

**Kosilov V. I.**, Doctor of Agricultural Sciences, Professor, **the main author.** <https://orcid.org/0000-0003-4754-1771>

FSFEIHPE «Orenburg State Agrarian University», Russia, [kosilov\\_vi@bk.ru](mailto:kosilov_vi@bk.ru)

**Bozymov K.K.**, Doctor of Agricultural Sciences, Professor, <https://orcid.org/0000-0003-1611-4400>.

NJSC «West Kazakhstan Agrarian and Technical University named after Zhangir khan», Uralsk city, Zhangir khan street 51, Republic of Kazakhstan, 090009, [dzhumagalieva1973@mail.ru](mailto:dzhumagalieva1973@mail.ru)

**Shakirbek N.**, Postgraduate, <https://orcid.org/0000-0001-9287-2698>

NJSC «West Kazakhstan Agrarian and Technical University named after Zhangir khan», Uralsk city, Zhangir khan street 51, Republic of Kazakhstan, 090009, [shakirbek01@gmail.com](mailto:shakirbek01@gmail.com)

## CHARACTERISTICS OF GROWTH AND DEVELOPMENT OF YOUNG KALMYK CATTLE

### ANNOTATION

One of the most important tasks of the agro-industrial complex is to find a reserve for increasing the production of livestock products and especially beef.

To increase beef production, it is necessary to rationally use the resources of cattle breeding, which consist primarily in the reproduction of the herd, increasing the live weight and fatness of young cattle sold for meat.

The obtained data can be used to create highly productive factory lines and breed groups of Kalmyk cattle with increased meat productivity, high growth intensity, milk production and better reproductive abilities. This, in turn, will make it possible to supply the farms of the region with high-value breeding products for developing beef cattle breeding. It is possible to make sure that Kalmyk cattle play an important role in the development of beef cattle breeding, based on the results of the study.

The article presents the features of growth and development of young Kalmyk breed. The results indicate the dynamics of growth and development of youngsters, in addition to their exterior qualities.

**Key words:** *the Kalmyk breed, productivity, live weight, body size, body Index, absolute growth, average daily growth.*

**Introduction.** The peculiarities of Kalmyk cattle were formed in conditions of year-round pasture maintenance. The conditions of keeping and breeding of these cattle contributed to its high endurance and strength of the constitution. And also for a long time the leading factor in the formation and maintenance of economically useful qualities was natural selection. The Kalmyk breed has a number of valuable technological features, such as: light calving, relatively low calves during the suckling period and high fertilization during the short period of seasonal insemination. [1]

The coat is red and has various shades of red, usually with white markings on the head, belly and limbs. The head is light, the horns are curved in a crescent. The nasal and horns are light in color, the neck is fleshy, the withers are wide. The backbone is strong and thin. The skin is thick, the hair is thick and long, has very well-developed muscles. The chest is broad, steep-edged with a muscular middle chest. The back is smooth and wide, the loin is elongated and wide. The ribs are widely spaced apart. The belly is round. The legs are strong with proper positioning. The udder is small. [2,3]

There is no consensus on the origin of the breed. It is assumed that either Indian cattle or an Asian tour were used in the creation process. Usually the color of the animals is red, of various shades, there may be a white stripe along the upper part of the trunk and a white muzzle. By the age of one and a half years of life, bulls gain a live weight of up to 450 kilograms, while the slaughter weight is 66%, which is higher than that of some other breeds of beef cattle. Manufacturers reach a body weight of up to 800-900 kilograms. [4,5]

In the East Kazakhstan region, farmers are now engaged in breeding Kalmyk cows. 180 heads were purchased from one of the local agricultural firms, they were brought from the Akmola region. It should be noted that the Kalmyk breed is exceptionally adaptable to a sharp change in climate, tolerates both frost and heat well. In the future, the farmers of the region intend to increase their livestock and breed a new breed. [6]

The Kalmyk breed of cattle is a breed of meat direction. Bred in Kalmykia from cattle exported from Mongolia about 400 years ago.

Live weight of bulls — from 600 to 1100 kg, cows — from 400 to 540 kg, depending on age. The height at the withers is 125-130 cm. The weight of calves at birth is 22-25 kg, while the daily increase is from 800 g to 1 kg. Kalmyk cattle are of two types: precocious meat and late-ripening meat. The first type is characterized by a lower height, a lighter backbone and a higher slaughter yield. The slaughter yield for the breed as a whole is approximately 55-60%. The meat is juicy and high-quality, permeated with fatty inclusions. [7,8]

Under the guidance of Academician of the Russian Academy of Sciences Gorlov I.F. (2020), the exterior features and meat productivity of animals of the Kalmyk breed with animals of the Mongolian breed of cattle bred in China having a common ancestor were studied and compared. During the study, it was revealed that in terms of meat productivity, the Kalmyk and Mongolian breeds achieve a fairly high yield of raw materials, but the Mongolian breed is somewhat inferior to the Kalmyk breed.

As studies have shown, the productivity of bulls aged 15-16 is: the pre-slaughter weight reaches 420 kg on average, the slaughter weight is 256 kg, the slaughter yield is 52.6%, the pulp mass is 220.92 kg, the percentage of pulp yield is 86.3%; the thickness of the skin is 0.51 cm; the thickness of the abdominal muscles is 8 cm; the thickness of the thigh muscles – 15 cm; fat thickness: back fat thickness – 0.9 cm; waist fat thickness – 0.9 cm; the ratio of bones and meat is – 5.65; the area of the thick edge of the carcass is 54.67 cm<sup>2</sup>.

When comparing young Mongolian breed at 15-16 months of age is characterized by the following indicators: pre-slaughter weight – 390 kg, slaughter weight – 234 kg, slaughter yield – 50.1%, pulp weight – 198 kg; pulp yield - 84.8%; skin thickness is 0.35 cm; thickness of abdominal muscles – 6 cm; thickness of thigh muscles 12 fat thickness: the thickness of the fat of the back is 0.7 cm; the thickness of the fat of the waist is 0.7 cm; the ratio of bones and meat is 4.84; the area of the thick edge of the carcass is 40,75 cm<sup>2</sup>. Such indicators in Mongolian cattle are consistent with the results obtained by Chinese researchers (Guan Y.P. et. al., 2012).

Animals of the Kalmyk breed demonstrate a better ratio in the structural composition of amino acids in the blood compared with animals of the Mongolian breed. [9]

The Kalmyk cattle breed is the only meat breed in Russia. This breed of cattle is hardy, productive, well adapted to the conditions of a sharply continental climate, unpretentious and does not require special conditions of maintenance. It can be adapted for breeding in a variety of climatic conditions. The breed remains well-fed both during summer droughts and during long wintering. The weight gain reaches one kilogram per day. In winter, cows grow thick fur. Kalmyk cows graze well, give stable gains.

Kalmyk cattle played a big role in the creation of the Kazakh white-headed breed and the best breeding herds of Aberdeen Angus and Shorthorn breeds.

The high adaptive ability of the new meat breed "Russian Komolaya" is inherited from Kalmyk cattle during its breeding. [10,11]

In addition, Kalmyk cows have good milk productivity. The duration of lactation in cows is usually 8-9 months, cows can give 900-1500 kg of milk during lactation. The fat content of milk is 4.1-4.5%, milk has a very high nutritional value. The amount of milk and its nutritional value during lactation are sufficient for the full provision and feeding of the offspring during the dairy period, which allows you to get high-quality calf.

Milk productivity of Kalmyk cows is not high and ranges from 1000 to 1200 kg. Milk has a fat content of 4.1 – 4.5%. But the milk of Kalmyk cows is extremely nutritious. Lactation usually lasts for eight to nine months. [12]

In Kazakhstan, this breed has long been popular among cattle breeders. In 2012, the Republican Chamber of the Kalmyk breed began its activity in our country. She is engaged in accounting and registration of breeding animals in the database, coordinates breeding and breeding work, assigns breeding status to animals and issues breeding certificates. [13]

Cows of the Kalmyk breed have a live weight from 450 to 480 kg, the best representatives of this breed reach a live weight of 550 kg or more. Full-aged bulls-producers of the Kalmyk breed have a live weight from 750 to 950 kg, individual bulls-record holders reach a weight of up to 1150 kg or more.

Usually cows of the Kalmyk breed have a good reproductive ability, calving of cows passes without any complications, the death of newborn calves is very low, viability is very high, young animals develop rapidly due to the biological usefulness of colostrum. Colostrum of Kalmyk cows has high bactericidal activity and acidity.

Conditions of an industrial complex, Kalmyk bulls at the age of 15 months had a live weight in groups of 403.0-439.0 kg, carcass yield – 55.2-56.9% and slaughter yield – from 58.0- 60.2%.

Calmyk calves at the age of 15.5 months with intensive cultivation reached a live weight of 484, 18 months - 561 kg, carcass weight was 257 and 292 kg. The authors note that their meat productivity indicators were higher in comparison with their peers of the Aberdeen Angus and Shorthorn breeds.

The breed was originally formed in a harsh sharply continental climate. The content was mainly pasture-nomadic. The main factor influencing the formation, development and maintenance of useful qualities of the breed was natural selection. That is, weak individuals did not have the opportunity to survive.

Kalmyk cattle have no analogues in the reproduction of the herd and the preservation of young animals. [14,15]

The breed has a number of valuable features, such as easy calving (almost all cows calve independently), protection of young animals from various external factors and adverse weather conditions. The yield of calves ranges from 85 to 98%. Kalmyk cows are capable of producing viable offspring for 10 -15 years. [16]

For eight years, 48 farms from 11 regions of Kazakhstan have become members of the Republican Chamber of the Kalmyk breed. To date, the total number of the breed in Kazakhstan is 17343 heads, of which 15172 breeding stock. [17]

According to the experts of the chamber, the main problem hindering the development of the Kalmyk breed is the lack of breeding stock. This is a common problem for both Kazakhstan and Russia. Few farmers sell heifers, mostly everyone tries to keep them for themselves. The remaining problems are local in nature – cases of spreading misinformation about the breed, etc. [18]

In 2020, 2,293 heads of breeding young animals were sold, including 1142 bulls and 1151 heifers. Due to the peculiarities of breed formation, long-term natural selection, Kalmyk cattle have a unique genetic material. Therefore, it was successfully used in breeding such meat breeds as the Kazakh white-headed.

By breeding animals of the Kalmyk breed, taking into account their body type, it is possible to effectively increase the meat productivity of this breed of cattle. For example, the resulting calves of the tall type of cattle of the Kalmyk breed at the age of 16 months surpass their peers in live weight of medium and compact types by 12.1-23.0 kg, respectively, while the increase per day increases by 5.05 and 9.95%, and the level of economic profitability of meat production increases by 6.84 and 12.85%.

The process of accumulation of adipose tissue in Kalmyk cattle. He revealed that 50-60 kg of internal fat and no less fat in the carcass can be deposited in the body of Kalmyk cows with a live weight of 500 kg by autumn, which allows animals to do without premises, overcome long distances, lie down and sleep on snow or frozen ground. [19]

Harsh climatic conditions and natural selection have made Kalmyk cattle an ideal animal for steppe, desert and semi-desert zones. They are perfectly able to “freeze” (that is, to get food from under the snow on winter pastures). Also, cattle are able to quickly gain weight in spring and autumn, while maintaining their weight during a long summer drought or difficult wintering. [20]

Kalmyk breed at the age of 15 months had a live weight of 384.1 and 403.0 kg, carcass yield – 55.1 and 56.2%, slaughter yield – 57.1 and 58.9%, with a level of profitability of beef production of 29.8 and 45.8%.

Calmyk bulls in the conditions of an industrial fattening complex at the age of 15 months had a live weight of 428.7, 17 months - 493.8 kg. The increase in live weight of young animals was 1065.9 g per day. The mass of carcasses of bulls slaughtered at the age of 17 months was 272.4 kg, the yield of carcasses was 55.1%, the slaughter yield was 58.7%.

These animals are able to create a large supply of internal and subcutaneous fat, which will be used in winter, with a lack of food. In addition, fat in animals accumulates not only under the skin, but also between muscles and muscle fibers, providing meat with juiciness and "marbling". Therefore, despite the fact that cows can eat sparse vegetation, this does not negatively affect their meat. Its taste qualities remain consistently high. [21]

In search of food, animals are able to travel long distances, from 15 to 50 km per day. Thick dense wool provides reliable protection from the cold. A peculiar device of the skin allows the sebaceous glands to lubricate the hair more abundantly with fat. Therefore, they are much easier to tolerate strong wind and precipitation. The breed is also known for its ability to protect itself well from wolves and other predators.

The unique natural meat rapidity is an important economically useful feature of Kalmyk cattle. So, calves already at the age of 8 months have 35-40% of dry matter in the flesh part of the carcass, including fat – 11-16 and protein – 22-26%.

The high slaughter yield of young Kalmyk breed is noted in the work of Egizaryan A.V. (2011). According to him, well-fed Kalmyk cattle have a slaughter yield of 62-66%. The author believes that the meat of Kalmyk cattle meets the requirements of domestic and foreign markets.

The exterior characteristics of the breed are distinctive and recognizable. Broad chest, muscular middle chest, straight broad back, long wide loin, wide-set ribs, well-developed musculature, strong legs with correct posture. [22]

**Materials and methods of research.** The research was carried out in 2021-2023 in the Kyzylorda region, Syrdarya district, Akzharma rural area, Maksat farm.

One of the main elements of breeding work aimed at the qualitative improvement of animals is the proper rearing of young animals, and for this you need to know how the animal develops and how to manage its development. Growth is understood as the process of increasing the size of the body, its mass, which occurs due to the accumulation of active, mainly protein substances in it. Growth is a quantitative change in the body. When studying the growth of individual tissues and organs, linear, volumetric and weight growth are distinguished. In the postnatal period, the growth of farm animals is taken into account by weighing (or measuring) animals. Cattle are weighed at birth, at the age of 1, 2, 3, 4, 5, 6, 9, 12, 15, 18 and 24 months. The mass is recorded in a certain document (the journal of the rearing of young animals).

The primary weighing of young animals takes place immediately after calving. In the future, to control the growth and development of calves, they are weighed monthly. To avoid inaccuracies, the average value is calculated based on the results of 2 measurements that are carried out 2 days in a row before feeding. Today, in the arsenal of modern livestock complexes and farms there are a variety of machines and equipment that help to make the work of herd reproduction and animal husbandry more efficient and less time-consuming. To account for the mass of cattle, you can not do without special scales for livestock. The main difference between such scales and platform scales is the presence of an animal weighing mode, which allows you to accurately measure the mass of an animal, even if it is in motion.

But even here there are its own peculiarities. When weighing, even if it is carried out on animal scales, it is necessary to take into account daily fluctuations in weight, which can reach 15-20 kg. in an adult animal. During the control weighing, the average value is calculated based on the results of several weighings. The most favorable time for weighing livestock is in the morning, before feeding.

Cattle breeding is one of the promising areas of animal husbandry. In order to obtain a quick and stable economic effect, it is important to ensure the right conditions for keeping and feeding animals. One of the main criteria for assessing the normal development of cattle is the average daily gain, which allows you to quickly make adjustments to the diet and other factors to obtain the desired result.

The growth of animals is determined by the live weight and measurements. There is an absolute and relative increase in live weight. Absolute gain is understood as an increase in live weight or measurements of young animals for a certain period of time (day, decade, month, year), expressed in kilograms, centimeters.

**Research results.** The research works were conducted in the conditions of the city of Kyzylorda district, Syrdarya region, in the rural area of Akzharma.

Table 1 – Class composition of the KH "Maksat"

Class	2021		2022	
	n	%	n	%
by herd				
Elite-record	95	49,48	72	30,13
Elite	50	26,04	131	54,81
1st Class	47	24,48	36	15,06
Total	192		239	
by cow				
Elite-record	71	79,78	57	50,00
Elite	16	17,97	36	31,58
1st Class	2	2,25	21	18,42
Total	89	100	114	100

During the research, the exterior features were studied primarily, since the exterior - constitutional type plays an important role in the selection and evaluation of beef cattle. Including the

measurement of physique, the absence of external defects and defects, compliance with the requirements of the breed standard. In general, the Kalmyk breed is distinguished by a stocky Constitution, meat productivity, quickness in care and rapid fertility.

In one of the main branches of agriculture related to the breeding of farm animals for food and raw materials, important importance is given to the control of weight parameters, which are measured to assess the general condition and correctness of the development of livestock, its meat productivity.

It is possible to determine the mass of cattle by measurements using matrices or formulas or by simple weighing. In the absence of special scales for cattle or the inability to weigh the animal at a certain point in time, the live weight can be determined by the calculation method. But no matrix gives such accurate results as special weighing devices. Weighing on animal scales is the most reliable method of determining the live weight of cattle and other animals.

The most effective way to determine weight gain is constant weighing on special scales. Since the weight of cows during the day can fluctuate by a significant 15-20 kg, the operation was carried out at the same time.

The formula for the average daily rate is as follows:

$$\text{Average Daily Rate} = \text{Total Room Revenue} \div \text{Total Number of Rooms Sold.}$$

Table 2 – Dynamics of live weight and average daily rate, (X±Sx)

	Live weight, kg			Average Daily Rate, g	
	0	8 month	12 month	0-8 monthes	0-12 monthes
n	10	10	10		
Heifers	21,70±0,65	191,00±1,41	265±3,29	705,42±2,71	675,83±4,32
Bulls	24,40±0,78	213±3,23	312±4,11	785,83±3,31	798,89±5,12

10 bulls and 10 heifers were selected for the study. The live weight of young Kalmyk breed was weighed using scales at birth, and at the age of 8 and 12 months, measured in the morning hours before feeding. And at the end, the average daily rates were calculated and analyzed.

According to the above data, an increase in the live weight of both heifers and bulls can be observed. It is characterized by improved development of cattle, good maintenance and feed provision.

The live weight of heifers at birth showed 21.70 kg, and in bulls it was 24.40 kg. At the 8th month, the live weight of heifers increased to 191 kg, respectively, in bulls up to 213 kg. The average daily rate from birth to 8 months in heifers showed 705.42 g, in bulls 785.83g.

At 12 months, these indicators increased in heifers to 265 kg, in bulls 312 kg. As a result, the average daily rate in heifers was 675.83g, and in bulls 798.89g.

Measuring an animal's body is a more accurate method of studying the exterior. The evaluation of animals by measurements makes it possible to compare them with each other. Each of the measurements is taken at certain points of the animal's body with a measuring stick, a compass and a measuring tape. The figures obtained by measuring animals give an idea of the quantitative expression of the development of individual articles, but do not characterize their qualitative features and the development of all other articles. The physique index is understood as the ratio of one measurement to another anatomically related measurement, expressed as a percentage.

Table 3 – Body dimensions of young Kalmyk breed (X±Sx), cm

Indicators	8 month		12 month	
	Bulls(n=10)	Heifers(n=10)	Bulls(n=10)	Heifers(n=10)
Withers (shoulder) height	107,0±1,23	105,8±2,49	111,5±3,15	109,6±3,24
Sacrum height	108,8±1,67	107,2±2,15	113,1±2,88	112,3±2,19
Chest depth	47,6±0,96	45,9±1,41	56,1±0,47	54,8±0,96
Chest width	25,4±0,49	25,1±0,34	37,9±0,33	36,3±0,85
Oblique length of the trunk	104,8±0,86	103,4±3,24	121,9±3,68	121±2,87
Chest girth	123,6±1,67	122,3±2,39	156,9±3,82	155,4±2,69
Pastern girth	13,4±0,19	13,1±0,13	17,5±0,27	17,3±0,32

For an in - depth research of the exterior and constitutional features of cattle, body dimension are calculated. The calculation of body dimensions allows the exterior features of animals to be studied with full accuracy.

Table 3 shows the body dimensions of bulls and heifers of the Kalmyk breed, the height at the withers of bulls in the interval of 8-12 months increased by 4.5 cm, in heifers-by 3.8 cm. The chest depth of bulls and heifers of the Kalmyk breed increased by 8.5 cm and 8.9 cm. We see that in bulls aged 8-12 months, the chest circumference increased by 12.5 cm, in heifers - by 11.2 cm, in bulls-by 17.1 cm, and in heifers -by 17.6 cm.

By calculating body indices, we were able to study the consistency of the physique of cattle on the farm " Maksat", the accuracy of the ratio of body proportions.

Cattle of this breed perfectly tolerates heat and cold, quickly gains weight, and also has offspring resistant to many diseases. Kalmyk cows have good health and are quite unpretentious in nutrition.

**Conclusion.** It is possible to make sure that Kalmyk cattle play an important role in the development of beef cattle breeding, based on the results of the study.

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As a result, the average daily rate in heifers was 675.83g, and in bulls 798.89g.

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The exterior characteristics of the breed are distinctive and recognizable. Broad chest, muscular middle chest, straight broad back, long wide loin, wide-set ribs, well-developed musculature, strong legs with correct posture.

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## РЕЗЮМЕ

В статье приведены результаты исследовательской работы в кх «Максат» по продуктивности скот калмыцкой породы. Были исследованы экстерьерно- конституциональные особенности, были исследованы живая масса и взяты промеры, в результате чего были анализированы выводы.

В изучении роста и развитии молодняка калмыцкого скота важными показателями являются экстерьерные особенности, живая масса и среднесуточный прирост так же промеры. По результатам промеров и живой массе были оценены экстерьерные особенности телок и бычков при рождении и в возрасте 8 и 12 месяцев.

Взвешивание животных проводилось по утрам перед кормлением при рождении, в 8 и 12 месяцев, для дополнительной информации были использованы результаты бонитировки. Средняя живая масса при рождении телок показало 21,7кг, а среди бычков 24,4 кг. Живая масса бычков и телок с возрастом заметно увеличивалась, что показывает хорошую упитанность данной породы, кроме этого влияние внешних факторов, такие как полноценное кормление и хороший уход за молодняками.

В результате исследования можно заметить хорошую динамику живой массы, и улучшения экстерьерных особенностей, что можно сделать вывод, что рост и развитие молодняка калмыцкого скота в условиях в кх «Максат» протекает отлично. Это ещё раз доказывает, что калмыцкая порода играет главную роль не только в развитии мясного производства, так же для совершенствования генофонда мясных пород, в целях получения более продуктивной и качественной говядины.

## ТҮЙІН

Мақалада қалмақ тұқымының өнімділігі бойынша "Мақсат" ШҚ зерттеу жұмысының нәтижелері көрсетілген. Сыртқы экстерьерлік- конституциялық ерекшеліктер, тірілей салмағы зерттелді және дене өлшемдері алынды, нәтижесінде қорытындылар талданды.

Қалмақ тұқымды төлдердің өсуі мен дамуын зерттеуде сыртқы ерекшеліктері, тірі салмағы және орташа тәуліктік өсуі де маңызды көрсеткіштер болып табылады. Өлшеу нәтижелері мен тірі салмаққа сәйкес, туылған кездегі, сонымен қатар 8 және 12 айлық кезінде қашарлар мен бұқашықтардың сыртқы ерекшеліктері бағаланды.

Жануарларды өлшеу таңертеңгі уақытта азықтандыру алдында туылған кездегі, 8 және 12 айда жүргізілді, қосымша ақпарат алу үшін бонитировка нәтижелері пайдаланылды. Қашарлардың туылғандағы орташа тірі салмағы 21,7 кг, ал бұқалар арасында 24,4 кг көрсетті. Жасына қарай бұқашықтар мен қашарлардың тірілей салмағы едәуір өсті, бұл осы тұқымның жақсы азықтануын, сонымен қатар сыртқы факторлардың әсері, мысалы, төлдердің толыққанды азықтандыру және жақсы күтіп- бағу жағдайын көрсетеді.

Зерттеу нәтижесінде тірілей салмағының жақсы динамикасын және сыртқы ерекшеліктерінің жақсарғанын байқауға болады, бұл "Мақсат" ШҚ жағдайында қалмақ тұқымды төлдердің өсу мен дамуы өте жақсы жүреді деген қорытынды жасауға болады. Бұл қалмақ тұқымы тек ет өндірісін дамытуда ғана емес, сонымен қатар өнімді және сапалы сиыр етін алу үшін ет тұқымдарының генофондын жетілдіруде де маңызды рөл атқаратынын тағы да дәлелдейді.