

ANNOTATION

dissertation work of Doldasheva Gulzhaynar Kusainovna, prepared for obtaining the degree of Doctor of Philosophy (PhD) in the specialty 6D080200 – «Technology of production of livestock products» on the topic «Improvement of the technology of production of young lamb in the conditions of the Akmola region»

The market economy allows farms with various forms of ownership to function and enables the production of popular agricultural products, including meat and fat sheep. At present, the main task for the development of sheep breeding is to improve their breeding qualities and increase meat productivity.

In this regard, the improvement of productive and breeding qualities of raised sheep, development and implementation of modern technologies, systems and methods of obtaining sheep products have acquired special significance in the republic. Especially when using advanced technological processes of feeding and care, the costs of meat-fat sheep breeding are significantly reduced, and the production of meat-lamb increases, and the cultivation of meat-fat sheep becomes a highly profitable industry in various regions of the country. It should be noted that compared to the production of 1 kg of wool, 10 times less funds are spent on the increase of 1 kg of live weight of a sheep. Thus, in modern conditions, the optimal choice of breed for cultivation in a given natural forage zone is determined not only by the compliance with biological characteristics, but also by the competitiveness of products produced from meat-fat sheep breeds.

Relevance of the topic. The strategic document of the Republic of Kazakhstan "Kazakhstan-2030" pays special attention to the development of livestock farming, including sheep farming. It is also emphasized that in order to regulate and develop the meat and wool market in our country, it is necessary to intensify the work of the light industry, and not to leave wool and meat at the level of raw materials, but to process them and export them as goods.

Due to their good adaptation to various pastures, meat-fat sheep are cheap and high-quality meat producers. In our country, as a result of many years of selection and breeding work, a significant number of improved coarse-wool fat-tailed sheep have been created. They are well adapted to the climatic conditions of various regions.

An effective way to produce quality lamb is to grow lambs with high live weight and condition. One of the effective methods of preparing meat-fat fat-tailed lambs for lamb production is additional feeding of lambs with various types of feed during fattening.

Scientific research conducted by scientists from the CIS and other countries has shown that one of the methods for increasing the meat productivity of sheep, accelerating the growth of young animals and obtaining high profits is crossing local coarse-wool or other breeds of sheep with specialized meat breeds.

In sheep breeding, the economic efficiency of mutton production is determined by the quantity and quality of sheep prepared for meat. Therefore, high

fertility of ewes and raising a larger number of young animals contribute to an increase in the production of mutton and other sheep products.

Our scientific research is aimed at implementing measures for the production of young lamb, as specified in the 2017 Presidential Address "The Third Modernization of Kazakhstan: Global Competitiveness" and in the State Program for the Development of the Agro-Industrial Complex for 2017-2021.

It should be noted that the research work carried out was implemented within the framework of budget program No. 267 "Increasing the availability of scientific research knowledge" within the framework of the scientific and technical program "Development of intensive technologies in livestock industries" (No. BR06249209) on the topic "Development of effective technologies in the sheep breeding industry of Akmola region". Currently, research work continues within the framework of the program (project) BR22885692 "Development of modern selection-technological and molecular genetic methods for improving, preserving and rational use of genetic resources of sheep of different productivity directions". In this regard, the research work carried out is very relevant.

Purpose of the study. Improving technologies for the production of young lamb in the conditions of the Akmola region by fattening and fattening rams of purebred Kazakh coarse-wool fat-tailed sheep, as well as improving technologies for the production of young lamb from purebred Kazakh coarse-wool fat-tailed sheep and their crossbreeds.

Research objectives:

-Characteristics of Kazakh coarse-wool fat-tailed sheep used for crossbreeding, raised on the farm.

-Determination of the type and qualitative composition of various feeds used in the study.

-Use of artificial ewe technologies.

-Determining the fertility of queens and technology for raising young animals.

-Study of growth and development of purebred and crossbred lambs.

-Determination of slaughter indicators for 2- and 4-month-old rams.

-Study of the varietal, morphological and anatomical composition of carcasses of 2-4-month-old rams slaughtered at the age of 2-4 months.

-Study of changes in the live weight of young rams during the fattening period, slaughter qualities, morphological, varietal and anatomical composition of the carcass.

-Research of the technology of fattening rams, feeding rations during fattening, changes in the live weight of rams, slaughter qualities, morphological, varietal and anatomical composition of the carcass.

-Evaluation of the economic efficiency of meat production from purebred and crossbred Kazakh coarse-wool fat-tailed sheep.

Research methodology

The object of the study was Kazakh fat-tailed coarse-wool sheep, including stud rams and ewes, as well as purebred and crossbred lambs.

To characterize the pastures and their forage lands (to determine the chemical composition) used for raising sheep at the Tabys farm, vegetation samples were

taken from pasture areas using the plot method. As a result, the productivity of pastures was determined. The diversity of pastures, their dry mass was measured in centners/ha, and their productivity and overall fertility were determined in feed units and digestible protein.

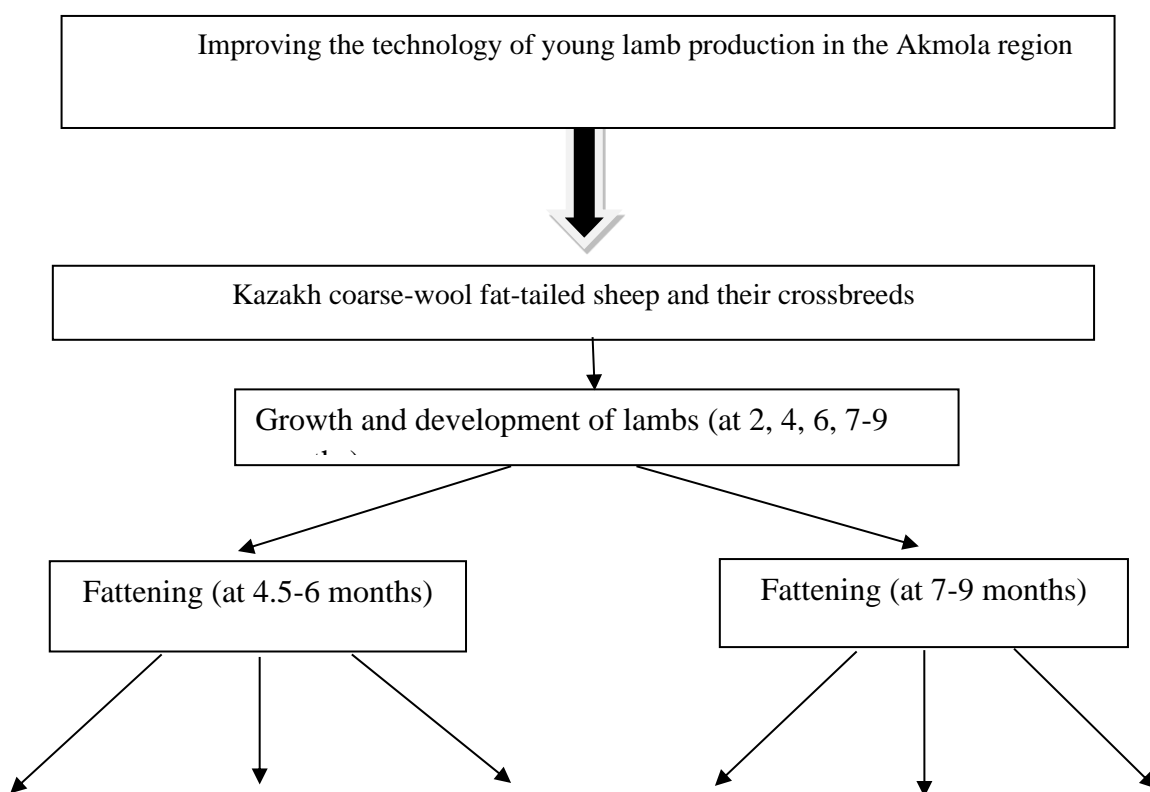
The chemical composition of the feed used in the experiment was determined in the feed quality assessment laboratory of the Department of Livestock Production and Processing Technology using express feed analysis with the FOSS NIRSDS 2500 analysis device.

To conduct the main study, Kazakh fat-tailed coarse-wool ewes were artificially inseminated using sperm from local purebred Kazakh fat-tailed coarse-wool ewes and specialized Hampshire rams.

During the breeding campaign of artificial insemination of ewes, traditional artificial insemination technologies were used. That is, ewes were inseminated early in the morning. Ewes that came into heat were identified using sample rams. These ewes were divided into separate groups and inseminated with semen of the main stud rams. During insemination, the quality of the sperm intended for insemination was checked. The quality of the sperm was determined by concentration and motility using the Accucell 783 photometer, as well as using the computer technology of the CASA system with the CEROS camera and software connected to a trinocular microscope.

The results of artificial insemination depend to a large extent on the quality of the sperm used. Therefore, the use of various methods of sperm evaluation allows predicting its fertilizing ability, which is an important link in the process of artificial insemination.

The research work was carried out according to the scheme shown in Figure 1.



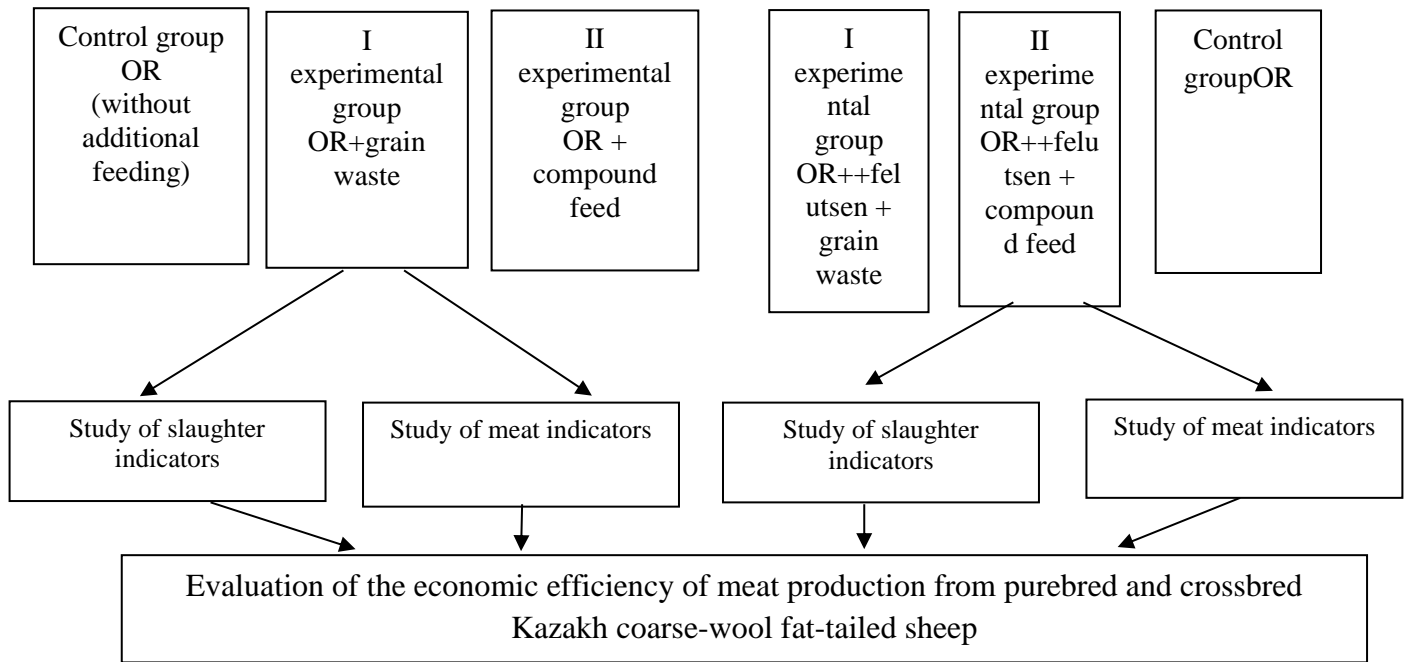


Figure 1 - Scientific research scheme

When evaluating ram sperm, attention is paid to its density, activity and color. Ewes that were inseminated successfully in heat are evaluated separately, and those that were not inseminated successfully were subjected to secondary insemination.

The fertility of the sheep was assessed by the number of surviving lambs per hundred ewes aged up to 4-4.5 months. During the study, the experimental sheep were under constant observation and assessed for breeding and productive qualities. In particular, their growth and development, exterior and constitution, productive qualities (meat content), reproductive ability and other indicators were studied.

During fattening and finishing of lambs by age groups, the absolute and comparative average daily weight gain was determined using scales.

The growth and development of purebred and crossbred lambs during the experiment were carried out from the moment of birth to 2, 4, 6, 7-9 months by weighing the live weight. Classical zootechnical methods were used to determine the exterior indicators of lambs, with the calculation of the main body sizes and their constitution indices for different ages.

To determine the quality of pasture fattening, 90 heads of 4-month-old rams were used. These 90 rams were divided into three groups. Two groups (60 rams) received the main diet with the addition of compound feed and grain groats, and one group (30 rams) was left on pasture without adding additional feed to the main diet.

For the production of young sheep meat for fattening, 3 groups of 7-month-old rams were formed. The rams for fattening were delivered on November 10. The rams for fattening were fattened according to a special ration. The composition of the ration included compound feed produced by TOO "Concern Tsesna Astyk", mineral and vitamin supplement "Felutsen" and grain cereals, which were added to the main ration.

The fattening and finishing qualities of the rams were studied during fattening and finishing, as well as by studying their live weight in the summer-autumn period. The quality of meat properties was studied according to the methodology of the All-Russian Society of Livestock Breeders (1978).

To determine the live weight of the experimental rams before and after fattening and finishing, electronic scales TV-S(M)-150.2-A1 were used.

The absolute and relative average daily weight gain of rams during fattening and finishing by age groups was determined during the experiment, i.e. in the summer-autumn period, by weighing the live weight. To determine the meat productivity of purebred Kazakh fat-tailed coarse-wool sheep and crossbred rams, they were slaughtered at the age of 2, 4, 6 and 9 months. Then, according to the standards GOST 5111-55 and GOST 1935-55, the slaughter qualities were determined.

Slaughter was carried out using the VIZH method. Electronic scales TV-S(M)-150.2-A1 were used to determine the slaughter weight of rams, carcass weight, muscle weight and other slaughter indicators. The cross-sectional area of the carcass was determined at the level of the 13th rib using a transparent tape and measured with a planimeter. A pH meter was used to determine the pH of the long spinal muscle after cooling the meat after 24 hours. The experiment was carried out in accordance with the interstate standards GOST 31777-2012 "Sheep and goats for slaughter, mutton, lamb and goat meat in carcasses" and GOST 32605-2013 "Lamb. Carcasses and cuts. Requirements for deliveries and quality control".

To determine the level of meat productivity and study its quality in the experiment, 3-5 rams from each group of rams were slaughtered according to the methods.

The slaughter indicators of animals were studied using the VIZh method. During slaughter, a stunning incision was made between the second and third cervical vertebrae. In accordance with the anatomical boundaries, the carcass was divided into the following parts: neck and shoulder-scapular part - the front edge along the stunning line, the back and lower seams passed between the tenth and eleventh ribs, as well as through the shoulder and elbow joints.

Lamb and goat meat are divided into (GOST 1985-55) on two categories.

First category (lowest limit): The muscles are developed satisfactorily, the spinous processes of the vertebrae in the area of the back and withers protrude slightly, subcutaneous fat covers the carcass with a thin layer on the back and slightly on the lower back, gaps are allowed on the ribs, in the area of the sacrum and pelvis.

Second category (lowest limit): The muscles are poorly developed, the bones protrude noticeably, on the surface of the carcass in places there are insignificant fat deposits in the form of a thin layer, which may or may not be absent.

The economic efficiency of lamb production was determined by calculating the difference between the cost of the obtained product and the costs of raising the experimental livestock.

The obtained research results were processed using biostatistical indicators ($M \pm m$, δ , C_v , etc.) based on the method of A. Plokhinsky and using the Microsoft Excel program for biometric data processing.

Description of the main provisions and results of the dissertation research:

The main provisions submitted for defense:

- Characteristics of the original breed of sheep used in scientific research.
- Type and qualitative composition of feed used in the study.
- Organization and implementation of insemination activities.
- Work schedule for the ewe insemination campaign.
- Technology of breeding sheep and raising young lambs.
- Fertility of ewes and technology of lamb rearing.
- Growth and development of purebred and crossbred lambs.
- Meat and slaughter indicators of lambs aged 2 and 4 months.
- Technology of fattening purebred rams.
- Slaughter qualities of fattened rams.
- Technology of fattening purebred rams.
- Feeding ration for fattening rams.
- Fattening indicators of purebred rams.
- Economic efficiency of production of mutton from Kazakh purebred fat-tailed and crossbred sheep.
- Economic efficiency of fattening purebred Kazakh fat-tailed coarse-wool sheep.

Key findings of the study:

1. To carry out the research work, the farm had a sufficient number of fat-tailed coarse-wool sheep. Namely, the number of stud rams was 12 heads, or 1.6%, ewes - 420 heads, or 56.0%, ewes and lambs, respectively - 240 heads, or 32.0%, and 78 heads, or 10.4%. A total of 750 heads.

2. During the scientific research experiment, the used rams-producers of the Kazakh fat-tailed coarse-wool breed of sheep had a live weight of 90-102 kg, ewes - 60-65 kg, and the average live weight of rams at weaning (at 4 months) was 35-37 kg, ewes had a live weight from 33.0 to 35.0 kg.

3. During the experiment, the growth and development of Kazakh fat-tailed coarse-wool sheep met the established requirements. In particular, during the milking period, during the fattening and finishing period, 4-4.5 month old rams made up 36% of the live weight of adult rams, ewes - 53.7%, and 1.5 year old ewes (rams and ewes) made up 73.6% and 84.9% of the live weight of adult ewes, respectively.

4. The wool yield from the experimental rams was 2.8-3.2 kg, from the ewes - 1.7-2.0 kg.

5. According to the data on the feeding rations of rams and ewes before insemination and during the insemination period, the nutritional value of the ration of stud rams was 1.9 feed units before insemination and 2.4 feed units during the insemination period, while the nutritional value of the ration of ewes was 1.36 feed units during the insemination period and 1.80 feed units in the second half of pregnancy, respectively.

6. The fertility rates of the ewes were satisfactory. Thus, of all fertilized ewes (582 heads), 542 heads, or 93%, gave birth, and the number of lambs obtained was 536 heads, or 92.1%.

7. Variability of growth of Kazakh coarse-wool fat-tailed sheep from birth to weaning was within the normal range. The average live weight of lambs at birth was 3.9 kg, and the live weight at the age of 20 days, 2 and 4 months, respectively - 8.2 kg 16.0; 28.8 kg, and the total absolute and average daily gain was 24.9 kg and 207.5 g. The average live weight of rams at birth was 4.1 kg, and the live weight at the age of 20 days, 2 and 4 months - 9.1 kg; 16.8; 31.5 kg, respectively, and the absolute and average daily gain was 27.4 kg and 228.3 g, respectively.

8. Crossbred rams showed higher live weight gain rates compared to purebred rams. In particular, at birth, as well as at 60 and 120 days - 4.5 kg; 17.9 kg and 34.4 kg, respectively, that is, by 0.4; 1.1 and 2.9 kg. were higher. The absolute and average daily gain were, respectively, 13.4; 16.5 and 29.9 kg and 223.3; 275.0 and 249.2 g.

9. During the research work, the slaughter rates of 2- and 4-month-old rams kept under their mother were studied and determined.

The live weight of 2-month-old purebred and crossbred lambs before slaughter was 16.8 and 17.9 kg, respectively, i.e. the live weight of crossbred lambs was 1.1 kg higher, and, accordingly, the slaughter weight and slaughter yield were 8.4-9.3 kg and 50-52%. Thus, the slaughter rates of crossbred lambs were higher.

The live weight of 4-month-old purebred and crossbred rams before slaughter was 31.5 and 34.5 kg, respectively, i.e. the weight of crossbred lambs was 3.0 kg higher, and, accordingly, the slaughter weight and slaughter yield were 16.5-18.6 kg and 52.4-53.9%. Thus, the slaughter rates of crossbred rams were higher by 2.1 kg and 1.5%.

10. In purebred and crossbred 2-4 month old rams, there was also an advantage of crossbred ones in terms of the varietal composition of carcasses. Thus, the mass of parts by variety was 7.49-8.40 kg or 92.5-93.3% (at 2 months) and in 4-month old lambs, respectively, 14.55-16.77 kg or 92.10-93.15%. Also, in terms of the morphological composition of carcasses, there was a predominance of crossbred rams, especially in terms of the meat coefficient, which was 1.64 and 1.34 units.

11. In the research work, a study was conducted on fattening purebred rams on pasture with the addition of grain and compound feed as additional feed. Accordingly, three experimental groups were formed. The first, experimental (control) group did not receive additional feed, the second group received grain, and the third group - compound feed. As a result, the rams in the experiment during the period of pasture maintenance added 9.21; 10.50 and 10.70 kg to their live weight, respectively, that is, compared to the control group, the lambs of the second and third groups added 1.30 and 1.50 kg more, and the average daily gain was 153.5; 175.0 and 178.3 g, respectively. Accordingly, the carcass weight and carcass yield of the rams were 18.8 kg; 19.8 and 20.1 kg and 50.1; 51.0 and 51.9%, and the slaughter weight and slaughter yield were 19.20; 20.30 and 20.56 kg and 51.3; 52.3 and 53.1%, respectively. In addition, the morphological and varietal composition of the carcasses of the rams in the experiment was determined, and it was noted that these indicators were also higher in the rams that received additional feed.

12. During the scientific and practical study, in accordance with the study plan, 7-month-old purebred rams were fattened for two months. Their live weight

before fattening was 39.0-38.5 kg. During fattening, the experimental rams were additionally given grain waste and compound feed. As a result, at the end of fattening, the live weight of the rams was 49.2 and 50.0 kg, respectively, the absolute gain was 10.2 and 11.5 kg, and the average daily gain was 170.0-192.0 g, i.e. the absolute gain of the rams fed compound feed was 1.3 kg, and the average daily gain was 22 g higher. In terms of slaughter indicators, the second group, i.e. the rams fattened with compound feed, also showed higher results. Overall, the slaughter weights were 25.4 and 27.17 kg, respectively, and the slaughter yield was 52.7-55.45%, that is, the indicators of the second group were higher by 1.77 kg or 2.75% compared to the first group.

In general, the indicators of the morphological composition of the carcasses of rams that were fed with additional compound feeds were higher both in terms of the morphological and varietal composition of the carcass, as well as in terms of the anatomical parts of the carcasses of rams.

13. The profit from meat productivity of young Kazakh purebred and crossbred coarse-wool rams amounted to 7200-7840 tenge from two-month-old lambs with an efficiency of 112.5-122.5%, and from four-month-old lambs - 16620-19050 tenge with an efficiency of 138.5 and 158.8%. In addition, the efficiency of fattening rams for fattening was determined. In particular, the profit from fattening rams aged 4-9 months amounted to 16440, 23180 and 24360 tenge, and the profitability level was 137.0; 178.3 and 135.3%, respectively. Thus, it was found that fattening rams aged 4 to 6 months is more efficient.

Scientific novelty and significance of research.

For the first time in the Akmola region, research was conducted to improve the production technologies of young lamb obtained from crossbred and purebred Kazakh coarse-wool fat-tailed sheep of various ages and a specialized meat breed of Hampshire sheep.

Practical significance of the research.

The study of animal productivity in farms occupies an important place from both theoretical and practical points of view. Therefore, in our scientific work, studies were conducted on the productivity indicators of purebred and crossbred sheep raised in farms, in particular, in the direction of improving meat productivity. According to the results of the studies, the possibility of increasing the meat productivity of Kazakh fat-tailed sheep was proven. In particular, it was found that the use of fattening technology for purebred and crossbred rams contributes to an increase in the production of young lamb.

Compliance of dissertation research with state requirements programs:

Completed research work was implemented within the framework of the budget program No. 267 "Increasing the availability of scientific research knowledge", within the framework of the scientific and technical program "Development of intensive technologies in livestock breeding industries" (No. BR06249209) was carried out on the topic of the scientific project "Development of effective technologies in the sheep breeding industry of Akmola region". Currently, research work continues within the framework of the program

(project) BR22885692 "Development of modern selection-technological and molecular-genetic methods for improving, preserving and rational use of genetic resources of sheep of different productivity areas".

Suggestions for production.

In the farms of Akmola region, engaged in breeding Kazakh coarse-wool fat-tailed sheep, we propose to organize targeted breeding, feeding, fattening and fattening of young animals up to one year old in order to increase the production of lean yang and young lamb, as well as to use breeding rams of domestic meat breeds of local Kazakh coarse-wool fat-tailed sheep.

Contribution of the doctoral student to the preparation of each publication.

The doctoral student actively participated in the analysis of literary sources on the topic of the dissertation, conducting laboratory and scientific and economic experiments. Statistical correlation and regression analyses of the research results were conducted. The technology of production of young lamb meat in the conditions of the Akmola region was mastered. She prepared the manuscript of the dissertation, formalized the obtained results and contributed to the publication in scientific journals.

List of scientific papers published based on the research results:

1. Omarova K.M., Shauenov S.K., Ibraev D.K., Doldasheva G.K. Fattening of young Kazakh coarse-wool fat-tailed sheep // "Bulletin of Science" of S.Seifullin Kazakh Agrarian University, No. 2(97), pp. 103-112. Astana, 2018.

2. Shauenov S.K., Ibraev D.K., Doldasheva G.K., Koyshuak E. Orta sharuashylyk zhagdayynda osiriletin saulyktardy uryktandyru tekhnologiyasy men natizheleri // Materials of the Republican scientific and theoretical conference "Seifullin Readings-14: Youth, science, innovation: digitalization - a new stage of development." Volume 1, Part 2, Astana, 2018, pp. - 283-280.

3. Shauenov S.K., Omarova K.M., Ibraev D.K., Sultanov O.S., Doldasheva G.K. Results of fattening of young rams of Kazakh coarse-wool fat-tailed sheep // Selection and technological aspects of intensification of production of sheep and goats. Collection of works of the International scientific and practical conference. Moscow, 2019, pp. 152-155

4. Shauenov S.K., Omarova K.M., Ibraev D.K., Doldasheva G.K., Mukhametzharaeva I.E. 10th anniversary of the Agrotechnical Faculty of Pavlodar State University named after S. Toraigyrov, Pavlodar, 2019, pp. 185-189.

5. Shauenov S.K., Omarova K.M., Ibraev D.K., Doldasheva G.K., Yuldashbaev Yu.A. Fattening and slaughter performance of young rams of the Kazakh coarse-wool fat-tailed breed of sheep // Theoretical and scientific-practical journal Bulletin of the Orenburg State Agrarian University, Orenburg, 2019, No. 2 (76) pp. 233-235

6. Shauenov S.K., Ibraev D.K., Doldasheva G.K., Konarbay A., Lesbek K.A., Akkair B.Zh. Results of fattening and morphological composition of ram carcasses // "Bulletin of Science" of S.Seifullin Kazakh Agrarian University, No. 1 (104), pp. 81-89. Astana, 2020.

7. Shauenov S.K., Yuldashbaev Yu.A., Ibraev D.K., Doldasheva G.K., Mukhametzharova I.E. Results of slaughter and morphological composition of carcasses of rams of different origins // Monthly theoretical and scientific-practical journal "Zootechnics", No. 7, pp. 19-22. Moscow, 2020.

8. Doldasheva G.K., Lesbek K. A., Abdimanat E. A. Meat productivity of Kazakh fat-tailed coarse-wool rams during fattening // Collection of articles based on the materials of the LXVII International scientific and practical conference "Innovative approaches in modern science" Moscow 2020, pp. 56-61

9. Doldasheva G.K., Konarbay A.M., Zhumakhmetova B.Zh., Akkair B.Zh. Kazakhtyn қылшық zhүнді құйрықты және зән қозыларунь өнімділігі // Collection of articles based on the materials of the LXVII International Scientific and Practical Conference "Innovative approaches in modern science", Moscow 2020, p. 157-162

10. Doldasheva G.K. Etti-maily bagyttagy koy tukymy kozylarynyn osui // Collection of materials of the International scientific and practical conference "Scientific potential of modern youth", Nur-Sultan, 2020, pp. 280-282.

11. Shauenov S.K., Ibraev D.K., Doldasheva G.K., Zhumakhmetova B.Zh., Konarbai A.M., Lakova A.B. Akmola oblysy zhagdayynda kozy etin ondiru technology // Scientific and analytical journal "Science and Agrarian Production", Almaty, 2020, pp. 16-18.

12. Shauenov S.K., Ibraev D.K., Aldabergenov B.Sh., Omarova K.M., Doldasheva G.K., and others.. Recommendations on lamb production technology / Publishing house of the Kazakh Agrotechnical University named after S.Seifullin, 2020., 25 p.

13. Ibraev D.K., Doldasheva G.K., Abdimanat E.Ә., Zhumakhmetova B.Zh. Kazaktyn qylshyk zhundi kuyrykty zhane budan kozylarynyn et onimdiligi // Materials of the International Scientific and Theoretical Conference "Seifullin Readings – 16: Youth science, a new formation - the future of Kazakhstan. - 2020. - T.I, Part 1 - P.205-208

14. Shauenov S.K., Doldasheva G.K. Fattening, finishing and slaughter qualities of Kazakh fat-tailed coarse-wool rams // Proceedings of the international scientific and practical conference "Seifullin readings - 18 (2): "Science of the XXI century - the era of transformation". - 2022. - T.I, Part II. - P. 142-144

15. Shauenov S.K., Doldasheva G.K., Mukhametzharova I.E., Ibraev D.K. Multidisciplinary scientific journal: Intellect, idea, innovation - intelligence, idea, innovation. - No. 2. - 2023. - P. 179-188

16. G. Doldasheva, S. Shauenov, Y. Yuldashbayevb, D. Ibrayev, I. Mukhametzharova. Enhancing lamb growth and meat quality: analysis of Kazakh fat-tailed and crossbred in central Kazakhstan's sharply continental climate // Brazilian Journal of Biology, 2024, vol. 84, e285337 <https://doi.org/10.1590/1519-6984.285337>

Structure and scope of the dissertation: The dissertation consists of the following sections: introduction, literature review, research methodology and materials, research results, conclusions and recommendations for production, list of used sources and appendices, and is written on 127 pages. The dissertation is

designed with 36 tables and 9 figures, includes 9 appendices. The list of used sources contains 225 titles, of which 57 are foreign literary sources.