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EXTERIOR INDICATORS AND MEAT PRODUCTIVITY OF DOMESTIC SHEEP MEAT - SEBACEOUS (EDILBAEV, KAZAKH FAT-TAILED COARSE-WOOLED AND KAZAKH FAT-TAILED SEMI-COARSE-WOOLED) BREEDS

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Abstract: In the modern market economy indicators of productive efficiency, competitiveness for domestic breeds of sheep in accordance with their quality and international standards should be prioritized. Today, sheep farming has shown an intense growth in the livestock industry. This shows that this industry has great potentials. It consists of forage and large areas of natural pastures. Deep phased study of meat and the quality of sheep in domestic breeds is of great importance. This study includes questions involving sheep fattening and development of evidence-based methods and techniques of selection which improves the quality of mutton, wool and sheep skin. This involves biological stability and adaptability of the animal to the environment where it is bred and reproduced. Its breed features its productivity to some extent and this can be seen on exterior indicators.

Keywords: exterior indicators, meat productivity, domestic sheep meat, sebaceous, sheep breeding.

1 Introduction

At the present stage of meat development - greasy sheep breeding is of the greatest economic significance. Its body weight, size, and shape of the tail, the yield of the carcass and more valuable parts of the carcass are also of great economic significance. Therefore, the priority of breeders is to improve breeding and productive qualities of fat-tailed sheep. First of all, these basic economic - valuable traits through a targeted selection and individual selection are maintained and its adaptive qualities in the natural habitat together with its feeding conditions in their breeding area are well understood. The exterior of sheep meat - sebaceous breeds have features that require comprehensive study. Fat-tailed sheep's grown in arid and semi-arid zones are characterized by a strong constitution, strong bones, large size, and long legs.

This article presents the results of the study of 2012 on meat-grease productivity, growth, and development of young domestic sheep breeds that are a fundamental element in raising meat productivity and will help strengthen the economy of sheep farms and reduce the cost of sheep breeding products

2 Materials and Methods

The material for this work was the herd of Edilbaev, Kazakh fat-tailed coarse-wooled and Kazakh fat-tailed semi-coarse-wooled sheep breeds of interbred (zone) type such as "Bayys" experienced like interbreed of Kazakh fat-tailed semi-coarse-wooled sheep breed, approved in 1994 by the Ministry of Agriculture.

Growth and development of the obtained posterity were examined by weighing and taking basic measurements in different age periods. Live weight of the sheep was examined in the following age periods: at birth, at ablactation (3-4 months), at the formulation and when removed from feeding or feeding with bonitation (18 months). Adult sheep - producers are weighed in the spring during bonitation and in the autumn before tupping.

Animals of breed herd are weighed without exception. The animals are weighed in the morning before watering and feeding. The precision of weighing at birth and ablactation - 0.1 kg, in other age periods - 0.5 kg.

For characteristics of body forming, seven key measurements are taken including the need for more detailed study of the exterior - much more measurements are taken. For taking measurements we need a measuring tape, measuring range, and ready-made notebooks to record taken measurements.

The procedure of taking seven basic measurements is further explained. Animals are placed on a smooth surface without bending the legs, back or head. Then measurements are made with appropriate tools.

2.1 Processing of the data is carried out by variation statistics

Meat-sebaceous productivity has been studied by means of control of anima slaughter at the age of four months. Pre-slaughter live weight was identified by individual weight of animals after a 24-hour hunger, the weight of doubled carcass without a fat tail, fat tail mass, visceral fat mass and weight at slaughter, and the output of these products of slaughter. By results of the dissection of chilled carcass without a fat tail, that is, separation of flesh from the bones, morphological composition, and the carcass beefiness coefficient are established.

The morphological composition of carcasses was determined by dissection of separate kinds and cuts with the release of flesh and bones, and then by the total weight of the flesh and the bones in the carcass which was installed. While dissection was done on chilled carcasses their weight was reduced by 200 - 300g.

3 Results and Discussion

The physique and the exterior are an important indicator of breeding and productive qualities of farm animals. Therefore, in practical, serious attention is paid to the accuracy and objectivity in the assessment of the animals on these indicators of breeding.

Table 1. Exterior Body Measurements of Sheep of Desired Type, cm

Kazakh fat-tailed semi-coarse-wooled breed			
Indicators	Age		
	At birth	4 months	18 months
	X± м	X± м	X± м
Number of animals	20	18	16
Height at the shoulder	35,7±0,44	56,8±0,72	59,0±0,64
Height at hips	36,9±0,31	57,5±0,73	60,2±0,71
Chest depth	10,3±0,25	25,9±0,60	31,4±0,31

Chest breadth	8,6±0,15	18,2±0,38	20,3±0,42
Breadth in hook bones	7,7±0,20	18,4±0,32	19,8±0,31
Chest girt	37,4±0,40	70,5±0,88	95,4±1,12
Metacarpus girt	5,12±0,14	7,5±0,15	8,8±0,15
Oblique body length	30,8±0,41	58,6±0,83	69,7±0,74
Kazakh fat-tailed coarse-wooled breed			
Indicators	Age		
	At birth	4 months	18 months
	X± м	X± м	X± м
Number of animals	30	27	24
Height at the shoulder	34,4 ± 0,41	59,6±0,75	72,5±0,81
Height at hips	35,6±0,32	60,0±0,77	73,5±0,82
Chest depth	9,8±0,30	25,4±0,62	30,2±0,54
Chest breadth	8,4±0,14	18,0±0,40	20,8±0,44
Breadth in hook bones	7,9±0,22	19,2±0,35	20,3±0,42
Chest girt	38,2±0,42	71,6±0,90	92,3±1,12
Metacarpus girt	5,7±0,15	7,3±0,19	8,2±0,10
Oblique body length	31,2±0,41	60,6±0,86	75,2±0,86
Edilbayevskaya breed			
Indicators	Age		
	At birth	4 months	18 months
	X± м	X± м	X± м
Number of animals	23	19	15
Height at the shoulder	36,7±0,44	66,0±0,72	74,3±0,23
Height at hips	37,9±0,31	64,4±0,70	74,2±0,29
Chest depth	11,3±0,25	27,9±0,60	33,0±0,16
Chest breadth	9,6±0,15	16,9±0,40	19,7±0,16
Breadth in hook bones	7,7±0,20	16,6±0,35	19,8±0,31
Chest girt	39,4±0,40	74,5±0,92	86,7±0,25
Metacarpus girt	5,2±0,14	7,8±0,16	8,5±0,11
Oblique body length	29,5±0,41	58,1±0,80	74,2±0,30

Table 1 shows the indicators of body measurements of sheep at the desired type at birth, 4 months and 18 months, describing their growth and development. The sheep are owned by the farm “Akbastau”, “Akzhar – Ondiris” LTD, farm “Aimautova”.

Study of exterior features of animals showed that during the growth and development of gimmers from birth to one and a half-year-old age rapid growth is noted in the following measurements: chest depth and girt, breadth in hook bones which increased for the accounting period almost twofold, but lower intensity growth is characterized by subsequent measurements of gimmers: metacarpus girt, height at the shoulder an at hips, which within one and a half year development increased only on 56.1 - 72.7%. Along with this, we noted that in some periods of individual development of gimmers the rank position of growth intensity measurements of body changes. So, if before ablactation at the age of 4 - 4.5 months, the rate of growth breadth of hook bones and chest depth was on the first place, from 4 to 18 months, chest girt over shoulder blades is characterized by the highest increase. On the contrary, the lowest growth rate before ablactation was recorded in the metacarpus, and from 4 to 18 months - breadth in hook bones, height at the shoulder and hips is of high increase.

A more complete and clear idea of the type of body-build of young stock gives a relative comparison to a number of pairs of anatomically related measurements, that is, body-build indexes (Table 2).

Table 2. Indices of Gimmers Body-build, %

Kazakh fat-tailed semi-coarse-wooled breed			
Index	Age		
	At birth	4 months	18 months
Long legs	71,1	54,4	46,8
Length	86,2	103,0	118,1
Blockiness	121,4	120,2	136,9
Proportionality	103,4	103,3	102,0
Bone massiveness	14,6	13,0	14,9
Massiveness	105,0	124,1	161,7
Kazakh fat-tailed coarse-wooled breed			
Index	Age		
	At birth	4 months	18 months
Long legs	71,5	57,3	58,3
Length	90,6	101,6	103,7
Blockiness	122,4	118,1	122,7
Proportionality	103,5	100,6	101,3
Bone massiveness	15,1	12,4	11,3
Massiveness	111,0	120,1	127,3
Edilbay breed			
Index	Age		

	At birth	4 months	18 months
Long legs	69,2	57,7	55,5
Length	80,3	88,0	99,8
Blockiness	133,5	128,2	116,8
Proportionality	103,2	97,6	99,8
Bone massiveness	14,1	11,8	11,4
Massiveness	107,3	112,8	116,6

In gimmers of studied breeds, during the post-uterine period, the depth of the chest grows more intense as opposed to the height and the shoulder, resulting to a decrease in the index of long legs from 69.2 - 71.5 to 46.8 - 58.3%.

Due to the more rapid growth in the body length of the Kazakh fat-tailed semi-coarse-wooled gimmers, the animals become more stretched with advancing age. Because of the intensity of growth of chest breadth and depth during the development from the ablactation period to one and a half year, the girth behind the shoulders increases significantly. This explains the improvement in the compactivity of animals at an older age. Due to the fact that with advancing age the gimmers' cylindrical bones grow less rapidly in diameter than at length, index of bone massiveness with advancing age tends to decrease.

Breeders are required to meet the requirements of the ever-increasing need of the population for meat and the need to produce it at the lowest cost for food and money. This involves getting fast-growing animals at a young age with the meat of the best quality. The main source of meat production becomes rearing young livestock.

In the production of meat, it is necessary to strive for the possibility of a growing animal to increase its body weight at a young age, which is mainly due to the increase in muscle mass. The marketing value of carcass is largely dependent on the development of muscle which is the pulp and because of its taste and nutritional quality is the most important part of the carcass.

This year some of the indicators of meat productivity of 4 months ram of different breeds have been studied. From meat productivity, indicators of lamb body weight before slaughter, weight at slaughter, slaughter yield, the proportion of bones and flesh, the proportion of meat and fat are the most valuable. The results of the control slaughter are shown in Table 3.

Table 3. Slaughter Aspects of 4-monthly Rams of Different Breeds (n = 3 animals)

Breed	Preslaughter live weight	Carcass		Fat tail		Visceral fat		Weight at slaughter	
		kg	%	kg	%	kg	%	kg	%
Edilbayev	40,6	16,7	41,1	2,8	7,0	0,517	1,3	21,0	50,5
Baiys' Kazakh fat-tailed semi-coarse-wooled	38,7	15,8	41,0	2,5	6,5	0,471	1,2	18,7	48,3
Kazakh fat-tailed coarse-wooled	39,5	16,2	41,0	2,6	6,6	0,466	1,2	19,2	48,6

Lambs of different breeds have a fairly high pre-slaughter live weight of 38.7 kg to 40.6 kg. According to the results of the slaughter, carcass weight is 15,8-16,7 kg, the yield of the carcass was an average of 41.0-41.1%. Higher slaughter yields belong to rams of Edilbaev breed - 50.5%.

In practice, the slaughter of animals uses such indicators as "net body weight". To achieve the smallest error in the calculation of indices of slaughter, the contents of the gastrointestinal tract is subtracted from the value of the pre-slaughter live weight, and all calculations are made on the base of the received indicator of body weight (Table 4).

Table 4. Slaughter Aspects of 4-monthly Rams of Different Breeds (n = 3 animals)

Preslaughter live weight, kg	Gastrointestinal tract contents		Live weight at slaughter		Mass of carcass without fat tail		Fat tail mass		Visceral fat mass		Weight at slaughter	
	kg	%	kg	%	kg	%	kg	%	kg	%	kg	%
Edilbayev breed												
40,6	7,0	17,2	33,6	82,8	16,7	49,7	2,8	8,3	0,517	1,5	21,0	62,5
Baiys' Kazakh fat-tailed semi-coarse-wooled breed												
38,7	6,5	16,8	32,2	83,2	15,8	49,1	2,5	7,8	0,471	1,5	18,7	58,1
Kazakh fat-tailed coarse-wooled breed												
39,5	7,0	17,5	32,5	82,5	16,2	49,8	2,6	8,0	0,466	1,4	19,2	59,1

Minus the contents of the gastrointestinal tract, pre-slaughter live weight of lambs decreased by 16,8-17,5%. Carcass yield increased by breeds on 8,1-8,1%, slaughter yield, respectively on 9,8-12,0%. Lambs of all breeds have a different nutritional state, as seen on fat tail yield, and the visceral fat, respectively 7,8-8,3% and 1.4-1.5%.

One of the most important elements of stock breeding with the breed of meat-sebaceous productive direction is an increase in flesh content of muscle tissue fraction, especially in the carcasses of young animals. This problem is by far more difficult and complex than the percentage increase in fat (Table 5).

Table 5. Morphological Composition of Carcasses of 4-monthly Rams of Different Breeds (n = 3 animals)

Breed	Chilled carcass mass without a fat tail, kg	Flesh				Bones		Proportion Meat: Bones: Fat	Beef coefficient
		muscles		fat		kg	%		
		kg	%	kg	%				
Edilbayev breed	16,1	9,3	57,6	2,6	16,3	4,2	26,1	3,6:1,6:1,0	2,8
Baiys Kazakh fat-tailed semi-coarse-wooled breed	15,2	8,7	57,4	2,5	16,2	4,0	26,4	3,5:1,6:1,0	2,8
Kazakh fat-tailed coarse-wooled breed	15,6	8,9	56,8	2,5	15,8	4,2	27,4	3,6:1,7:1,0	2,7

As can be seen from the data presented in Table 5, the yield of edible meat ranges from 72.6% to 73.9%. In terms of the ratio of muscle, fat, bone, and the coefficient beefiness interbreed significant differences were observed.

In the study of meat, the quality of rams pays particular interest to the absolute mass of individual organs. The degree of development of the internal organs of the body is dependent on livelihood. This, therefore, influences the productivity of the animal.

Better development of the internal organs characterizes rams meat-sebaceous different breeds as pets with a more intense occurrence of metabolic processes which further affected the best indicators of their meat production.

Parts of the carcass which consists of the flesh are considered the most valuable and the elucidation of their release is the most important criteria in the evaluation of carcasses of slaughtered lambs. We investigated the proportion of body parts in the carcass of 4 monthly rams of different breeds (Table 6).

Table 6. The Proportion of Body Parts in the Carcasses of 4-monthly Rams of Different Breeds (n = 3 animals)

Indicator			Breed		
			Edilbayev breed	Baiys Kazakh fat-tailed semi-coarse-wooled	Kazakh fat-tailed coarse-wooled
Chilled carcass mass		kg	16,10±0,60	15,20±0,27	15,60±0,28
		%	100,0	100,0	100,0
Fore limbs		kg	2,80±0,15	2,70±0,10	2,80±0,15
		%	17,53	17,90	18,30
Hind legs		kg	4,50±0,10	4,10±0,30	5,50±0,15
		%	28,20	27,12	28,60
Rib		kg	1,70±0,15	1,80±0,01	1,80±0,05
		%	10,63	11,70	11,62
Keel bone		kg	0,70±0,05	0,80±0,05	0,80±0,05
		%	4,60	5,24	5,00
Peritoneum		kg	1,70±0,01	1,80±0,02	1,70±0,10
		%	10,34	11,60	10,62
Central body (neural axis)	neck	kg	3,60±0,01	3,70±0,05	4,10±0,01
		%	22,80	24,20	26,80
	breast	kg	5,70±0,02	5,20±0,20	5,90±0,05
		%	35,20	33,90	34,83
	coupling	kg	5,80±0,15	5,50±0,10	5,00±0,10
		%	35,90	36,30	32,17
	urosacral part	kg	0,98±0,02	0,85±0,03	0,97±0,03
		%	6,10	5,60	6,20
	total (central body)	kg	4,30±0,16	3,90±0,18	3,90±0,13
		%	26,40	25,46	24,80
Trimmings meat		kg	0,37±0,05	0,15±0,04	0,16±0,14
		%	2,30	0,98	1,06

According to our data, a high yield of the most valuable parts of the front and back are characterized lambs of Edilbaev and Kazakh fat-tailed coarse-wooled, 18.3 - 28.6% and 17.53 - 28.20% respectively. According to the yield of the central body, regular interbred differences are not established.

Thus, the results of the slaughter of lambs of different breeds characterize them as the best animals with slaughter qualities; in their meat, there is less fat and a higher yield of the most valuable parts of the carcass.

4 Conclusion

Kazakhstan has large areas of natural pastures with sheep breeding as the leading and most efficient livestock industry. Sheep breeding, especially of meat-sebaceous direction has productivity which allows the use of grasslands and semi-arid zones most effectively.

In the conduct for selection and breeding work with fat-tailed sheep, special attention should be paid to the preservation of physique and improvement of exterior qualities.

It has long been known that the evaluation of the animals on the exterior and determination of their economic value on appearance is important in breeding herds. Animals of different

directions have different forms. E.Ya. Borisenko wrote that “the doctrine of the exterior should be understood as the study of external forms of farm animals in relation to their biological characteristics and economic value, that is, as the doctrine of the evaluation of animals by their appearance.” Many constitutional productive features of fat-tailed sheeps are marked in the works of M.A. Ermekov, A.V. Golodnov, (1) K.U. Medeubekov, (2) A.Ya. Rukhkyan, (3) and others. They noted that the Kazakh fat-tailed sheep are perfectly adapted for climatic and feeding conditions of vast areas of arid steppes, deserts and semi-deserts, harsh winter cold and summer drought and maintained year-round pastures. (2,4-5)

External indicators to some extent can be seen on the physique, that is, biological resistance and adaptation of animals to the environment where they are bred and multiplied, their breed features, as well as productivity.

The exterior of the sheep of meat-sebaceous direction has features that require comprehensive study. Fat-tailed sheep, grown under conditions of desert and semi-desert areas, are characterized with a strong physique, strong bones, large size, and long legs. (6-9)

Study of the growth according to the individual items of the exterior has definite value which together with the weighted data gives a complete characteristic of the biological maturation of the animal. (10)

During the global crisis where food security of the population is given first place, the production of lamb is one of the priorities in increasing the production of meat and meat products. Analyzing modern data and world sheep breeding experience in the present time, it is possible to conclude that the increased efficiency is due to more complete use of meat productivity of sheep. (11-12)

The ever-increasing population in the world and increase of the need of the population in meat and the need of meat production with the lowest cost requires breeders to get hasty large animals which at their young age provide the meat of the best quality. (13) Meat quality of farm animals, including sheep, to a large extent, is determined by a system of growing, slaughter age and breed characteristics. (3-5)

Efficiency and profitability of sheep breeding in market conditions is established by the study of growth, development, and productivity of meat in the young stock of fat-tailed meat-sebaceous breeds of Kazakhstan.

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INFLUENCE OF THE CONDITIONS OF SOIL NUTRITION AND MINERAL FERTILIZERS ON THE PRODUCTIVITY AND QUALITY OF CHICKPEA BEANS

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Abstract: The results of the researches carried out in the period from 2003 to 2007 are provided on the dark chestnut easy margalitic soils of Northern Kazakhstan for the study of soil nutrition and mineral fertilizers influence on the productivity and quality of chickpea. According to the results, the lack of moisture, heat and basic nutrients in the soil significantly affect the growth and development of chickpea. Basic nutrients are the main obstacle in the conditions of Northern Kazakhstan. The tests have shown that nitrogen and phosphorus fertilizers affected differently the forming chickpea yield according to the initial state of nitrogen and phosphorus in the soil. The applied fertilizers stimulated the intensive development of the vegetative mass and the root system, which is particularly important in dry years with high moisture scarcity in the soil in Northern Kazakhstan. Depending on the set edaphoclimatic conditions and the applied doses, phosphorus fertilizers increased the productivity of chickpea to 63.9%, but nitrogen ones – to 70%. In various years the best result was provided by various doses of the applied fertilizers. Thus, in 2003 the highest yield gain of chickpea was achieved when 90 kg of a rate of application was applied, in 2004 and 2005 – from 150 kg of a rate of application, in 2006 – from 210 kg, whereas in 2007 – from R120. The same relates to nitrogen fertilizers. The ratio of phosphorus to nitrogen in the soil is a major factor for the efficiency of phosphorus and nitrogen fertilizers. Phosphorus and nitrogen are produced by the applied fertilizers. The applied nitrogen fertilizers have significantly affected protein content by an average of 4%, whereas phosphorus fertilizers reinforced the production of fat and fiber. Nitrogen fertilizers almost did not affect the formation of fats, whereas phosphorus fertilizers – the albumen production.

Keywords: Chickpea, Nitrogen fertilizers, Phosphorus fertilizers, Dark chestnut soils, Productivity, Beans quality.

1 Introduction

Chickpea is one of the most important leguminous crops. This is a valuable food and feed crop rich in proteins and vitamins (A, C, B1, B2, C, RR, D). Chickpea is a relatively cheap source of protein nutrition. (1) Leguminous plants are unique according to their protein content. There is 1.5-3.0 times more protein in their seeds, than in the cereal crops. Leguminous plants are prominent with high accessibility. The proteins of leguminous plants are complete and have high quality. (2, 3) The researches by Behnoush Rasaei (4) have shown that chickpea proteins consist of such key amino acids as tryptophan, lysine, arginine and others, which are contained no less in peas, lentils, and legume.

In chickpea seeds, the protein content ranges from 13 to 30%, the fat content – from 4.1 to 7.2; nitrogen-free extractable substances – from 47 to 60; starch – from 48 to 61; crude fiber – from 2.4 to 12.2; ash – from 2.3 to 5.0; calcium – 0.255; phosphorus – 0.561%. (5-14)

A prevailing share of proteins is made by chickpea due to the atmospheric nitrogen being absorbed. Deeply penetrating the soil, the roots of chickpea improve the nitrogen balance of it and contribute to the increase in productivity of the crop rotation. (15-17) All leguminous crops are good forerunners for winter and spring crops. (18)

Chickpea is a culture which is relatively not strict to the soil compared to other leguminous crops. (19) It grows well, ranging from sand dunes in the Thal of Pakistan to sandy clay (Northern India), up to deep black cotton soils (central India, West Asia, and the Ethiopian highlands), as well as on sandy clays and light loams. (20) The reaction of the soil solution should be neutral or alkalescent. (21, 22) According to Mahler et al. (23), the optimum value of ph environment for chickpea should vary from 5.7 to 7.2.

The advantages of the chickpea should also include its high technology. Seeds do not lay, and grain does not crumble. (24) Zavyalova (25) notes that chickpea can be used as a green manure.

The world areas of chickpea are about 10 million hectares. The major producing countries are India (68 %), Turkey (11 %), and Pakistan (8 %). (26) Chickpea is mostly (90%) grown in rainfed conditions, as well as in semi-arid and arid regions. (27)

The cultivated areas of chickpea in Kazakhstan are 50.9 thousand hectares (0.5%) (according to the statistical agency of the Ministry of Agriculture).

Despite its drought resistance, high food, and feed value, it has not been widely spread in Kazakhstan, mainly due to its low productivity and insufficient knowledge.

In Kazakhstan, a lot of papers is devoted to the culture of chickpea. (25, 28-36) Here the main attention was paid to the issues of biology and technology of chickpea cultivation. However, soil nutrition and chickpea fertilizer, as a crucial method to improve its productivity and quality, have been insufficiently studied.

It is only known that regarding the conditions of mineral nutrition, chickpea is less strict to the soil, compared to other leguminous crops.

The conditions of nitrogenous nutrition largely affect the growth and development of plants. In the case of normal nitrogenous nutrition, plants form strong stems and leaves with bright green color. The plants grow and cluster intensively. Reproductive bodies are better formed and developed. Synthesis of protein substances is increased. A living ability of a body remains longer. The growth is accelerated and leaf senescence is slightly slower.

The yield is greatly increased, and its quality improves with normal phosphorous nutrition. Phosphorus improves winter resistance of plants, as well as accelerates their development and ripening. (37)

The optimal phosphorous nutrition contributes to the development of the plant root system. The latter more intensively branches and deeper penetrates into the soil. Due to that the nutrients and moisture get to the plants. That is particularly important for arid conditions. (38)

Saxena (39), Korbut (40), Bodnar (8), Vanifatiev (41-43), Vinokurov (35), Pereira Stamford (44), Jiang (45), Sarir (46), Schulze (47), and Islam (48) note the positive reaction of chickpea both for the seeding application of phosphorus fertilizers and the main application of nitrogen and phosphorus fertilizers, and complete mineral fertilizer (NPK). We also observed the positive influence of biological fertilizers, seed treatment with nitrogen, zinc sulfate and molybdenum on the productivity of chickpea. (34, 40, 44, 49-53)

However, these studies do not reveal the peculiarities of a crop's mineral nutrition and do not allow to develop a scientifically based fertilizer system of chickpea, according to the level of soil fertility, agronomic and other conditions.

The solution of these issues is relevant at the current stage. Due to that chickpea can take its rightful place in the diversification of a grain production in Kazakhstan.

Given these issues are insufficiently studied in northern Kazakhstan, we aim to study the influence of the conditions of soil nutrition and mineral fertilizer on the productivity and quality of chickpea in the conditions of dark chestnut soils in northern Kazakhstan.