establishes the biological feasibility and economic efficiency of feeding adult cull sheep on meat. The selection of adult culled sheep was carried out according to live weight according to autumn weighing, which is supplemented by an assessment of the severity of meat forms. The results of scientific and economic experiments conducted on two groups of sheep were comparatively analyzed in order to assess their effectiveness. Sheep fattening is the process of fattening sheep that have been selected for slaughter and meat production using pasture feed. Typically this process lasts from 60 to 100 days. During feeding, sheep gain weight by 20-30% or more of their original weight. With proper nutrition, lamb becomes 2-2.5 times more nutritious, and the yield of meat and fat at slaughter increases to 60-65%, improving the quality of the skins. The feeding stock includes ewes, adult ewes, and ewes culled from the flock, including ewes and rams.

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In the CIS, the share of lamb in the meat balance is 6-8%. The main contingent are rejected queens. Selling young animals for meat is little practiced, although it has been proven that the production of lamb is economically more profitable than mutton (V.A. Balmont, 1965; A.V. Golodnov, 1969; K.U. Medeubekov, 1975; D.A. Abakarov, 1970; A.S. Azhibekov, 1978; S.N. Bogolyubsky, 1971; A.K. Amirov, 1961; I.G. Lebedev, 1952, etc.) [1-19].

Research by A.V. Nagorny and V.N. Nikitin (1953), Isakova, Zh. T., et al. (2023) And Azhibekov, A.S., et al. (2023) are extensive and convincing in their evidence, and leave no doubt about the important role of biochemical changes, determined by the level and direction of metabolism, in age-related changes in the animal body. These facts are certainly reflected in the growth of animals.

One of the key conditions for the successful development of sheep farming in the Kyrgyz Republic is the use of a year-round pasture system for keeping sheep. Thanks to the presence of vast tracts of foothill, mountain and high-mountain pastures with varied feeding and climatic characteristics, the republic has the opportunity to obtain sheep products (meat, lard, wool, etc.) with a relatively low production cost. In addition, it is important to note that sheep have the hereditary ability to efficiently utilize pasture feed even after grazing by other animal species.

V.S. Masalsky (1913), having carefully studied the way of life of the peoples of Central Asia in his extensive monograph "Turkestan Region", the author wrote: "The fat-tailed sheep are wonderful. In terms of taste and huge fat deposits, sheep produces tasty meat, which in Turkestan is valued much more expensive than beef, and tender fat."

M.F. Ivanov (1940) notes that "tail-tailed sheep are excellent meat breeds, they produce excellent products and the meat itself is not inferior in taste to the meat of the best English sheep of Marseilles and London, where the consumer is demanding, their meat has been highly appreciated."

P.F. Kiyatkin (1968) pointed out the excellent quality of lamb and fat obtained from fat-tailed sheep.

S.I. Farsykhanov, A.Kh. Khaitov (1985), summarizing the results of many years of research on improving the quality of meat and fat productivity of fat-tailed sheep, come to the conclusion that in order to increase production and improve the quality of lamb in sheep farms, it is necessary to carry out a set of measures. These activities include the organization of intensive rearing, fattening and stall fattening of sheep that are intended for slaughter. Particular attention should be paid to the use of natural pasture forage areas, which are most effective. On pastures, adult sheep daily consume from 8.0 to 9.0 kg of grass containing 1.1-1.4 feed units, which contributes to a high increase in live weight of animals.

To increase the profitability of the production of meat and fat products in sheep farming with active replacement of imports and support of agricultural producers, it is necessary to more intensively develop the sheep breeding industry.

The relevance of the study is that when feeding sheep in the conditions of Kyrgyzstan, it is possible to obtain a significant amount of high-quality lamb with optimal use of labor resources and minimal costs. It should be noted that recently the leading place in the republic belongs to sheep breeds for meat and fat production.

In this regard, we have set the task of studying the formation of meat content during the feeding period of adult sheep and determining the effectiveness of raising sheep for feeding.

To solve this problem, it is necessary to conduct research to determine optimal pasture provision, assess the quality and quantity of food resources for fattening sheep, study the factors influencing the formation of meat, and also evaluate the effectiveness of the process of raising fattening sheep.

In addition, it is important to analyze the sheep meat market, determine the demand for this type of product, and identify potential sales markets. It is also necessary to research technologies for the production of sheep meat, modern methods of nutrition and animal husbandry, as well as develop recommendations for optimizing the production process.

In addition, to increase the profitability of production, attention should be paid to improving the quality of sheep meat, developing new products and packaging, as well as developing marketing strategies to promote products on the market.

Thus, the development of the sheep farming industry helps to increase the profitability of the production of meat and fat products, reduce dependence on imports, support agricultural producers and provide the population with quality food products.

## 2 Materials and research methods

To conduct the experimental part of the study, the Tagai-Tilek farm in the Suzak district of the Jalal-Abad region was used.

To study the meat content of adult sheep, feeding was carried out using generally accepted zootechnical research methods.

The feeding of adult culled queens was carried out in two stages: the first - preparatory, from the end of March to the end of April in the foothill zone, the second - the main one, from mid-June to September in high-mountain alpine and subalpine pastures.

In the Kyrgyz Republic, sheep fattening remains one of the most effective ways to prepare animals, especially culled adult sheep, for meat. Sheep feeding technology has its own characteristics in different zones. The adopted system for keeping sheep promotes feeding throughout the entire grazing period. However, it is worth noting that the resistance of animals, depending on their breed, origin and age, to feeding conditions is not the same and has some differences. The experimental part of the study was carried out taking these features into account. Culled queens were selected to study their meat content after feeding. Feeding was carried out on different types of pastures to compare results under different conditions.

As a result of the study, it was revealed that the preparatory and main stages of feeding have different effectiveness. It was also found that the breed, origin and age of sheep influence their resistance to feeding conditions. Thus, the study conducted on the Tagai-Tilek farm made it possible to obtain valuable data on the meat content of culled adult sheep after fattening. The results obtained can be used to optimize technologies for keeping and preparing sheep for meat production in the Kyrgyz Republic. This conclusion is important for the development of agriculture and increasing the efficiency of meat production in the country. Further research and practical activities can be aimed at improving the living conditions of sheep, as well as developing optimal methods for preparing animals for feeding. The results of the study can become the basis for developing recommendations for improving meat quality and increasing sheep productivity in Kyrgyzstan.

## 3 Research results

The following conclusions can be drawn from the results of the study on sheep feeding in Kyrgyzstan:

1. Using more balanced feed rations can significantly improve sheep performance, including weight gain and meat quality.

2. Regular assessment of the quality of feed resources and optimization of diets will improve the nutrition of animals and reduce the cost of their maintenance.

3. The introduction of modern feeding methods and technologies, including the use of supplements and vitamins, can help increase meat production and improve sheep health.

4. Systematic training of farmers and specialists on proper feeding of sheep is an important step in the development of the industry and increasing its efficiency.

Further research can be aimed at studying specific types of feed, optimizing diets taking into account seasonal characteristics and climatic conditions of the region, as well as developing programs to improve the skills of specialists in the field of feeding and keeping sheep.

Sheep feeding was carried out in stages: the first stage on spring pastures, the second on high-mountain summer pastures.

Table 1 shows data on changes in live weight and average daily gain of fat-tailed queens in kilograms, and are shown in the diagram. These animals were used for feeding.

**Table 1.** Changes in live weight and average daily gain of fat-tailed queens during fattening, in kg.

| Feeding indicators | | Breeds | |
|---|---|---|---|
| | | Gissar | Hissar-Kyrgyz |
| Beginning of feeding | | 52.3 | 48.0 |
| Before the stage | | 57.6 | 51.3 |
| Total growth for 1 period of 30 days | | 5.1 | 3.3 |
| Average daily growth | | 0.17 | 0.15 |
| After the stage | | 55.1 | 48.7 |
| Live weight loss | in kg | 2.5 | 2.6 |
| | % | 4.34 | 5.07 |
| End of feeding | | 63.8 | 57.2 |
| Total growth for period 2 | | 8.7 | 8.5 |
| Average daily growth | | 0.11 | 0.10 |
| Absolute increase over the entire feeding period (165 days) | | 11.3 | 9.2 |
| Average daily growth | | 0.06 | 0.05 |

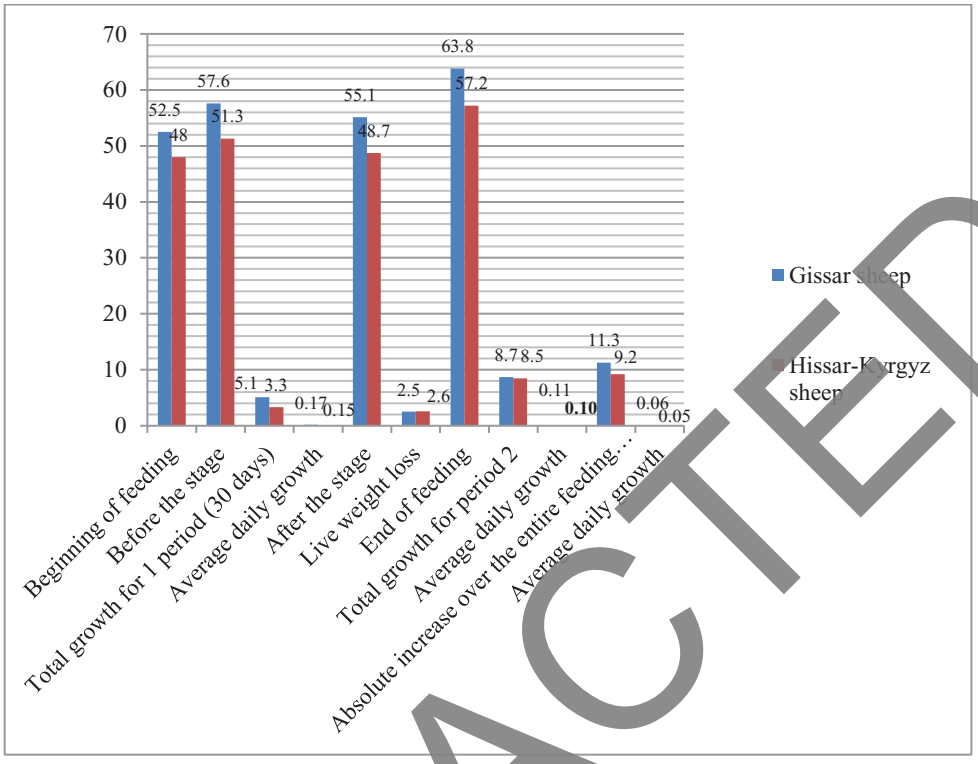


**Fig. 1.** The change in live weight of fat-tailed queens and their average daily gain in kg depending on the feeding period.

Fig. 1. shows the change in live weight of fat-tailed queens and their average daily gain in kg depending on the feeding period.

Before the start of feeding, the average live weight of the queens reached: 52.5 kg for Gissar sheep, and 48.0 kg for Gissar-Kyrgyz sheep.

During the preparatory period in the foothill pastures, live weight increased in the queens of the Gissar breed by 5.1 kg, and in the queens of the Gissar-Kyrgyz sheep by 3.3 kg, the average daily increase during this period was 0.17 and 0.11 kg, respectively.

The transfer of queens from winter to summer pastures was carried out gradually from the end of April to June 20. However, despite this, the animals lost in live weight, the Gissar - 4.34%, and the Gissar-Kyrgyz - 5.07%.

Queens spent 78 days on high alpine grassland from June 20 to September 5, the second main feeding period. During this time, Gissar sheep gained 8.7 kg, and Gissar-Kyrgyz sheep - 8.5 kg. Therefore, the average gain per day is 0.11 kg for Gissar sheep and 0.10 kg for Gissar-Kyrgyz sheep.

Based on the results of the analysis, changes in the live weight of queens during feeding show that Gissar queens showed the best results. Over the entire feeding period, they gained an absolute gain of 11.3 kg, while for the Hissar-Kyrgyz sheep this figure was 9.2 kg.

To study the effect of feeding on the meat quality of the queens, we carried out a control slaughter of 5 heads from each group. The results are shown in Table 2.

**Table 2.** Results of queen fattening.

| Indicators | Breed | |
|---|---|---|
| | Gissar | Hissar-Kyrgyz |
| Live weight at the beginning of feeding, kg | 52.5 | 48.0 |
| Live weight at the end of feeding, kg | 63.8 | 57.2 |
| Absolute gain, kg | 11.3 | 9.2 |
| Live weight before slaughter, kg | 58.9 | 53.7 |
| Fat tail weight, kg | 4.3 | 3.2 |
| Internal fat mass, kg | 0.5 | 0.4 |
| Carcass weight, kg | 25.7 | 24.0 |
| Slaughter weight, kg | 30.5 | 27.6 |
| Slaughter yield, kg | 51.78 | 51.39 |
| Meatiness coefficient, % | 2.9 | 2.7 |
| Revenue from product sales, som | 5650 | 4600 |
| Total costs, soms | 3703 | 3406 |
| Profit, soms | 1525 | 1380 |
| Profitability,% | 41 | 40.5 |

The results of the slaughter of queens show that the yield of fresh carcasses is 43.63% for queens of the Gissar breed, and 44.69% for Gissar-Kyrgyz sheep. There are no significant differences in the yield of internal fat between the uteruses of fat-tailed breeds. But, in terms of fat tail fat yield, Gissar sheep are 1.1 kg superior to Gissar-Kyrgyz sheep. The profit received from the sale of Gissar breed queens is 1,525 soms, and Gissar-Kyrgyz sheep - 1,380 soms.

The results of the study showed that the cull ewes of the Gissar and Gissar-Kyrgyz breeds had good growth potential and adaptation to living conditions on distant pasture feed. They were characterized by good body weight and callus intensity, which indicates their good health and feed digestibility. The quality of meat from ewes of the Gissar and Gissar-Kyrgyz breeds also turned out to be high, it was distinguished by good juiciness and taste. In addition, the wool of these ewes had good technical characteristics, which makes them valuable for meat and wool production.

## 4 Discussion

The article likely discusses the effectiveness and practicality of foraging, especially in the conditions typical for this region. To begin, let's define the main aspects of the article on the feeding of adult cull sheep in the south of Kyrgyzstan. The topic of sheep fattening is a common and important practice in livestock production in various regions of the world, including Central Asia. Feeding is one of the ways to provide nutrition and care for animals, especially during the grazing season.

Important aspects for discussion:

- Feeding efficiency: how effective the method is in maintaining sheep health and improving wool or meat quality.
- Feeding conditions: what factors, such as climate, access to pasture and water, influence feeding efficiency in southern Kyrgyzstan.
- Comparison with other sheep management methods: is it worthwhile to use feeding or are there better ways to care for animals, especially given changing climate conditions and market demands.

## 5 Conclusions

Thus, analysis of the results of feeding queens on spring and high-mountain summer pastures confirms their significant effectiveness in increasing meat production. A study of the results of feeding queens on spring and high-mountain summer pastures shows that this practice actually helps to increase meat production. This is due to the fact that the use of culled queens for breeding on pastures with good nutrition makes it possible to maintain and increase the size of the herd, as well as increase the percentage of breeding queens among the culled individuals.

Thus, the use of queen feeding on high mountain pastures has the potential to increase meat production, as well as improve its quality by improving the genetic potential of the herd. This confirms the significant effectiveness of this method in the context of breeding fat-tailed sheep and optimizing meat production.

Fat-tailed sheep are distinguished by high meat and fat qualities, thanks to which they will continue to play a major role in replenishing meat resources.

Feeding cull ewes has proven to be a highly effective measure and can significantly increase lamb production and improve quality on high-mountain summer pastures.

There are huge reserves for increasing the meat and fat productivity of fat-tailed sheep.

We deeply thank the owners of the Tagai-Tilek farm in the Suzak district of the Jalal-Abad region for the opportunity to conduct the research. Their hospitality, professionalism and willingness to cooperate were invaluable to the successful implementation of the project. Thanks to them, we were able to obtain valuable data and results that greatly enriched our research.

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