УДК 636.39.636.085.1.

Research article

Open access

DOI: 10.32634/0869-8155-2025-401-12-68-75

Adilbay T. Yesimbetov
Ruzimbay U. Turganbaev
Shodlik N. Madrakhimov ✉
Khurshid A. Mamatov
Yusupbek F. Sultanov
Rustembay T. Aitjanov

Nukus Branch of Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology, Nukus, Uzbekistan

✉ *shodlikmadrahimov1963@gmail.com*

Received by the editorial office: 25.10.2025
Accepted in revised: 11.11.2025
Accepted for publication: 26.11.2025

Comparative assessment of meat productivity of purebred and crossbred fat-tailed sheep in the Republic of Karakalpakstan

ABSTRACT

The article presents data on the live weight and meat productivity of first-generation (F_1) crossbred lambs obtained from crossing Jaidari breed ewes with Hissar breed lambs, which is a scientific basis for increasing the meat productivity of tailed sheep breeds in the natural and climatic conditions of the Republic of Karakalpakstan. It was found that at the age of 18 months, lambs of the second group (Hissar pure breed) and the third group (Hissar x Jaidari) of the first generation (F1) outperformed their peers from the first group (Jaidari pure breed) in live weight, respectively, by 6.0 kg, or 9.2% ($p < 0.001$), and by 4.4 kg, or by 6.7% ($p < 0.01$). This indicates the high genetic potential of these animals in the formation of live weight and meat productivity, as well as their good adaptability to the environment and the high potential of breeding sheep, as well as the main absolute and relative indicators of slaughter results. Group II (pure Hissar breed) and Group III (½ Hissar x ½ Jaidari) bred first-generation sheep (F1) compared to their peers in Group I (Jaidari breed), respectively, by 15.6 kg, or by 33.5% ($p < 0.001$), and 5.6 kg, or by 12.0% ($p < 0.01$), uncooled carcass weight — by 9.4 kg, or by 47.7% ($p < 0.001$), and 5.2 kg, or by 26.4% ($p < 0.01$), slaughter weight — by 13.5 kg, or 59.5% ($p < 0.001$), and by 6.8 kg, or 29.9% ($p < 0.01$), slaughter yield of sheep — by 48.8%, 58.3% and 56.7%, respectively, which is 9.5% and 7.9% higher than that of their peers Group I (Jaidari). Thus, based on the scientific basis for increasing the meat productivity of tailed sheep breeds in the natural and climatic conditions of the Republic of Karakalpakstan, the first-generation (F_1) crossbred lambs obtained as a result of crossing purebred Hissar and Jaidari sheep with Hissar sheep showed high live weight and meat productivity indicators, which testifies to the high genetic potential of feeding them with complete and rationed feeds in pasture conditions.

Key words: breed, rams, sheep farming, sheep, pedigree, crossbreeding, rams, Jaidari, Gissar, crossbreed, meat productivity, live weight, slaughter yield

For citation: Yesimbetov A.T., Turganbayev R.U., Madrakhimov Sh.N., Mamatov Kh.A., Sultanov Yu.F., Aytjanov R.T. Comparative assessment of meat productivity of purebred and crossbred sheep of fat-tailed breeds in the conditions of the Republic of Karakalpakstan. *Agrarian science.* 2025; 401 (12): 68–75 (in Russian).
https://doi.org/10.32634/0869-8155-2025-401-12-68-75

Научная статья

Открытый доступ

DOI: 10.32634/0869-8155-2025-401-12-68-75

А.Т. Есимбетов
Р.У. Турганбаев
Ш.Н. Мадрахимов ✉
Х.А. Маматов
Ю.Ф. Султанов
Р.Т. Айтжанов

Нукусский филиал Самаркандского государственного университета ветеринарной медицины, животноводства и биотехнологий, Нукус, Узбекистан

✉ *shodlikmadrahimov1963@gmail.com*

Поступила в редакцию: 25.10.2025
Одобрена после рецензирования: 11.11.2025
Принята к публикации: 26.11.2025

Сравнительная оценка мясной продуктивности чистопородных и помесных овец курдючных пород в условиях Республики Каракалпакстан

РЕЗЮМЕ

В статье представлены данные о живой массе и мясной продуктивности первого поколения (F_1) помесных ягнят, полученных при скрещивании джайдарских овец с гиссарскими баранами, что является научной основой повышения мясной продуктивности курдючных пород овец в природно-климатических условиях Республики Каракалпакстан. Было установлено, что в 18-месячном возрасте ягнята второй группы (гиссарская чистая порода) и третьей группы (гиссарская х джайдарская) первого поколения (F_1) превосходили своих сверстников из первой группы (джайдарская чистая порода) по живой массе, соответственно, на 6,0 кг, или на 9,2% ($p < 0,001$), и на 4,4 кг, или на 6,7% ($p < 0,01$). Это свидетельствует о высоком генетическом потенциале этих животных в формировании живой массы и мясной продуктивности, а также их хорошей приспособляемости к внешней среде и высоком потенциале племенных баранов, а также об основных абсолютных и относительных показателях результатов убоя. II группа (чистая гиссарская порода) и III группа (½ гиссарская х ½ джайдарская) скрестили баранов первого поколения (F_1) по сравнению со своими сверстниками в I группе (джайдарская порода), соответственно, на 15,6 кг, или на 33,5% ($p < 0,001$), и на 5,6 кг, или на 12,0% ($p < 0,01$), неохлажденная масса туши — на 9,4 кг, или на 47,7% ($p < 0,001$), и на 5,2 кг, или на 26,4% ($p < 0,01$), убойная масса — на 13,5 кг, или на 59,5% ($p < 0,001$), и на 6,8 кг, или на 29,9% ($p < 0,01$), убойный выход у баранов — на 48,8% 58,3% и 56,7% соответственно, что на 9,5% и 7,9% выше, чем у сверстников I группы (джайдари). Таким образом, на основе научного обоснования повышения мясной продуктивности курдючных пород овец в природно-климатических условиях Республики Каракалпакстан полученные в результате скрещивания чистокровных гиссарских и джайдарских овец с гиссарскими овцами ягнята первого поколения (F_1) помес показали высокие показатели живой массы и мясной продуктивности, что свидетельствует о высоком генетическом потенциале их полноценными и нормированными кормами в условиях пастбищных условий.

Ключевые слова: порода, бараны, овцеводство, овцы, породность, скрещивание, баранчики, джайдари, гиссарская, помесь, мясная продуктивность, живая масса, убойный выход

Для цитирования: Есимбетов А.Т., Турганбаев Р.У., Мадрахимов Ш.Н., Маматов Х.А., Султанов Ю.Ф., Айтжанов Р.Т. Сравнительная оценка мясной продуктивности чистопородных и помесных овец курдючных пород в условиях Республики Каракалпакстан. *Аграрная наука*. 2025; 401 (12): 68–75.
https://doi.org/10.32634/0869-8155-2025-401-12-68-75

Introduction/Введение

Today, there are 1.2 billion sheep and goats in the world, from which meat, wool, leather, and other products are obtained. Sheep and goats, compared to other animals, not only possess resistance to environmental factors, but also adapt well to pasture climatic conditions [1–5] and produce a wide range of products [6–9].

Wool and wool-beef breeds are bred in Europe, Australia, and New Zealand. In the countries of Africa and Asia, sheep breeds are bred mainly for coarse wool and meat production. In the countries of Central Asia, fat-tailed sheep breeds occupy a special place, the main characteristics of which are the rapid accumulation of fat around the tail vertebrae under normal feeding conditions, a high degree of maturity, and the formation of excellent meat and fat productivity [10].

Most of them are indigenous and, along with a high level of meat and fat productivity, are semi-gentle (Degress), semi-coarse (Saradja, Tajik, Alay) and coarse-furred tail breeds (Hissar, Jaidari, Edilboy) and others. They are distinguished by the speed of their growth and development, the ability to effectively convert feed into products, and the possibility of economic use of young animals at an early age.

In the Republic of Karakalpakstan, the sheep breeding sector is developing in large natural fodder areas in desert areas where the possibility of using other animals is limited. The fat-tailed sheep bred in the region are distinguished by both their productivity and breed diversity, which allows for the efficient use of these breeds. At the same time, the development and implementation of effective methods for using fat-tailed sheep breeds to ensure food security, improve the standard of living of the population, and create new jobs is relevant.

Sheep breeding differs from other livestock sectors primarily in the variety of products produced (meat, wool, karakul and sheepskin, milk, and others), its high adaptability to pasture conditions, growth and development [4, 11, 12], early maturity, efficient and low feed consumption, and conversion into a product [13–20].

Analysis of the development of sheep farming shows that to increase its efficiency and competitiveness, it is necessary to fully utilize its entire genetic potential [21, 22].

Various natural-climatic and economic conditions, as well as ethnic and other characteristics, have contributed to the breeding of genetically based groups of over 1,200 breeds and sheep of various productivity orientations in various countries of the world, achieving high productivity.

The market economy mainly requires new requirements for the agro-industrial complex, namely, the production of high-quality [23–26], competitive, affordable agricultural products [27, 28], including in the sheep breeding sector, and the expansion of the range of raw materials and export goods [29–31]. Due to the growing global problem of providing the population with food products and the growing shortage of food proteins, especially animal proteins, developing meat exports as an alternative to grain exports could become a significant challenge.

Analysis of the development of sheep breeding in the world shows that sheep breeding in developed countries specializes mainly in the production of mutton, which contributes to ensuring the economic efficiency and sustainable development of the industry.

For many years, objective conditions for the development of the sheep breeding industry have been formed in the Republic of Karakalpakstan. These are unique and favorable natural and climatic conditions, meeting the population's needs for meat, leather, and wool products, as well as the availability of significant pasture areas.

Due to the current economic situation in the Republic of Karakalpakstan, the number of sheep has decreased over the past quarter century. Rapid transition to an economy based on market principles, complete absence of demand for wool, sharp increase in equipment, energy carriers, and feed prices led to sheep breeding becoming the least economically protected sector in the region, which significantly impacted the sheep breeding sector, resulting in a decrease in sheep numbers [32–35].

As is known, the preservation of the gene pool of agricultural animals is the most important task, since the production of various types of livestock products, increasing their volume, depends on the effectiveness of breeding. In this direction, it is necessary to carry out work aimed at preserving all sheep breeds and maintaining them at a standard level, paying special attention to local breeds, which, due to their unique biological qualities, are adapted to the production of a wide range of products in harsh and difficult natural and climatic conditions [36–39].

In order to further increase the productivity of fat-tailed sheep breeds in sheep farming, it is necessary to develop new scientifically based effective breeding and technological methods by feeding and keeping fat-tailed sheep breeds on the basis of a complete ration.

In order to increase the meat productivity of sheep and further increase the volume of their meat production, it is necessary to carry out work on the selection of sheep with high meat qualities and the reproduction of their offspring through the effective use of the hereditary potential of sheep breeds with high meat productivity [40–43].

Based on this, taking into account the adaptive properties of fat-tailed sheep breeds, their year-round adaptation to pasture grazing, and their high maturity, creating opportunities for further increasing their meat and fat productivity through pure breeding of fat-tailed sheep and crossbreeding them with rams with high meat productivity and hereditary capabilities is considered the most important and urgent task.

Materials and methods /
Материалы и методы исследования

Scientific research was conducted from 2017 to 2024.

Three groups were formed, consisting of the existing Jaidari, Hissar, and their first-generation (F_1) hybrid offspring. Specifically: Group I comprised 36 Jaidari (control) animals, Group II included 32 Hissar animals, and Group III consisted of 29 lambs that were ½ Hissar × ½ Jaidari hybrids (experimental group) (Table 1).

The live weight of rams of different ages was measured at birth and at 4–4.5, 7, 12 and 18 months of age, individually on electronic scales before morning feeding; absolute growth was determined using the following formula:

$$A = W1 - W0,$$

Where: *A* — Absolute growth, kg; *W0* — Initial live weight, kg; *W1* — Final live weight, kg.

The average daily growth was determined by the following formula:

$$D = \frac{W1 - W0}{t1 - t0},$$

Where: K — Relative growth rate, %; *W1 – W0* — Final and initial live weight, kg.

When studying the composition of fat-tailed sheep meat, samples were taken from the longest lumbar muscle of animals aged 4.5–5.0 months, 7 months kept under pasture conditions, and 7 months kept under pasture conditions with supplementary feeding.

The meat productivity of sheep was assessed according to the following indicators: live weight before slaughter, carcass weight, internal fat weight, slaughter weight, and slaughter yield. The meat productivity of the experimental sheep was determined by weighing and control slaughter (at 4.0–4.5 months, 7 months, and 18 months of age). Meat productivity of sheep at the ages of 4.0–4.5, 7, and 18 months was studied according to the requirements of GOST 31777-2012[1]. All experiments on animals were carried out in compliance with the rules and ethical practices[2].

The obtained data underwent biometric reprocessing using the Microsoft Excel 2010 computer program, following the method of A.M. Yakovenko, T.I. Antonenko and M.I. Selionova (2013)[3].

Results and discussion /
Результаты и обсуждение

Experience in developing meat-oriented sheep farming shows that increasing its economic efficiency and competitiveness requires fully utilizing the potential of its unique productivity characteristics. This is especially important due to the growing demand for meat products in the world market. In turn, this creates a foundation for the accelerated development of meat-oriented sheep farming and, at the same time, helps to some extent address the tasks aimed at meeting the population's need for high-quality and affordable food products.

Dumb sheep breeds are distinguished by high maturity and adaptability to pasture conditions, which contributes to the wide distribution of meat-producing sheep breeds. Most importantly, the high demand for affordable meat products among the population indicates their economic importance.

In the Republic of Karakalpakstan, the main part of sheep breeding is fat-tailed sheep, and fat-tailed sheep breeds belonging to the purebred sheep population are mainly developed in the region. To increase meat and fat production from them, utilizing the hereditary potential of meat-producing sheep breeds with a global gene pool (Hissar, Edilboy, and others) is considered one of the pressing issues [44–47].

To successfully implement these tasks to a certain extent, in our experimental work, we studied the live weight of ram lambs obtained from crossing Hissar rams with Jaidari ewes at various growth stages. The data collected from this study is presented in Table 2.

Analysis of the data in Table 1 shows that, despite the experimental lambs being fed and kept under the same conditions, a difference in the live weight of the lambs at birth was observed between the groups.

In particular, the live weight of the lambs in group II (pure Hissar breed) at birth was 4.60 kg, which is 0.8 kg or 21.1% higher than their counterparts in group I (pure Jaidari breed) and 0.4 kg or 9.5% higher than group III (½ Hissar x ½ Jaidari) first-generation

Table 1. **Research description**

Group	Species and breed				Slaughter age, months
	♀ Mother	♂ Father	n	♂+♀ Obtained offspring	
I	Jaidari	Jaidari	36	Jaidari	18
II	Hissar	Hissar	32	Hissar	18
III	Jaidari	Hissar	29	½ Hissar × ½ Jaidari	18

[1] ГОСТ 31777-2012 Овцы и козы для убоя. Баранина, ягнятина и козлятина в тушах. Технические условия.
GOST 31777-2012 Sheep and goats for slaughter. Lamb, mutton, and goat meat in carcasses. Specifications (in Russian).
[2] Директива Европейского парламента и Совета Европейского союза по охране животных, используемых в научных целях.
Directive of the European Parliament and of the Council on the protection of animals used for scientific purposes.
https://ruslasa.ru/wp-content/uploads/2017/06/Directive 201063jus.pdf
[3] Яковенко А.М., Антоненко Т.И., Селионова М.И. Биометрические методы анализа качественных и количественных признаков в зоотехнии: учебное пособие. Ставрополь: Агрус. 2013; 91.
Yakovenko A.M., Antonenko T.I., Selionova M.I. Biometric methods for analyzing qualitative and quantitative traits in animal husbandry: a tutorial. Stavropol: Agrus. 2013; 91 (in Russian).

Table 2. **Changes in live weight dynamics of experimental rams, kg ($\bar{X} \pm S\bar{x}$)**

Growth period, oh	Group		
	I	II	III
	Genotypes		
	Jaidari (n = 36)	Hissar (n = 32)	½ Hissar× ½ Jaidari (n = 29)
When born	3,80 ± 0,19	4,60 ± 0,45	4,20 ± 0,32
1	12,5 ± 0,24	14,9 ± 0,76**	13,8 ± 0,53*
4,0–4,5	25,7 ± 0,87	33,6 ± 1,09**	30,2 ± 0,96*
7	37,9 ± 1,56	42,3 ± 1,21**	39,7 ± 1,78*
12	48,6 ± 1,56	52,5 ± 1,37**	50,2 ± 1,54*
18	65,5 ± 1,92	71,5 ± 1,01**	69,9 ± 1,76*

Note: * p < 0,01; * p < 0,001.

(F1) crossbred ram lambs, respectively. This indicates the high hereditary potential of the breeding rams.

Similar growth trends were observed in the subsequent 1, 4–4.5, 7, 12, and 18 months of the ram lambs' growth and development period. Group II (pure Hissar breed) ram lambs maintained their superiority over their peers in group I (pure Jaidari breed) and group III (½ Hissar x ½ Jaidari) first generation (F_1) crossbred ram lambs.

Specifically, during the first month of the growth period, group II (pure Hissar breed) and group III (½ Hissar x ½ Jaidari) first generation (F_1) crossbred ram lambs surpassed their group I (pure Jaidari breed) peers by 2.4 kg or 19.2% ($p < 0.001$) and 1.3 kg or 10.4% ($p < 0.01$) respectively. At 4–4.5 months of age, the difference was 7.9 kg or 30.7% ($p < 0.001$) and 4.5 kg or 17.5% ($p < 0.01$) respectively. At 7 months, it was 4.4 kg or 11.6% ($p < 0.001$) and 1.8 kg or 4.7% ($p < 0.01$), at 12 months 3.9 kg or 8.0% ($p < 0.001$) and 1.6 kg or 3.3% ($p < 0.01$), and at 18 months — 6.0 kg or 9.2% ($p < 0.001$) and 4.4 kg or 6.7% ($p < 0.01$) respectively.

To ensure food security for the population, especially in meeting the demand for livestock products, it is necessary to develop new breeding and technological methods for the effective use of meat-oriented sheep breeds. The main product of fat-tailed sheep is their meat productivity. Therefore, the production of mutton will satisfy the population's demand for food products to a certain extent.

Based on these considerations, our experimental work focused on studying the meat productivity of first-generation (F_1) crossbred ram lambs obtained from crossing Hissar and Jaidari breeds under the natural climatic conditions of the Republic of Karakalpakstan.

The slaughter results of Hissar, Jaidari, and their first-generation (F_1) crossbred ram lambs at 18 months of age are presented in Table 3.

Analysis of the data in Table 3 reveals that the live weight of 18-month-old rams before slaughter in group II (pure Hissar breed) and group III (½ Hissar x ½ Jaidari) first-generation (F_1) crossbred rams was higher compared to their counterparts in group I (pure Jaidari breed) by 15.6 kg or 33.5% ($p < 0.001$) and 5.6 kg or 12.0% ($p < 0.01$) respectively.

Table 3. **Slaughter results of experimental rams at 18 months of age ($\bar{X} \pm S\bar{x}$)**

Indicators	Group (n = 3)		
	I	II	III
	Genotypes		
	Jaidari	Hissar	½ Hissar × ½ Jaidari
Live weight before slaughter, kg	46,5 ± 0,45	62,1 ± 0,32***	52,1 ± 0,12**
Warm carcass weight	19,7 ± 0,13	29,1 ± 0,41***	24,9 ± 0,65**
Warm carcass yield, %	42,4	46,9	43,6
Rump weight	2,54 ± 0,09	6,25 ± 0,39***	4,10 ± 0,38***
Rump yield, %	5,4	10,1	7,9
Internal fat weight, kg	0,48 ± 0,05	0,84 ± 0,07	0,52 ± 0,04
Internal fat yield, %	1,0	1,4	1,0
Slaughter weight, kg	22,7 ± 0,32	36,2 ± 0,13***	29,5 ± 0,15**
Slaughter yield, %	48,8	58,3	56,7
Rump to slaughter weight ratio, %	11,2	17,3	13,9

Note: * p < 0,01; * p < 0,001.

The weight of the warm carcass was higher by 9.4 kg or 47.7% ($p < 0.001$) and 5.2 kg or 26.4% ($p < 0.01$) respectively, while the slaughter weight was higher by 13.5 kg or 59.5% ($p < 0.001$) and 6.8 kg or 29.9% ($p < 0.01$) respectively. The slaughter yield of the rams was 48.8%, 58.3%, and 56.7% for groups I, II, and III respectively, with groups II and III being 9.5% and 7.9% higher than their counterparts in group I (pure Jaidari).

Additionally, in group II (pure Hissar breed) and group III (½ Hissar x ½ Jaidari) first-generation (F_1) hybrid ram lambs, the tail fat weight was 6.25 and 4.10 kg, respectively, which was 3.71 kg or 146.1% ($p < 0.001$) and 1.56 kg or 61.4% ($p < 0.001$) higher than their counterparts in group I (pure Jaidari breed). The ratio of tail fat to live weight before slaughter and to carcass weight was 5.4% and 11.2% respectively in group I (pure Jaidari breed) ram lambs, 10.1% and 17.3% in group II (pure Hissar breed), and 7.9% and 13.9% in group III (½ Hissar x ½ Jaidari) first-generation (F_1) hybrid ram lambs. It was determined that these ratios were 4.7 and 6.1 percentage points higher in group II, and 2.5 and 2.7 percentage points higher in group III, respectively, compared to their counterparts in group I (pure Jaidari breed).

Conclusions/Выводы

In the natural and climatic conditions of the Republic of Karakalpakstan, effective utilization of the genetic potential of fat-tailed sheep breeds through crossbreeding local ewes with Hissar breed rams has shown that the resulting first-generation (F_1) crossbred lambs exhibit high live weight during various growth and development stages. This demonstrates not only their strong genetic potential and adaptability to the external environment but also the high prepotency of the rams in transmitting desirable traits for meat productivity from generation to generation. Furthermore, it indicates the significant

role of both hereditary potential and environmental adaptability in shaping the meat productivity of these crossbred lambs.

The meat productivity of local Jaidari and Hissar breed ram lambs, as well as the first-generation (F_1) crossbred ram lambs obtained from their crossing, demonstrated high results in terms of warm carcass weight, slaughter weight, and dressing percentage. This indicates that it is intrinsically linked to their full-value nutrition in pasture conditions and their genetic potential.

Thus, the use of the method of crossbreeding fat-tailed sheep breeds for meat production: Jaidari, Hissar, and Jaidari ewes with Hissar rams — has proven to be an economically efficient approach.

All authors bear responsibility for the work and presented data.
All authors made an equal contribution to the work.
The authors were equally involved in writing the manuscript and bear the equal responsibility for plagiarism.
The authors declare no conflict of interest.

Все авторы несут ответственность за работу и представленные данные. Все авторы внесли равный вклад в работу.
Авторы в равной степени принимали участие в написании рукописи и несут равную ответственность за плагиат.
Авторы объявили об отсутствии конфликта интересов.

FUNDING

The research work on the effectiveness of tailed sheep was carried out according to the research plan of the Nukus branch of the Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology.

ФИНАНСИРОВАНИЕ

Исследовательская работа на тему эффективности курдючных овец выполнена по плану научных исследований Нукусского филиала Самаркандского государственного университета ветеринарной медицины, животноводства и биотехнологий.

REFERENCES

1. Greguła-Kania M., Nazar P., Kulik M., Patkowski K., Hahaj-Siembida A., Junkuszew A. Some Physiological Responses of Native Sheep Breeds to Environmental Conditions during Grazing in Natura 2000. *Agriculture.* 2023; 13(5): 982. https://doi.org/10.3390/agriculture13050982

2. Yuldashbaev Yu.A. *et al.* The effect of young ram's genotype on mineral metabolism. *Sheep, goats, and wool business*. 2024; (1): 15–18 (in Russian). https://doi.org/10.26897/2074-0840-2024-1-15-18

3. Nikonova E.A. *et al.* The effectiveness of growing purebred and crossbred sheep. *Journal of Osh State University. Agriculture: agronomy, veterinary and zootechnics*. 2023; (4): 164–170 (in Russian). https://doi.org/10.52754/16948696_2023_4_24

4. Kosilov V.I., Nikonova E.A., Rebezov M.B., Akhmedov D.M. Influence of gender and physiological state young sheep of the kazakh short-tailed rough-haired sheep breeds for the development of the musculoskeletal system in postnatal period of ontogenesis. *Status and prospects for improving the genetic and productive characteristics of fat-tailed sheep. Proceedings of the International scientific and practical conference*. Dushanbe: Matbaa. 2021; 218–223 (in Russian). https://elibrary.ru/rmetko

5. Kosilov V.I. *et al.* The effect of the genotype of young sheep on the nitrogen balance. *Agrarian science*. 2025; (4): 81–87 (in Russian). https://doi.org/10.32634/0869-8155-2025-393-04-81-87

6. Martyshkin A.A., Belykh K.S. Production of sheep products in England. *Nauka i obrazovaniye*. 2023; 6(2) (in Russian). https://elibrary.ru/ctmqou

7. Vershinin A.S. Market organization and product processing are the most important factors in the development of sheep farming. *Current state, breeding and technological solutions in the development of sheep and goat farming. Proceedings of the scientific and practical conference held within the framework of the All-Russian exhibition of breeding sheep and goats*. Chita. 2024; 21–26 (in Russian). https://elibrary.ru/yrvlen

8. Nikonova E.A. *et al.* Growth intensity of rams of the Romanov breed and its crossbreeds with the Edilbaev breed of different generations. *Gylym jäne bilim.* 2022; (4–3): 3–10 (in Russian). https://doi.org/10.52578/2305-9397-2022-4-3-3-10

9. Gerasimova T.G., Rebezov M.B., Lukin E.V. Wool productivity of sheep of different genotypes. *Actual problems of intensive development of animal husbandry. Collection of papers based on the materials of the national scientific and practical conference with international participation, dedicated to the memory of the Honored Worker of Higher Education of the Russian Federation, Honorary Worker of Higher professional education of the Russian Federation, honorary citizen of the Bryansk region, Doctor of Biology, Professor E.P. Vashchekin*. Bryansk. 2022; 1: 300–303 (in Russian). https://elibrary.ru/fkpdfx

10. Abdurasulov A.Kh., Kalandarov M.A., Rebezov M.B., Kosilov V.I. Live weight and body features of Ala-Too sheep. *Agrarian science*. 2025; (10): 71–80 (in Russian). https://doi.org/10.32634/0869-8155-2025-399-10-71-80

11. Kosilov V.I., Nikonova E.A., Rakhimzhanova I.A., Kubatbekov T.S., Rebezov M.B., Bykova O.A. Features of the physique of purebred and crossbred young sheep. *Izvestia Orenburg State Agrarian University*. 2025; (5): 267–273 (in Russian). https://doi.org/10.37670/2073-0853-2025-115-5-267-273

БИБЛИОГРАФИЧЕСКИЙ СПИСОК

1. Greguła-Kania M., Nazar P., Kulik M., Patkowski K., Hahaj-Siembida A., Junkuszew A. Some Physiological Responses of Native Sheep Breeds to Environmental Conditions during Grazing in Natura 2000. *Agriculture.* 2023; 13(5): 982. https://doi.org/10.3390/agriculture13050982

2. Юлдашбаев Ю.А. *и др.* Влияние генотипа баранчиков на минеральный обмен. *Овцы, козы, шерстяное дело.* 2024; (1): 15–18. https://doi.org/10.26897/2074-0840-2024-1-15-18

3. Никонова Е.А. *и др.* Эффективность выращивания чистопородных и помесных баранчиков. *Вестник Ошского государственного университета. Сельское хозяйство: агрономия, ветеринария и зоотехния*. 2023; (4): 164–170. https://doi.org/10.52754/16948696_2023_4_24

4. Косилов В.И., Никонова Е.А., Ребезов М.Б., Ахмедов Д.М. Влияние пола и физиологического состояния молодняка овец казахской курдючной грубошерстной породы на развитие опорно-двигательного аппарата в постнатальный период онтогенеза. *Состояние и перспективы совершенствования генетических и продуктивных особенностей овец курдючных пород. Материалы Международной научно-практической конференции*. Душанбе: Матбаа. 2021; 218–223. https://elibrary.ru/rmetko

5. Косилов В.И. *и др.* Влияние генотипа молодняка овец на баланс азота. *Аграрная наука*. 2025; (4): 81–87. https://doi.org/10.32634/0869-8155-2025-393-04-81-87

6. Мартышкин А.А., Белых К.С. Производство продукции овцеводства в Англии. *Наука и образование.* 2023; 6(2). https://elibrary.ru/ctmqou

7. Вершинин А.С. Организация рынка и переработка продукции — важнейшие факторы развития овцеводства. *Современное состояние, селекционные и технологические решения в развитии овцеводства и козоводства. Материалы научно-практической конференции, проводимой в рамках Всероссийской выставки племенных овец и коз*. Чита. 2024; 21–26. https://elibrary.ru/yrvlen

8. Никонова Е.А. *и др.* Интенсивность роста баранчиков романовской породы и ее помесей с эдильбаевской разных поколений. *Ғылым және білім*. 2022; (4–3): 3–10. https://doi.org/10.52578/2305-9397-2022-4-3-3-10

9. Герасимова Т.Г., Ребезов М.Б., Лукин Е.В. Шерстная продуктивность овец разного генотипа. *Актуальные проблемы интенсивного развития животноводства. Сборник трудов по материалам национальной научно-практической конференции с международным участием, посвященной памяти заслуженного работника Высшей школы РФ, почетного работника высшего профессионального образования РФ, почетного гражданина Брянской области д-ра биол. наук, профессора Е.П. Ващекина*. Брянск. 2022; 1: 300–303. https://elibrary.ru/fkpdfx

10. Абдурасулов А.Х., Каландаров М.А., Ребезов М.Б., Косилов В.И. Живая масса и особенности телосложения овец породы ала-тоо. *Аграрная наука*. 2025; (10): 71–80. https://doi.org/10.32634/0869-8155-2025-399-10-71-80

11. Косилов В.И., Никонова Е.А., Рахимжанова И.А., Кубатбеков Т.С., Ребезов М.Б., Быкова О.А. Особенности телосложения чистопородного и помесного молодняка овец. *Известия Оренбургского государственного аграрного университета*. 2025; (5): 267–273. https://doi.org/10.37670/2073-0853-2025-115-5-267-273

12. Kosilov V.I., Yuldashbaev Yu.A., Nikonova E.A., Rahimzhanova I.A., Sedykh T.A., Rebezov M.B. Influence of genotype and castration of rams on consumption and use of feed ration nutrients energy. *Bulletin of KrasGAU*. 2024; (9): 135–141 (in Russian). https://doi.org/10.36718/1819-4036-2024-9-135-141

13. Zhilyakova G.M., Lagkonova M.D. Shear yield and wool properties of Buryat-type ewe lambs of the Transbaikal breed obtained at different lambing times. *Sheep, goats, wool business*. 2015; (4): 43–44 (in Russian). https://elibrary.ru/vqehal

14. Zabelina M.V., Amiyan A.A. The relationship of meat productivity with the size of the kurdyuk in sheep of the Edilbaev breed, depending on the milk productivity of their mothers. *Modern methods of improving the productive qualities of farm animals. Collection of articles of the International scientific and practical conference*. Saratov: Vavilov University. 2023; 25–29 (in Russian). https://elibrary.ru/kbilrr

15. Yuldashbaev Yu.A., Karynbayev A.K., Kozhamuradov N. Effective technologies for mutton production in karakul sheep breeding. *Sbornik nauchnykh trudov Stavropol'skogo nauchno-issledovatel'skogo instituta zhivotnovodstva i kormoproizvodstva*. 2009; (2): 156–159 (in Russian). https://elibrary.ru/ootsjf

16. Davletova A.M., Smagulov D.B., Traisov B.B., Tulebaev B., Kubatbekov T.S. Productive qualities of fat tail sheep reared in the West Kazakhstan region. *Izvestia Orenburg State Agrarian University*. 2020; (2): 267–270 (in Russian). https://elibrary.ru/qqwgom

17. Erokhin A.I., Karasev E.A., Erokhin S.A. On the age of sheep at slaughter. *Sheep, goats, wool business*. 2016; (3): 40–43 (in Russian). https://elibrary.ru/wqsctr

18. Zateev D.V. Hematological parameters and natural resistance of Caucasian rams from different climatic zones. *Sheep, goats, wool business*. 2017; (2): 43–45 (in Russian). https://elibrary.ru/yrrldh

19. Yuldashbaev Yu.A., Kosilov V.I., Traisov B.B., Davletova A.M., Kubatbekov T.S. Economical and biological peculiarities of Edilbaev sheep. *Herald of beef cattle breeding*. 2015; (4): 50–57 (in Russian). https://elibrary.ru/vhjbjh

20. Turganbaev R., Sultanov Yu. Hematological parameters of young fat-tailed sheep in the conditions of Karakalpakstan. *Agro ILM*. 2022; (1): 54–56 (in Russian).

21. Morel P.C.H., Wickham J.L., Morel J.P., Wickham G.A. Effects of birth rank and yearling lambing on long-term ewe reproductive performance. *Proceedings of the New Zealand Society of Animal Production*. 2010; 70: 88–90.

22. Pain S.J., Loureiro M.F.P., Kenyon P.R., Blair H.T. The effect of dam age on ewe offspring productive performance and efficiency. *Proceedings of the New Zealand Society of Animal Production*. 2015; 75: 239–242.

23. Rebezov M. *et al.* Improving meat quality and safety: innovative strategies. *Potravinarstvo Slovak Journal of Food Sciences*. 2024; 18: 523–546. https://doi.org/10.5219/1972

24. Sarkar T. *et al.* A Review on the Commonly Used Methods for Analysis of Physical Properties of Food Materials. *Applied Sciences*. 2022; 12(4): 2004. https://doi.org/10.3390/app12042004

25. Okuskhanova E. *et al.* Study of morphology, chemical, and amino acid composition of red deer meat. *Veterinary World*. 2017; 10(6): 623–629. https://doi.org/10.14202/vetworld.2017.623-629

26. Kosilov V.I., Nikonova E.A., Yuldashbaev Yu.A., Kubatbekov T.S., Gazeev I.R., Rebezov M.B. Commodity value of carcass cuts of young sheep of the South Ural breed of different sex and age. *Sheep, goats, wool business*. 2021; (3): 32–34 (in Russian). https://doi.org/10.26897/2074-0840-2021-3-32-34

27. Zaytseva T.N., Rebezov M.B., Ryabova V.F. Prospects for the development of the regional market for poultry products. *Actual problems of modern science, technology and education. Abstracts of the 82nd International scientific and technical conference.* Magnitogorsk: Nosov Magnitogorsk State Technical University. 2024; 2: 362 (in Russian). https://www.elibrary.ru/xfnmat

28. Smolnikova F.Kh., Amirkhanov K.Zh., Asenova B.K., Rebezov M.B., Okuskhanova E.K. Main directions in the integrated processing of poultry meat. *Innovative trends, scientific advances, and factors for sustainable development of food systems. 24th International scientific and practical conference dedicated to the memory of V.M. Gorbatov (Gorbatov Readings)*. Moscow: Gorbatov Research Center for Food Systems. 2024; 164–168 (in Russian). https://www.elibrary.ru/pppiss

12. Косилов В.И., Юлдашбаев Ю.А., Никонова Е.А., Рахимжанова И.А., Седых Т.А., Ребезов М.Б. Влияние генотипа и кастрации баранчиков на потребление и использование энергии питательных веществ кормов рациона. *Вестник КрасГАУ*. 2024; (9): 135–141. https://doi.org/10.36718/1819-4036-2024-9-135-141

13. Жилякова Г.М., Лагконова М.Д. Настриг и свойства шерсти ярок бурятского типа забайкальской породы, полученных в разные сроки ягнения. *Овцы, козы, шерстяное дело*. 2015; (4): 43–44. https://elibrary.ru/vqehal

14. Забелина М.В., Амиян А.А. Связь мясной продуктивности с величиной курдюка у баранчиков эдильбаевской породы в зависимости от молочной продуктивности их матерей. *Современные способы повышения продуктивных качеств сельскохозяйственных животных. Сборник статей Международной научно-практической конференции.* Саратов: Вавиловский университет. 2023; 25–29. https://elibrary.ru/kbilrr

15. Юлдашбаев Ю.А., Карынбаев А.К., Кожамурадов Н. Эффективные технологии производства баранины в каракулеводстве. *Сборник научных трудов Ставропольского научно-исследовательского института животноводства и кормопроизводства*. 2009; (2): 156–159. https://elibrary.ru/ootsjf

16. Давлетова А.М., Смагулов Д.Б., Траисов Б.Б., Тулебаев Б., Кубатбеков Т.С. Продуктивные качества курдючных овец Западно-Казахстанской области. *Известия Оренбургского государственного аграрного университета*. 2020; (2): 267–270. https://elibrary.ru/qqwgom

17. Ерохин А.И., Карасев Е.А., Ерохин С.А. О возрасте овец при убое. *Овцы, козы, шерстяное дело*. 2016; (3): 40–43. https://elibrary.ru/wqsctr

18. Затеев Д.В. Гематологическое показатели и естественная резистентность баранчиков кавказской породы разных климатических зон. *Овцы, козы, шерстное дело*. 2017; (2): 43–45. https://elibrary.ru/yrrldh

19. Юлдашбаев Ю.А., Косилов В.И., Траисов Б.Б., Давлетова А.М., Кубатбеков Т.С. Хозяйственно-биологические особенности овец эдильбаевской породы. *Вестник мясного скотоводства*. 2015; (4): 50–57. https://elibrary.ru/vhjbjh

20. Турганбаев Р., Султанов Ю. Гематологические показатели молодняка курдючных овец в условиях Каракалпакии. *Agro ILM*. 2022; (1): 54–56.

21. Morel P.C.H., Wickham J.L., Morel J.P., Wickham G.A. Effects of birth rank and yearling lambing on long-term ewe reproductive performance. *Proceedings of the New Zealand Society of Animal Production*. 2010; 70: 88–90.

22. Pain S.J., Loureiro M.F.P., Kenyon P.R., Blair H.T. The effect of dam age on ewe offspring productive performance and efficiency. *Proceedings of the New Zealand Society of Animal Production*. 2015; 75: 239–242.

23. Rebezov M. *et al.* Improving meat quality and safety: innovative strategies. *Potravinarstvo Slovak Journal of Food Sciences*. 2024; 18: 523–546. https://doi.org/10.5219/1972

24. Sarkar T. *et al.* A Review on the Commonly Used Methods for Analysis of Physical Properties of Food Materials. *Applied Sciences*. 2022; 12(4): 2004. https://doi.org/10.3390/app12042004

25. Okuskhanova E. *et al.* Study of morphology, chemical, and amino acid composition of red deer meat. *Veterinary World*. 2017; 10(6): 623–629. https://doi.org/10.14202/vetworld.2017.623-629

26. Косилов В.И., Никонова Е.А., Юлдашбаев Ю.А., Кубатбеков Т.С., Газеев И.Р., Ребезов М.Б. Товарная ценность отрубов туши молодняка овец южноуральской породы разного пола и возраста. *Овцы, козы, шерстяное дело.* 2021; (3): 32–34. https://doi.org/10.26897/2074-0840-2021-3-32-34

27. Зайцева Т.Н., Ребезов М.Б., Рябова В.Ф. Перспективы развития регионального рынка продуктами птицеводства. *Актуальные проблемы современной науки, техники и образования. Тезисы докладов 82-й Международной научно-технической конференции*. Магнитогорск: Магнитогорский государственный технический университет им. Г.И. Носова. 2024; 2: 362. https://www.elibrary.ru/xfnmat

28. Смольникова Ф.Х., Амирханов К.Ж., Асенова Б.К., Ребезов М.Б., Окусханова Э.К. Основные направления в комплексной переработке мяса птицы. *Инновационные тренды, научные достижения и факторы устойчивого развития пищевых систем. XXIV Международная научно-практическая конференция, посвященная памяти В.М. Горбатова (Горбатовские чтения)*. М.: ФНЦ пищевых систем им. В.М. Горбатова РАН. 2024; 164–168. https://www.elibrary.ru/pppiss

29. Slozhenkina M.I., Gorlov I.F., Mosolova N.I., Anisimova E.Yu., Knyazeva S.A., Reshetnikova A.O. Economic and biological features of a new "Povolzhsky" type of the Edilbay sheep breed. *AIP Conference Proceedings*. 2023; 2700(1): 050038. https://doi.org/10.1063/5.0124963

30. Kirgiafini D., Kyrgiafini M.-A., Gournaris T., Mamuris Z. Understanding Circular RNAs in Health, Welfare, and Productive Traits of Cattle, Goats, and Sheep. *Animals*. 2024; 14(5): 733. https://doi.org/10.3390/ani14050733

31. Li M. *et al.* Pan-Omics in Sheep: Unveiling Genetic Landscapes. *Animals*. 2024; 14(2): 273. https://doi.org/10.3390/ani14020273

32. Singh P.P., Tomar S.S., Thakur M.S., Kumar A. Polymorphism and association of growth hormone gene with growth traits in Sirohi and Barbari breeds of goat. *Veterinary World*. 2015; 8(3): 382–387. https://doi.org/10.14202/vetworld.2015.382-387

33. Presnyakova T.A., Khainatsky V.Yu. The use of modern technologies for the genetic examination of the origin of meat animals. *New approaches to the development of animal husbandry based on the use of regional breed resources. All-Russian scientific and practical conference with international participation*. Elista: Kalmyk State University. 2025; 154–163 (in Russian). https://elibrary.ru/klieok

34. Greguła-Kania M., Gruszecki T.M., Junkuszew A., Juszczuk-Kubiak E., Florek M. Association of *CAST* gene polymorphism with carcass value and meat quality in two synthetic lines of sheep. *Meat Science*. 2019; 154: 69–74. https://doi.org/10.1016/j.meatsci.2019.04.007

35. Plemyashov K.V., Belikova A.O. Innovative molecular genetic technologies in animal husbandry. *Contemporary topics of reproductive health of animals. Materials of the International Scientific and Practical Conference dedicated to the 95th anniversary of Vyatka State Agrotechnological University and the 95th anniversary of the birth of the Honored Scientist of the Russian Federation, Dr. Veterinary Sciences, Professor A.I. Varganova.* Syktyvkar: Komi Scientific Center of the Ural Branch of the Russian Academy of Sciences. 2025; 317–322 (in Russian). https://elibrary.ru/gjtncq

36. Erokhin A.I., Karasev E.A., Erokhin S.A. Intensification of production and improvement of sheep meat quality. Moscow: *Mechanization and Electrification of Agriculture*. 2015; 303 (in Russian). ISBN 978-5-9904440-9-6 https://elibrary.ru/tkfjcj

37. Yusupov S. Constitutional differentiation and productivity of Karakul sheep. Monograph. Tashkent. 2005; 239 (in Russian).

38. Shaptakov E.S. Ways to increase mutton production in Karakul breeding. Samarkand. 2020; 197 (in Russian).

39. Aqnazarov D., Ruziboev N. Results of crossing Uzbek fine-wool ewes with Dagestan fine-wool rams. *BIO Web of Conferences*. 2025; 173: 02020. https://doi.org/10.1051/bioconf/202517302020

40. Khamiruev T.N., Goncharenko G.M., Khoroshilova T.S. Association of polymorphism of genes *GDF9/G1*, *CAST*, *KRT1.2*, *KAP1.3* with economically useful traits of sheep breeds of the Trans-Baikal Territory. *Actual problems of agriculture and development prospects. Proceedings of the All-Russian (national) scientific and practical conference dedicated to the 60th anniversary of the Eastern Siberia Veterinary Research Institute — branch of the Siberian Federal Scientific Center for Agrobiotechnology of the Russian Academy of Sciences and the 300th anniversary of the Russian Academy of Sciences.* Chita. 2024; 137–144 (in Russian). https://elibrary.ru/rmgwjq

41. Orozbaev B., Turdubaev T., Bekturov A., Altybay Uulu B., Chortonbaev T. Lifetime estimation of meat qualities in selection of sheep curds. *BIO Web of Conferences*. 2024; 130: 07001. https://doi.org/10.1051/bioconf/202413007001

42. Basitov K.T., Prmanshaev M., Chortonbaev T.D., Bekturov A. Heritability of breeding traits in meat breeds of sheep of different origin in the South-East of Kazakhstan. *BIO Web of Conferences*. 2024; 83: 01004. https://doi.org/10.1051/bioconf/20248301004

43. Gorlov I.F. *et al.* Association of the growth hormone gene polymorphism with growth traits in Salsk sheep breed. *Small Ruminant Research*. 2017; 150: 11–14. https://doi.org/10.1016/j.smallrumres.2017.02.019

44. Madrakhimov S., Roziboev N. Growth and development of F_1 hybrid progenies of Schwitz cows using beef breeds. *E3S Web of Conferences*. 2023; 371: 01003. https://doi.org/10.1051/e3sconf/202337101003

45. Madraximov Sh.N. The effect of feeding on the expression of the hereditary opportunities of monbelyard bulis belonging to different genotypes. *European multidisciplinary journal of modern science*. 2023; 22: 1–6.

29. Slozhenkina M.I., Gorlov I.F., Mosolova N.I., Anisimova E.Yu., Knyazeva S.A., Reshetnikova A.O. Economic and biological features of a new "Povolzhsky" type of the Edilbay sheep breed. *AIP Conference Proceedings*. 2023; 2700(1): 050038. https://doi.org/10.1063/5.0124963

30. Kirgiafini D., Kyrgiafini M.-A., Gournaris T., Mamuris Z. Understanding Circular RNAs in Health, Welfare, and Productive Traits of Cattle, Goats, and Sheep. *Animals*. 2024; 14(5): 733. https://doi.org/10.3390/ani14050733

31. Li M. *et al.* Pan-Omics in Sheep: Unveiling Genetic Landscapes. *Animals*. 2024; 14(2): 273. https://doi.org/10.3390/ani14020273

32. Singh P.P., Tomar S.S., Thakur M.S., Kumar A. Polymorphism and association of growth hormone gene with growth traits in Sirohi and Barbari breeds of goat. *Veterinary World*. 2015; 8(3): 382–387. https://doi.org/10.14202/vetworld.2015.382-387

33. Преснякова Т.А., Хайнацкий В.Ю. Использование современных технологий для генетической экспертизы происхождения животных мясных пород. *Новые подходы в развитии животноводства на основе использования региональных породных ресурсов. Всероссийская научно-практическая конференция с международным участием.* Элиста: Калмыцкий государственный университет. 2025; 154–163. https://elibrary.ru/klieok

34. Greguła-Kania M., Gruszecki T.M., Junkuszew A., Juszczuk-Kubiak E., Florek M. Association of *CAST* gene polymorphism with carcass value and meat quality in two synthetic lines of sheep. *Meat Science*. 2019; 154: 69–74. https://doi.org/10.1016/j.meatsci.2019.04.007

35. Племяшов К.В., Беликова А.О. Инновационные молекулярно-генетические технологии в животноводстве. *Актуальные проблемы репродуктивного здоровья животных. Материалы Международной научно-практической конференции, посвященной 95-летию Вятского государственного агротехнологического университета и 95-летию со дня рождения заслуженного деятеля науки Российской Федерации д-ра ветеринар. наук, профессора А.И. Варганова*. Сыктывкар: Коми научный центр Уральского отделения РАН. 2025; 317–322. https://elibrary.ru/gjtncq

36. Ерохин А.И., Карасев Е.А., Ерохин С.А. Интенсификация производства и повышение качества мяса овец. М.: *Механизация и электрификация сельского хозяйства*. 2015; 303. ISBN 978-5-9904440-9-6 https://elibrary.ru/tkfjcj

37. Юсупов С. Конституциональная дифференциация и продуктивность каракульских овец. Монография. Ташкент. 2005; 239.

38. Шаптаков Э.С. Пути повышения производства баранины в каракулеводстве. Самарканд. 2020; 197.

39. Aqnazarov D., Ruziboev N. Results of crossing Uzbek fine-wool ewes with Dagestan fine-wool rams. *BIO Web of Conferences*. 2025; 173: 02020. https://doi.org/10.1051/bioconf/202517302020

40. Хамируев Т.Н., Гончаренко Г.М., Хорошилова Т.С. Ассоциация полиморфизма генов *GDF9/G1*, *CAST*, *KRT1.2*, *KAP1.3* с хозяйственно полезными признаками пород овец Забайкальского края. *Актуальные проблемы сельского хозяйства и перспективы развития. Материалы Всероссийской (национальной) научно-практической конференции, посвященной 60-летию Научно-исследовательского института ветеринарии Восточной Сибири — филиала СФНЦА РАН и 300-летию РАН.* Чита. 2024; 137–144. https://elibrary.ru/rmgwjq

41. Orozbaev B., Turdubaev T., Bekturov A., Altybay Uulu B., Chortonbaev T. Lifetime estimation of meat qualities in selection of sheep curds. *BIO Web of Conferences*. 2024; 130: 07001. https://doi.org/10.1051/bioconf/202413007001

42. Basitov K.T., Prmanshaev M., Chortonbaev T.D., Bekturov A. Heritability of breeding traits in meat breeds of sheep of different origin in the South-East of Kazakhstan. *BIO Web of Conferences*. 2024; 83: 01004. https://doi.org/10.1051/bioconf/20248301004

43. Gorlov I.F. *et al.* Association of the growth hormone gene polymorphism with growth traits in Salsk sheep breed. *Small Ruminant Research*. 2017; 150: 11–14. https://doi.org/10.1016/j.smallrumres.2017.02.019

44. Madrakhimov S., Roziboev N. Growth and development of F_1 hybrid progenies of Schwitz cows using beef breeds. *E3S Web of Conferences*. 2023; 371: 01003. https://doi.org/10.1051/e3sconf/202337101003

45. Madraximov Sh.N. The effect of feeding on the expression of the hereditary opportunities of monbelyard bulis belonging to different genotypes. *European multidisciplinary journal of modern science*. 2023; 22: 1–6.

46. Madrakhimov Sh.N., Abdurasulov A.Kh. Growth and development of Simmental sterrs and its crosses with Aberdeen Angus, Limousin and Sharolais ponies. *Journal of Osh State University. Agriculture: agronomy, veterinary and zootechnics*. 2024; (3): 122–131 (in Russian).
https://doi.org/10.52754/16948696_2024_3(8)_15

47. Kholbekova M., Amirov S., Madrakhimov S. Technological characteristics of milk from Estonian red breed cows. *E3S Web of Conferences*. 2024; 563: 03048.
https://doi.org/10.1051/e3sconf/202456303048

46. Мадрахимов Ш.Н., Абдурасулов А.Х. Рост и развитие бычков симментальской породы и ее помесей с абердин-ангусской, лимузинской и шаролезской. *Вестник Ошского государственного университета. Сельское хозяйство: агрономия, ветеринария и зоотехния*. 2024; (3): 122–131.
https://doi.org/10.52754/16948696_2024_3(8)_15

47. Kholbekova M., Amirov S., Madrakhimov S. Technological characteristics of milk from Estonian red breed cows. *E3S Web of Conferences*. 2024; 563: 03048.
https://doi.org/10.1051/e3sconf/202456303048

ABOUT THE AUTHORS

Adilbay Tlepovich Yesimbetov
Doctor of Biological Sciences, Professor
adilbay.esimbetov@mail.ru
https://orcid.org/0000-0002-6958-1873

Ruzimbay Urazbaevich Turganbaev
Doctor of Agricultural Sciences, Professor
turganbaev19643@mail.ru
https://orcid.org/0000-0003-0172-1849

Shodlik Nazarovich Madrakhimov
Doctor of Agricultural Sciences, Associate Professor
shodlikmadrahimov1963@gmail.com
https://orcid.org/0009-0005-9233-0748

Khurshid Abdirafiyevich Mamatov
Candidate of Agricultural Sciences
mamatovxurshid22@gmail.com
https://orcid.org/0009-0009-4044-5534

Yusupbek Fayzullaevich Sultanov
Candidate of Agricultural Sciences
Yusupbeksultanov@gmail.com

Rustembay Turganbayevich Aitjanov
Doctoral Student
rustembayaitjanov1989@mail.ru

Nukus branch of Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnologies,
31 A. Utepov Str., Nukus, Republic of Karakalpakstan, Uzbekistan

ОБ АВТОРАХ

Адилбай Тлепович Есимбетов
доктор биологических наук, профессор
adilbay.esimbetov@mail.ru
https://orcid.org/0000-0002-6958-1873

Рузимбай Уразбаевич Турганбаев
доктор сельскохозяйственных наук, профессор
turganbaev19643@mail.ru
https://orcid.org/0000-0003-0172-1849

Шодлик Назарович Мадрахимов
доктор сельскохозяйственных наук, доцент
shodlikmadrahimov1963@gmail.com
https://orcid.org/0009-0005-9233-0748

Хуршид Абдирафиевич Маматов
кандидат сельскохозяйственных наук
mamatovxurshid22@gmail.com
https://orcid.org/0009-0009-4044-5534

Юсупбек Файзуллаевич Султанов
кандидат сельскохозяйственных наук
Yusupbeksultanov@gmail.com

Рустембай Турганбаевич Айтжанов
докторант
rustembayaitjanov1989@mail.ru

Нукусский филиал Самаркандского государственного университета ветеринарной медицины, животноводства и биотехнологий,
ул. им. А. Утепова, 31, Нукус, Республика Каракалпакстан, Узбекистан