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Abstract: Relatively high demand and the market price for horse meat ensure the profitability of a herd of horse breeding for meat, promote the financial interest of farmers in the development of the livestock industry. The low cost of prices of horse meat compared to other meats is due to the fact that herd horses are kept on year-round horse herd feed without any capital expenditure on their maintenance.

Keywords: horses, Novoaltaysk breed, development, productive horse breeding, horse meat.

1 Introduction

Specific conditions for breeding horses require high adaptability to climate and feeding conditions. In this regard, the mother herds are taken to complete mares of local breeds. However, it is well known that the local breed of horses is different and as a rule, they are short in stature and have a relatively small body weight.

In order to further and more accelerate development of horse breeding in the conditions of market economy, special attention must be given to the herd of tebenevochnomu horses as the main provider of dietary, therapeutic and preventive meat and koumiss. It is necessary to expand research work to find new technologies for the production of horse breeding and to increase the profitability of horse breeding. Along with effective methods of increasing meat productivity as a purebred breeding, an important means of improving the meat quality of animals is a method of cross-breeding and the need to pay special attention to the selection of breeds not only with a pronounced effect of heterosis, but the maximum preservation of the adaptive qualities and genotype of local horses.

To meet these growing demands in recent years, environmentally friendly and health care products of horse breeding – Mare's milk and horse meat, not only in Kazakhstan but also in European countries (Germany, France, etc.) is becoming an urgent task to increase the number of highly productive animals and on their basis, creation of new productive lines and types of Kazakh horse breed.

1.1 The purpose and objectives of the research

The aim of this work is to improve milk and meat productivity of Kazakh horses crossing local Kazakh mares with stallions such as toad Novoaltaysk breed.

In accordance with the intended purpose was defined the following tasks of research:

- to study the chemical and biochemical composition of meat of young hybrids and Kazakh horses;
- describe the breeding and genetic selection parameters of toad purebred and young hybrids;
- set the milk productivity of mares;
- to identify the economic efficiency of rearing.

Scientific novelty of the work. For the first time in the conditions not only in the north-east of Kazakhstan and the CIS but based on the requirements of today's market economy before us, it raised the question of how we can quickly and effectively improve the meat quality of local horses, while maintaining the maximum adaptability of Tabun horse to feeding content.

Practical significance. The possibility and effectiveness of cross-breeding stallions Novoaltaysk breed with females Kazakh breed type toad is to create highly productive herds of horses and increase the production of high-quality production of horse breeding in the north-eastern region of the country

2 Materials and Methods

The main research and production studies were conducted in the farm “Turar”, Ekibastuz district of Pavlodar region. The farm is located in the dry zone of North-Eastern region of the country with a sharply continental climate characterized by, dryness of spring and summer, high summer and harsh winter temperatures which are insufficient and inconsistent over the years considering the amount of precipitation and significant wind activity throughout the year.

The object of research was young Novoaltaysk x Kazakh hybrids and pure-bred, young Kazakh horse breeds such as the toad local selection.

3 Results and Discussion

Meat productivity of Kazakh horses and their crosses with different breeds studied for a long time. J.N. Barmintsev, I.N. Nechaev (1) studied the development of myasnosti horses under Betpak Dalin experimental station of animal husbandry in experiments with horses of the type of toad. A. Imangaliev (2) studied the meat quality of the Adaev type in Guryev region. V.Z. Borkum (1964) studied the economic efficiency of production of foals for meat purposes. J.N. Barmintsev, G.A. Grushevsky, L.K. Volkov (3) found that 8-month crossbred foals x and the Kazakh Soviet heavy draft breed weighed 322 kg. Carcass Weight amounted to 173.3 kg, internal and subcutaneous fat 3.8 kg. A.E. Zhumagulov found that foals draft-Kazakh Kazakh hybrids were superior to their peers in live weight by 15.85 kg. A.A. Khamitov (4) studied the productive performance of heavy-Kazakh hybrids in the conditions of high mountains of Eastern Kazakhstan. A.T. Turabaev (5) studied the meat productivity of kulandinskogo intrabreed type Mugalzhar breeds in comparison with local Kazakh breed of horses. G.V. Sizonov (6) studied the meat productivity and morphological composition of meat of horses of different breeds and hybrids.

In the experiments conducted by the All-Union Scientific Research Institute of horse breeding farms in the Aktobe region, Kazakh Mare at the age of 4.5 years had a live weight of 395 kg, and mare hybrids obtained by crossing with stallions of improving breeds and grown in normal herd conditions at the same age had weight: hybrids from Lithuanian draught stallions breed – 458 kg, Vladimir – 497, Soviet heavy draft – 484, the Russian heavy draft – 490 kg, Latvian draught – 473, Tory – 453 kg.

The given examples show that the Kazakh horses and their hybrids in different climatic and grazing regions of Kazakhstan have high meat productivity. However, all these hybrids of the first generation are recommended to breed "in itself" for the acquisition of uterine herds and the accumulation of hybrids of higher generations, inevitably leads to a loss of the adaptive qualities of year-round grazing horse content and overall profitability of the industry.

Based on the experience of the leading scholars of the breeders of the Republic and the CIS countries, to improve the meat quality of the Kazakh breed of horses, not repeating the past step in this direction, we stopped at Novoaltaysk breed of horses, as a Brightener and only local Kazakh breeds to be better suited to the task than other breeds of horses. (7-8)

This is because, firstly, it's an opportunity for the manifestation of the heterosis effect due to the difference of genotypes and secondly, the closeness of their qualitative characteristics as suited to year-round horse herd content, very high instinct, fecundity and so on. Third, the increase in live weight of experimental horses was associated with a significant percentage of the blood at the heavy draft breeds.

Already the first indicators that our experiments have produced encouraging results in which the meat quality of the experimental population was judged not only on live weight, build indexes on computed basis of measurements, but to gain an objective assessment of meat productivity of animals supplemented for full performance and to yield characteristics of myasnosti slaughter weight and slaughter yield. As P.N. Kuleshov (9) noted, "the Basis for a correct evaluation of beef cattle is the exact definition of deadweight, i.e. the weight of meat and fat and then..." calculating the deadweight of the living – is the surest way to evaluate beef cattle".

To determine the meat productivity of Kazakh Novoaltaysk x hybrids compared to purebred Kazakh type toad in KKH "Turar" we have made the bottom 3 heads of young stallions hybrids and 3 heads of young stallions Kazakh type like a toad at the age of 6 and 18 months grown under the pasture horse content.

The slaughter made at a meat processing plant in Ekibastuz LLP "IPC Ekibastuz". To study the morphological composition of meat, we were butchering young animals according to the scheme adopted by the Republican standard PCT No. 725-72: 1 – Kazi, 2 – pressed, 3 – dorsal portion of 4 – back, 5 – shoulder, 6 – shank, 7 – desperately, 8 – shank front, 9 – shank back. The first-grade includes the dorsal portion and the rear portion. The second grade will take the blade portion and the shank. The third grade will carry desperately and knuckles. Outside varieties are distinguished Kazi and stings.

At slaughter, horses were separated from the carcass's front legs at the carpal joint and hind legs at the hock.

After cooling, the carcasses made the cut on the variety. Line cuts of the dorsal part of the first-grade passes – between the 6th and 7th ribs, back – between 17 and 18 ribs. The Line is cut at the rear of the carcass belonging to the first class – between 17 and 18 ribs, back of the knee joint. The Line is cut and the blade part of the second-class passes – between the 2nd and 3rd cervical vertebrae and in the back, between the 6th and 7th ribs. The Shank with respect to the second class is separated at the knee joint, the lower part of the bottom – across the tibia 2 cm above the Achilles tendon. The upper half of the tibia enters the shank.

Lines cut off desperately relating to the third class, passes between the occipital bone and the first cervical vertebra, the posterior border of the desperate cut is between the 2nd and 3rd cervical vertebrae. The front of the shank is separated by the line through the middle of the ulna and radius, the Shin part of the lower half of the elbow and the lower half of the radial bone and wrist. The shank is separated across the back of the tibia at the level of 2 cm above the Achilles tendon. The rear shank includes the lower half of the tibia and hock.

Figure 1. Diagram of Cut Carcasses of Horse (PCT of Kazakh SSR 725-72)

1 - Kazi; 2 - pressed; 3 - dorsal; 4 - back; 5 - blade section;
6 - shank; 7 - desperately; 8 - the shank front; 9 - shank back

Table 1. Meat Quality of Young Horses of Different Genotypes (colt, n=3)

Experimental Group	Age of Slaughter, months.	cutting indicators kg								
		Slaughter live weight			Carcass weight			Slaughter yield, %		
Biometrics		M±m	σ	Sv	M±m	σ	Sv	M±m	σ	Sv
Control (KT)	6	183,7±2,12	3,6	2,0	102,0±1,64	2,8	2,7	55,5±0,28	0,5	0,9
	18	293,6±7,70	13,2	4,5	154,6±3,80	6,2	4,0	52,7±0,23	0,4	0,7
Experienced (NA x KT)	6	202,0±5,50	9,5	4,7	113,14±3,69	6,4	5,6	56,0±0,57	1,0	1,7
	18	371,9±18,60	32,3	8,7	194,7±9,5	16,4	8,5	52,3±0,15	0,2	0,5

From Table 1 it is seen that the pre-slaughter weight of the crossbred calves is much superior to that of purebred calves of the Kazakh toad. So, the difference in 6 months was 18.3 kg and at the age of 18 months – 78.3 kg (P>0.99), which is probably due to the influence of paternal inheritance factors.

At the control, slaughtering of young stallions was determined by the carcass yield. He stood at 6-month foals hybrids – 56,0%, the same young toad – 55,6%, at the age of 18 months hybrids – 52,3%, the toad –52.7%. At 6-months of age on slaughter yield hybrids, there is a slight advantage of 0.5%, rather than the young toad. At 18 months of age, the Kazakh youngsters ahead of hybrids was 0.4%. In General, the difference in both cases is negligible.

After cooling, each produced carcasses weighing and trimming cuts. For each cut, by weighing on the electronic scales determined by the weight of flesh, bone, and fat, based on the

weight data calculated percentage for each experimental group of animals (Table 2).

Table 2. Morphological Composition of Carcasses of Young Horses of Different Genotypes (colt, n=3)

Experimental group	Age of Slaughter, months.	cutting indicators, kg								
		Mass of pulp			Bone Mass			Mass of fat		
Biometrics		M±m	Sv	Yield, %	M±m	Sv	Yield, %	M±m	Sv	Yield, %
Control (KT)	6 85,0±1,6	85,0±1,6	3,3	83,3	14,4±0,03	0,4	14,1	2,6±0,03	2,3	2,5
	18 127,6±3,3	127,6±3,3	4,5	82,5	21,3±0,05	0,4	13,7	5,7±0,34	10, 4	3,6
Experienced (NA x KT)	6	94,7±3,4	6,2	83,7	15,8±0,3	3,1	14,0	2,6±0,01	0,9	2,3
	18	163,2±7,7	8,2	83,8	25,6±1,6	10,7	13,1	5,9±0,27	8,1	3,0

The level of Fat has, morphological structure of carcass slaughter output, as can be seen from tables 1-2 the percentage of significant differences between groups of animals with different genotypes are observed, which confirms the identity of formation of quality of meat at this age. But the development of mass carcasses of crossbred young and purebred is superior to the toad 6 months of age is 11.1 kg, the pulp weight 9.7 kg (P>0,99), at 18 months of age on the carcass weight to 40.1 kg, the mass of the pulp at 35.6 kg (P>0,999).

Thus, a higher slaughter weight and carcass weight had a half-breed animals or hybrids of the first generation in the manifestation of heterosis that occurs in crosses of different breeds, with different gene pool. In addition, herd horse's ability to fat deposition describes their adaptive qualities to withstand the harsh conditions of feeding. In our experience, the yield of fat hybrids and Kazakh youngsters are absolutely identical, which confirms that the high adaptive qualities of hybrids are not inferior to the toad.

The research results already at this stage, provide material for conclusions about the appropriateness of the use of delivery and Novoaltaysk stallions to improve the meat quality of Kazakh horses. Moreover, horses of Novoaltaysk breed with exceptional adaptation, adaptive qualities to the horse herd content is not inferior to the Kazakh breed, at the same time significantly superior to the last in live weight which can be used in absorption of crossing to the third generation, accumulating the positive qualities in the descendants, then to produce a backcrossed hybrids with elite stallions toad, hybrids breed "in itself", and on the basis of the results obtained to participate in the creation of new, specialized lines and types of Kazakh breed of the meat direction of productivity.

It is important that the creation of new specialized lines and types of meat of horses first requires determining what proportion of krovnosti to breed hybrids "in itself". The noteworthy experience of creating cabin meat type of Kazakh horse breed has been proven by the order of the Ministry of agriculture No. 178 dated 15.11.95 year in terms of year-round grazing horse content in the Alpine zone of Eastern Kazakhstan (1200-3000 m above sea level). Genetic potential stallions for live weight 650 kg, mares – 530 kg, slaughter yield is 54-57%, fruitfulness of 85-90%. Unfortunately, this type remained only in KKH "Azamat" EKR and on 01.01.06 city numbered only 195 goals, of which 68 mares. (10)

Cabin type of Kazakh breed was created using simple cross-breeding of the Kazakh mares with stallions of Soviet heavy draft breed and for backcrossed hybrids, ½ blood with the representatives of the Kazakh breed and the resulting hybrids ¼ blood bred "in itself". In the first phase of work, along with the breeding of hybrids "in itself", it was decided to continue the crossing with stallions of the purebred Soviet heavy draft breed with the aim of increasing the number of hybrids from which the selection was made. But the increase of krovnosti Soviet heavy horses of the Kazakh breed greatly weakened adaptive quality of offspring.

In our experiment, the increase of krovnosti horses Novoaltaysk breed in Kazakh breed is not a threat and you can accumulate positive signs even unto the third and to the fourth generations, to make a rigorous selection of hybrids of the best qualitative characteristics. Then apply backcrossing hybrids with stallions Kazakh breed type toad with the most pronounced characteristics, conformation, and meat quality. This will work in the future.

In this direction, we have already laid. For these purposes, the number of yearlings who have successfully passed the first test of the winter pasture tebenevochnoy (2008-2009 g), selected 6 colts with the most severe symptoms of meat, good conformation, well able "to keep the body" in the period of underfeeding pasture.

It is well known that all of the exterior-constitutional peculiarities of horses that are formed in the process of growth and development are based on a definite hereditary condition of existence. In horses bred for the growth and development of young animals, along with genotypes great influence of par atypical factors. Animals feed on pasture all year-round while in certain seasons of the year, they do not fully satisfy the need for nutrients and that greatly affect their future growth and development. Considering this factor, the above 6 goals crossbred of young stallions, in the most unfavorable of the growing seasons of the year (winter), will be taken under special control and feeding.

Currently, in KKH "Turar", there are 96 goals crossbred calves ½ krovnosti, including 38 of the colts and 58 fillies which is the backbone of the breeding group. In the future, hybrids of the second generation are envisaged to breed "in itself", with the aim of creating new productive lines, meat and milk type of the Kazakh breed of horses.

Figure 1. Mixed Young 7 Months Before Slaughter

Figure 2. Mixed Young 18 Months of Age

Figure 3. HCV Distribution by Genotype

Figure 4. Deboning Carcasses of Young Animals

3.1 Chemical and biochemical composition of meat of young horses

One of the important indicators that give an idea of the nutritional value of meat is its chemical composition, which does not remain constant in the process of individual development of animals and is closely related to the level of feeding, maintenance, age, and fatness.

Horse meat contains a significant amount of nitrogen-containing substances, with reduced intramuscular fat. Based on this, already in the nineteenth century, physicians believed that horse meat is a dietary product and recommended in the treatment of several diseases. In 1869, in the article "Horse, its present and its future value as breeding material in the economic life of the Russian people", Arkhangelsk was written, "the Preservation of human life should be put ahead of preserving prejudice. For horse meat should be viewed as a precious and cheap medicine."

As a result of studies conducted on the carcasses of the horses from the stables of content by Professor Wolvertem in 1933, it was concluded that horse meat contains on average 74.2% of water, 21.6% protein, 2.5% fat and 1.0% ash.

Unlike horses from the stables of contents, herd horses during spring and especially autumn feeding accumulate in the body a significant amount of fat. So, according to P.S. Drogin, meat even 6-month foals of Yakut breed contain 15.66% of fat, protein 20.87%. (11)

According J.N. Barmintseva, I.N. Nechaeva, N.P. Andreev, Kazakh horse meat contains 70% water, 24.6% protein, 4.7% fat, 0,93% ash; Kazakh heavy draft hybrids meat contains 70.5% water, 25.9% of protein, 3.1% fat, and 1.05% of ash; the meat 6-month foals of Kazakh breed has an average of 66.97% water, 18.32% protein, 13.3% fat, and 0.80% of ash.

In the example shown in table 3, the data shows that with age, the amount of water in the carcass of young horses as toad and hybrids is reduced, the amount of fat increases.

Table 3. Chemical Composition of individual parts of the carcasses of young horses

Indicator	Part of the carcass											
	Shoulder				Rib				Rear			
	KT		NA x KT		KT		NA x KT		KT		NA x KT	
	6 month	18 month	6 month	18 month	6 month	18 month	6 month	18 month	6 month	18 month	6 month	18 month
Moisture, %	74,8	74,1	74,9	73,2	50,0	45,9	50,8	46,3	66,6	64,3	70,0	67,8
Protein, %	20,0	20,5	21,3	24,0	16,1	14,0	17,2	16,2	17,3	17,5	20,2	23,1
Fat, %	2,2	3,3	2,0	3,0	33,2	40,2	32,0	39,7	14,0	16,2	10,1	14,0
Ash, %	1,1	1,02	1,5	1,3	0,08	0,07	0,9	0,8	0,93	0,85	0,9	0,8
Kcal/kg	998	1117	1032	1230	3632	4178	3568	4221	1952	2158	1721	2188

The water content of the average meat hybrids exceeds meat toad in 6-month age by 1.45%, in 18 months by 0.98%, protein content of meat hybrids is richer than the meat of the Kazakh toad, so in 6 months by 1.76%, at 18 months of age by 3.76%.

The fat content of meat of hybrids is slightly lower to the meat of the Kazakh toad, in 6 months by 1.74%, in 18 months by 0.98%. The ash content of meat of hybrids exceeds the toad in 6-month age – 0.39%, at 18 months of age by 0.32%.

Kazakh youngsters at 6 months of age, the caloric content of meat is higher than in the hybrids by 87 kcal, but in the 18 month of age, it is lower than the hybrids by 62 calories. This appears to be due to the fact that more mature young hybrids have greater muscle mass and protein content, which affects the caloric value of meat.

Currently, accumulated considerable information on the nutritional and biological value of horse meat. Evaluation of General chemistry analysis (water, protein, fat, ash) is an insufficient indicator of the biological value of meat, so in our studies, along with the chemical composition of meat, we conducted an analysis on the content in meat of crossbreed and calves toad of some essential (tryptophan) and non-essential (hydroxyproline) amino acids.

It is known that muscle tissue includes sarcoplasmic proteins of the myofibrils, which are complete and contain all the essential amino acids. The connective tissue proteins contain some essential amino acids, particularly tryptophan, which plays a significant role in the biochemical processes of the body, helps induce natural sleep, reduce pain sensitivity, act as a natural antidepressant, helps relieve anxiety and tension, reduces some symptoms of biochemical disturbances in the body and prevents the development of alcoholism.

At the same time, 14% of the proteins of the connective tissue accounts for hydroxyproline amino acid which is not present in the complete protein. The selection of these amino acids is determined by the fact that tryptophan is an essential amino acid present in all muscle proteins at a pretty constant quantity and hydroxyproline – the constant component which is characteristic for defective food with respect to proteins of connective tissues. Therefore, hydroxyproline can be considered as a kind of label detection collagenous proteins in tissues. Collagen is the major component of connective tissue that is part of cartilage, tendons, ligaments, bones, teeth, blood vessels, and up to 25% of the total protein mass of the body, essential for joints and ligaments. Thus, connective tissue unites the various organs and tissues of the body. Therefore, from metabolic processes in the connective tissue, will depend on the processes of adaptation and stability of organs and systems. One of the main indicators of the metabolism of collagen is hydroxyproline contents.

Therefore, based on the above stated, the content of proteins in meat identifies tryptophan and defective - for hydroxyproline. The ratio of tryptophan to hydroxyproline is called protein quality indicator (B. K. P.) and characterizes the usefulness of the proteins in the meat, being one of the criteria of its quality.

The study of proteins shows that their amino acid composition varies with species, age, individual parts of the carcass of the animal.

B.N. Gutin (1976-1977) in the experiments with thoroughbred breeds gives examples of the high content of B. K. P. meat in the range of 6.7 to 7.7; P. Rabaev (1973) in experiments with the Kazakh breed of the type of toad and kushumskaya breed bred to Registered stud, shows the protein quality index in kushumskaya rocks in front of the carcasses to 4.94-5.50; backs – 5.64-6.36; respectively, the toad of 5.75-5.50; 6.11-6.20. According to the All-Union Scientific Research Institute of the meat industry in the meat of young horses, it is – 4.5-7.7 mg per 1 g of protein nitrogen.

In our experience with the Novoaltaysk x Kazakh mixed-breed and purebred toad, B. K. P. to hybrids – of 6.72, toad – of 6.39 mg/g.

Studies of VNIIMP found relatively high correlation between the content in the meat of hydroxyproline and its stiffness (r=0.66). Meat containing large amounts of connective tissue has a lower nutritional value. The results of our research, presented in Table 4 shows that B.K.P. hybrids are not inferior to the toad, to some extent even superior (0.33 mg/1 g protein nitrogen) and that characterizes the quality of the meat

Horse fat in their chemical composition and associated biological values are significantly different from fat of other species of farm animals (cattle, sheep, and pigs). They have a high iodine value, low-melting, rich in vital fatty acids and vitamin A.

Table 4. Characteristics of Quality Protein and Fat Meat 18-month-old Calves

Breed	Quality indicators				
	Protein			Fat	
	Tryptophan	Hydroxyproline	B. K. P.	Melting point, °C	Iodine number
KT	100.4	15.7	6.39	31.8	92.3
NA x KT	110.3	16.4	6.72	31.2	92.6

Earlier studies of the Kazakh horses and their hybrids under conditions of herd keeping showed fat hybrids on the biological value of fat yield to the local horses and of the toad. P.S. Friendess, who studied the constant characteristics of fat young Yakut horses and their crosses with the Russian heavy truck, provides data on the iodine content of the Yakut foals – 86.5, hybrids – 84.0, melting point fats respectively to 24.6°C and 27.6°C. (11)

Studies conducted on the underbrush Kazakh horses (N. In. Analina he touched upon the use of K. D.) had a melting point of the fat 30.9°C, iodine number of 98.2.

In our experience, a significant difference in the melting temperature and iodine number are observed (Table 4).

The melting point of the fat in the Kazakh youngsters is above hybrids by 0.6°C and is 31.8, hybrids of 31.2°C. Iodine number from toad amounts to 92.3, 92.6 percent of the hybrids. As we can see the significant difference in these indicators is not detected, which again shows the similarity of the biological characteristics of the two breeds.

3.2 Selection and genetic parameters for the selection of hybrids

The relationship of breeding traits has great importance in the improvement of productive qualities of animals and are often directed towards selection according to the same basis, one can enhance and negatively affect others at the same time. Numerous studies have found that the degree and character of correlation of breeding characteristics specific to individual breeds and groups of animals.

In the meat herd horse breeding, such studies are quite rare.

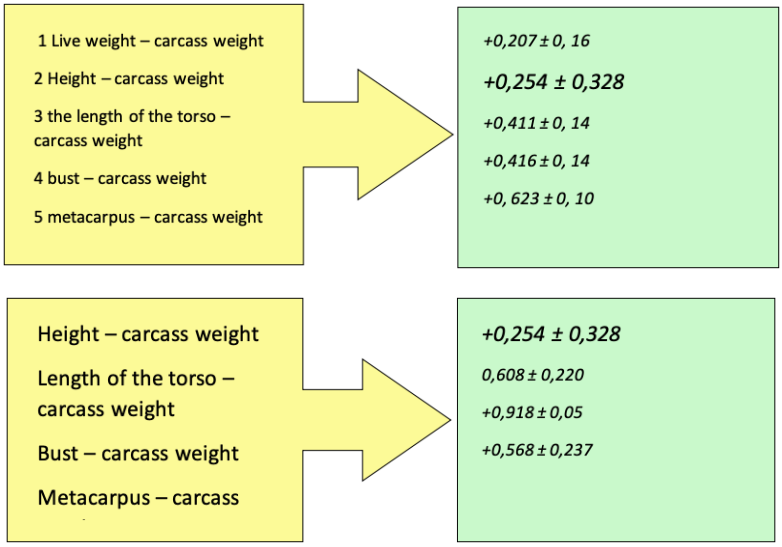
When selecting meat herd horses, the main features are live weight, growth and development of the body in length and width, development of the backbone. Based on this, we have conducted studies to elucidate patterns and relationships between the basic measurements and live weight of experimental animals, describing the growth and development of horses.

The results revealed a positive correlation between live weight and basic measurements of horses as the height at withers, body length, chest girth, and metacarpus. The highest correlation between the metacarpus and live weight, and the smallest between the height at withers and live weight. Thus, we were entitled to expect that the selection of young animals with the above measurements, the positive impact on the increase of their live weight.

The most productive and most effective selection expected by metacarpus, chest girth and body length, which amounted to the values given in Table 5.

Table 5. Correlation Between Body Measurements and Live Weight Herd Horses

The relationship of measurements	The correlation coefficient, x
1 the height at the withers – live weight	*+0,207 ± 0,16*
2 body Length – live weight	*+0,411 ± 0,14*
3 chest Girth, live weight	*+0,416 ± 0,14*
4 metacarpus – live weight	*+0, 623 ± 0,10*



As can be seen from the calculations made, there is a positive correlation between the basic measurements and live weight in 18-month-old crossbred calves. The highest positive correlation coefficient (+x) is observed between the measurements of the metacarpus and live weight, and the smallest correlation coefficient between the measurements of height at withers and live weight. The selection has virtually no effect on the selection at a height at the withers.

According to N. Anasini, (12) it is impossible to fully agree on the need for the selection of meat of horses only the magnitude of the metacarpus. The correlation coefficients of the metacarpus with the live weight varies greatly depending on the size and nature of the sample and statistical processing. Much more stable correlation is observed between the magnitude of the metacarpus and bone mass in the carcass. Breeding objectives are to improve the meat yield of pulp and the greatest possible reduction of the relative weight of the bones in the carcass, with the prerequisite of preserving the proportionality of tissue in the body and strength of constitution animals.

When breeding horses, the aim is improving meat quality and emphasis should be placed on creating intrabreed meat type. Since the main purpose of the breeding beef herd of horses is horse meat production, is of great interest to establish correlations between measurements, live weight, and carcass, which is the “proper” meat. Establishing such links will allow you to judge how effective it is to possibly select animals by one or other characteristics with the aim of obtaining the greatest amount of horse meat (Table 6).

Table 6. Correlation Between Body Measurements and Carcass Weight of Horses

The relationship of measurements	The correlation coefficient, x
1 Live weight – carcass weight	*+0,99 ± 0,004*
2 Height – carcass weight	*+0,25 ± 0,328*
3 the length of the torso – carcass weight	*+0,61 ± 0,220*
4 bust – carcass weight	*+0,91 ± 0,053*
5 metacarpus – carcass weight	*+0,56 ± 0,237*

As you can see, there is a positive relationship between all measurements, live weight, and carcass weight. The highest degree of confidence between the live weight - carcass weight and chest girth - carcass weight. High is also a correlation between the oblique body length - weight carcasses and metacarpus - carcass weight.

Thus, we can conclude that the selection of an increase in body weight can increase the yield of meat. This pattern is inherent in other breeds, which is confirmed by data slaughter Novoaltaysk x Kazakh first-generation hybrids and purebred Kazakh toad (Table 7).

Table 7. The Degree of Variability Contingency (Correlation) Guinea Young Horses at 18 Months of Age

The relationship of measurements	Breed	
	The toad (KT)	Hybrids (NA x KT)
Live weight – carcass weight	*0,99±0,004*	*0,99±0,001*
Height – weight carcasses	*0,25±0,30*	*0,66±0,28*
The length of the torso – carcass weight	*0,61±0,22*	*0,76±0,18*
Chest – carcass weight	*0,91±0,51*	*0,87±0,10*
Metacarpus – carcass weight	*0,56±0,24*	*0,69±0,23*

In practice of meat and horse breeding stallions made in the process of growth and development of a preliminary assessment at the age of 1.5; 2.5; 5.5 years and finally the accumulation of data on the quality of the offspring, it is important to have criteria for early prediction of their productivity, of which the main feature is the live weight. In this regard, we determined the correlation between the live weight of young stallions in 6-months and 18 months of age. The live weight of stallion toad at 6 and 18 months – 0.75±0.05; hybrids – 0.76±0.07. The foals grown in the horse herd at the steppe zone of Pavlodar region set a high degree of repeatability of live weight.

According to I.N. Nechaev, (13) with increasing age periods, the rate of recurrence is reduced, which is explained by the strong influence of their para typical factors of growth and development.

Therefore, identifying the predictive value of the increased live weight of young animals at the age of 6 and 18 months.

3.3 Milk yield of Kazakh and Novoaltaysk mares

The horses in Kazakhstan is not only meat but also dairy animals. Drinks made from mare's milk (kumis) is a drink not only in Kazakhstan. Among the features that characterize the economic value of the horse population, considerable importance is the milk production of mares.

The milk of mares contains more lactose and has a specific composition of protein and fat, very rich in vitamin C (ascorbic acid), has a unique set of mineral salts, trace elements, vitamins, and enzymes. Milk of mares has 1.3-1.5 times more milk sugar than in cow milk, which creates favorable conditions for lactic acid and alcoholic fermentation during processing in the Mare. Fat in Mare's milk is less than in cows, but its advantage is that it inhibits the development of TB bacteria, while they vigorously develop into fat cow's milk.

One liter of Mare's milk contains about 20 grams of protein, i.e. about as much as it is contained in 100 g of beef of average fatness. The milk of Kazakh mares on average contains sugar – 6.43%, fat – 1.82%, protein – 2.12%.

Features of Mare's milk also have vitamin and mineral composition. The total number of minerals in Mare's milk is 2 times less than in cow, but it has much more calcium, essential for the normal functioning of the nervous system and strengthen the bone tissue. Furthermore, calcium affects mineral metabolism in patients with tuberculosis and calcium salts promotes healing of tuberculous lesions.

Mare's milk is rich in fat-soluble (A, D, E) and water-soluble (C, group B, etc.) vitamins. A liter of Mare's milk contains on average the daily needs of an adult for vitamin C (70-100 mg), 1.5-2L – vitamin A (1.5 mg), and 100 g – vitamin B12. According to the content, vitamin C (ascorbic acid) is among the products of animal origin which the mare takes the first place. Vitamin C is used as a means of active chemoprevention of cancer, gives the body resistance to cancer.

Vitamin A delays the aging process and decay of the body. In one liter of Mare's milk, it contains 125 to 300 μg/L. Vitamin E has a preventive and curative property in atherosclerosis due to its ability to lower cholesterol in the blood.

The composition of Mare's milk contains antibiotic nisin which inhibits the development of the Tubercle Bacillus, therefore is used for the treatment of pulmonary tuberculosis. Possessing antibiotic properties, like penicillin, streptomycin kills putrefactive bacteria and E. coli or prevents them from multiplying. Before antibiotics, koumiss was the only means of treatment and prevention of pulmonary tuberculosis.

KKH "Turar" is also engaged in the milking and sale of koumiss through outlets in the city of Ekibastuz. Since 2007, 20 mechanized milking horses of Kazakh breed type toad were produced. Previously, the milking of mares in the farm is not practiced, and the domestication of mechanical milking of herd of wild horses was a complex process. To tame mares for milking, in the first three days, animals at several times during 1-1.5 hours are kept in the machines split, then released and let them with foals. On 4-5th day try to carry out hand milking when the electric motor is on in order that the Mare get used to the noise, and only on the 6th day, put the teat cups on the nipples for the first time

The first time, a separate mare had to be fixed on the back of the left leg, and the other was enough to hang on a rope around his neck or keep an eye on the level of the raised hand. After 10-12 days, the Mare began to get used to the new environment.

Observations have shown that a calm horse gets used faster to the noise of the engine of the milking machines and to the process of mechanical milking than animals with a more excitable nervous system.

The farm is set corresponding to the daily routine and milking interval.

A kind of Koumiss is prepared using the national fermented milk product "skin" made from cow's or goat's milk. Sourdough is specially prepared, held until signs of alcoholic fermentation, followed by low doses several times a day, add in fresh and mix thoroughly. After 6-9 days, koumiss leaven is ready.

Thus, prepared this way, Mare enjoys sufficient demand among the population.

Rationally organized koumiss is an important source of farm incomes. In this regard, we are also interested in imported milk from Novoaltaysk mares in comparison with Kazakh females. The study of the milk yield of Kazakh and Novoaltaysk x hybrids is not yet possible at this stage of the study, because its age is not possible. The study of milk yield of Novoaltaysk mares is of both scientific and practical interest since on the basis of these data it is possible to carry out an objective assessment of them as productive animals that are used as improvers of Kazakh horses. In this regard, the task was to indirectly examine the milk of Novoaltaysk mares breed imported to the farm "Turar" compared to mare's toad of the farm.

The research was conducted on the basis of the live weight of the experimental foals at birth, in months, since at this age the weight gain is due to the mother's milk. (According I.M. Goraczkowski, on the basis of the performed experiments with heavy-Kazakh hybrids, (14) the milk of mares in the first month of lactation was not significantly different from milk yield of mares, evaluated by the method of control milking). Calculation

of milk yield was carried out on the basis of milking accepted in horse breeding, consumption of 10 liters of milk per 1 kg gain in live weight of the foal. In 1937-1939, Professor V.P. Dobrinin in the study of milk yield of the horses adopted a method of weighing horses, they were asked to judge the milk yield of mares in body weight gain of foals in the first 1.5-2 months after birth, on the assumption that 1 kg of weight gain during this period foals use 10 liters of mother's milk. Growth of foals is determined by 5 milking Novoaltaysk mares and 5 mares of the Kazakh breed of toad. These data are shown in Table 8.

Table 8. Milking of Mares (n=5)

	foal Weight, kg		Gain for 30 days, kg	The average increase for a month, g	Allocated milk*/day
	At birth	In months of age			
Kazakh mares toad					
M±m	43,8	80,3	36,5	1,22	12,2
σ	45,0	78,8	33,8	1,13	11,3
sv	42,3	80,0	37,7	1,26	12,6
	45,0	77,7	32,7	1,09	10,9
	42,9	82,2	39,3	1,31	13,1
	43,8±0,54	79,8±0,75	36,0±1,21	1,2±0,04	12,0±0,40
	1,2	1,7	2,7	0,09	0,90
	2,8	2,1	7,6	7,5	7,5
Mares Novoaltaysk breed					
M±m	44,5	92,7	48,2	1,60	16,0
σ	44,0	88,3	44,3	1,48	14,8
sv	43,7	95,0	51,3	1,71	17,1
	43,8	85,4	41,6	1,39	13,9
	46,5	95,3	48,8	1,63	16,3
	44,5±0,52	91,3±1,9	46,8±1,7	1,56±0,05	15,6±0,56
	1,1	4,3	3,8	0,12	1,2
	2,6	4,7	8,2	8,1	8,1

Milk yield of mares in each breed varies widely, that is characterized by a high individual variability, which gives many opportunities to guide the selection. The study of milk yield of the experimental mares on the gain in live weight of the foal in the first months (1.2-2) of life show that the milk of mares of Novoaltaysk breed is higher than milk yield of Kazakh breed and an average of 15.6±0,56L, the Kazakh mares – 12.0±0,40 L.

In dairy breeding, the amount of milk per every 100 kg of body weight of a Mare is calculated, the so-called index of milk production, because the more milk an animal produces per unit of its mass, the better it pays to feed. Particularly important is the determination of the index of milk production on farms, where the practice of stables or stables-grazing horses and bearing of the high cost of feeding and maintenance of livestock.

According to M.S. Mironenko, A.M. Allegrina, O.I. Krasnova, M.K. Akhtaeva, P.V. Cherepanova, T.V. Ammosov, (15) the level of milk production of horses for the first 5 months of lactation did not significantly change (Table 9).

Table 9. Level of Milk Production of Mares of Different Breeds by Months of Lactation with Herd Content

Breed	Milk yield by month of lactation, l					Researchers
	1st	2nd	3rd	4th	5th	
Novoaltaysk	543	522	501	483	444	M. Mironenko
Kyrgyz	360	390	411	396	360	M. Mironenko
Logiska	375	393	352	245	152	A. Allauzen
Garbarska	376	394	334	286	216	M. Tokhtaev
Bashkir	386	381	351	280	208	O. Krasnova
Kazakh	480	480	460	430	370	V. Cherepanova
Yakut	369	322	328	288	236	T. Ammosova
Draft-Kazakh hybrids	530	540	530	510	420	V. Cherepanova

From Table 9 it follows that in mares during the first three months of lactation the milk yield is kept approximately at the same level, and only the fourth month it is observed a slight decrease. The level of milk production of mares in late lactation has not been studied, as almost everywhere milking mares stop in September, with the end of the koumiss season.

However, it is known that pregnant mare's lactation is considered to last 7-9 months and breastfeeding lasts more than a year, but the level of milk production in late lactation is low. To characterize milk productivity of mares on their daily milk yield, live weight was calculated and conditional indices of milk production for the 5 months of lactation are given in Table 10.

Table 10. Indices of Milk Yield of Mares, n = 5

Breed mare	Avg. live weight, kg	Avg. milking, L	Conventional milk*, L	Index of milk yield
Kazakh toad	412	12.0	1800	436.86
Novoaltaysk	493	15.6	2340	474.60

Note: *during 5 months of lactation

According to J.N. Barmintseva, (16) B.R. Akimbekova, (17) A. E. Zhumagulova, M. Omarova, A. A. Khamitova (18) the horses of the Kazakh breed toad, Bashkir, Novoaltaysk, heavy-Kazakh hybrids, index of milk production equal 560-680; Soviet and Russian heavy 410-440, the mares of trotting and horse breeds 260-400. In our current indicator, index of milk yield of hybrids is slightly higher than in mare's toad but has no significant difference. In General, hybrids have a higher yield which of course affects the intensity of the growth and development of young stock.

Milk yield of mares depends on many factors, one of which is breed. I. M. Goraczkowski, A.M. Atanasova (19) wrote that the daily milk yield of Kazakh mares varies from 10 to 20.5L and hybrids with a heavy-duty from 15 to 27.5 L.

V.N. Frankincense, L.P. Markushin, M. Sinitsin (20) working with mares of Soviet heavy draft breed, found their high milk productivity. So, on the first and second month of lactation, the daily milk yield was 18L. 3-4 months – 10L, 7-8 months – 8 L. For the entire 8-month of lactation, milking heavy draft mares ranged from 3500-5000 L.

V. Medvedev, V. Jaworski (21) in experiments on the productivity of mares of Soviet, Russian and Lithuanian heavy draught (n=10; 10; 17) for 8 times, the milking for 210 days of lactation milk yield amounted to respectively species: 2214,8; 2236,3; 2442 L, and the average for a day of 10.54; 10,64; and 11.63L. The absolute value of the milk production of the Russian Mare heavy draft breed is inferior to the Soviet draft, but the index of milk production per 100 kg live weight surpasses the Soviet draft horses. So, the Russian heavy-duty on 100 kg of live weight has 525 liters of milk, the Soviet heavy – 504 L. The Record of the Soviet heavy draft Rowan mares, (the Bard of Rojnica) for 348 days of lactation at the age of 7 years – 6173 L. Record Russian heavy draft mares Cohort – 5338 L. A. Remizov gives the data of the Lithuanian draught Mare AUX Biches, with record milk production in 7007L with the highest daily yield of milk – 31.3L.

All these facts mean that Novoaltaysk breed, having in their blood high genotypic potential of the Soviet, Russian and Lithuanian breeds can be improvers of the Kazakh breed and milk production, which is especially important due to the manifestation of heterosis in Novoaltaysk x Kazakh hybrids grown in Pavlodar region, milk production should manifest itself to an even greater degree than the original species.

3.4 Economic efficiency the results of the experiments

Economic efficiency management of cattle breeding is determined by the degree of competitiveness of their products. In herd horse breeding, these are the production and marketing of environmentally clean, enjoying high customer demand of high-quality diet of horse meat and koumiss.

Practice and horse breeding in our region showed the profitability of the organization even for short-term milking of mares and the production of koumiss. (29) To determine the milk yield of imported mares Novoaltaysk breed we organized 3 milking mares foaled in mid-April 2009. A month after parturition started hand milking. Milking was performed in the period of two months and by the end of the second decade of July, mares with foals are released into the General herd. Milking was performed 7 times, every 2 hours starting from 6 am to 18 PM, then mares with foals until morning was released in the pasture near the stables.

Within two months of milking (15.05 – 17.07.09.), it was necessary in 1278 liters of milk, the average daily milk yield is 7.1L per head per day. Milk of mares after technological processing in a day, koumiss were taken to be sold in retail chains of the city of Ekibastuz. If market sales price of koumiss is 250-300 T/L, the total amount of revenue is amounted to 319.5 thousand Tenge.

At the cost of feed of 310,0 thousand Tenge (hay – 10 thousand/t, bran – 18 THD/t, salt-lick – 3 thousand/ton) transport costs – 40.2 thousand Tenge, for the salary of a dairy farmer – 40.0 thousand Tenge, to Supplement the herd-groom – 20.0 thousand Tenge, the total amount of expenses for production and sale of koumiss was – 127.5 thousand Tenge. Thus, the net income from the sale of koumiss made 188.3 thousand Tenge.

On the basis of experimental data on the milk yield of mares in the period of scientific and economic experience, they estimated the economic efficiency of growing young horses of Kazakh toad (control) and crossbred with the Novoaltaysk breed calves (experience), grown under the same conditions year-round horse herd content. The increase of productive qualities of Kazakh horses Novoaltaysk x hybrids compared to those of purebred Kazakh horses type toad observed not only for meat but also for milk plays an important role in improving the Economics of the industry.

The superiority of the crossbred foals in terms of growth and development, meat quality over their peers from the control group provided higher rates of production in the experimental group (Table 11).

Table 11. Calculation of Economic Efficiency of Rearing Horses, 1 Goal in 18 Months of Age

Age	Live weight		The cost of growing-set, Tenge	The cost price of 1 quintal of live weight, Tenge	Profit, Tenge	Margin, %
	Kg	Cost, Tenge				
Novoaltaysk x Kazakh hybrids						
18	369	28080	7597	7597	67860	241.6
Kazakh type of toad						
18	298	77470	28080	9429	49390	175.9

Calculations show that the cultivation in the period from birth to 18 months of age of the crossbred calves is more profitable compared to cultivation of young growth of Kazakh horses' type toad. The amount of profit from cultivation of hybrids in the experimental group per head is 18,740 Tenge higher compared to the cultivation of young purebred of Kazakh breed type toad. The cost of 1 quintal of live weight gain from the crossbred calves in comparison with the toad is below in 1832 Tenge.

Novoaltaysk-Kazakh hybrids allow you to get more income from the first young head than the young toad. The most profitable for implementation of age management of young cattle for meat is at 6, 9 and 18 months. (30)

To increase the production of horse breeding in Pavlodar region under year-round grazing horse content, it is advisable to mix the local Kazakh mares with stallions of Novoaltaysk breed and to animals with a high meat productivity to ensure the region and in the whole of the Republic of valuable stallions' beef.

Data obtained in the experiments indicate that crossing the Kazakh mares with stallions Novoaltaysk breed greatly influenced the formation of meat productivity of crossbred animals. Revealed the superiority of the crossbred over purebred calves of the Kazakh type of toad, the weight gain, the number of meat and flesh and the index of meat and for adaptive qualities and biochemical composition of meat is not inferior to the toad.

Thus, to increase production and reduce production costs of horse breeding and for high quality, environmentally clean, treatment and prevention of horsemeat and koumiss, it is advisable to grow Novoaltaysk x Kazakh crosses at the first and higher blood composition, in conditions of year-round grazing horse content in the North-Eastern area of Kazakhstan. (31)

Along with the increase in meat productivity in commercial breeding, for improving the economic efficiency of the industry, is of great importance the condition of the breeding work of the farm. (32)

With the increase in reproduction level, breeding horses significantly increased the economic performance and marketability of the industry of horse breeding. In general, the increase in business output of foals per 100 mares causes a significant reduction in the cost of one foal at birth. Therefore, in order to enhance the marketability and economic indicators, it is necessary to pay attention to the increase in business output of foals by reducing idling and aborted ewes, as well as more rational use of breeding stallions.

4 Conclusion

The generalization of the results of the conducted research allows to draw the following conclusions:

1. The best implementations of meat forms of hybrids is affected by a significant increase in measurements of body: the length of the body, respectively, by 4.2 cm and 6.3 cm, chest − 13.2 cm and 11.6 cm higher than their peers in the control group; this, in turn, increases their indices of bone and massiveness, which are important indicators of meat productivity.
2. Young crossbred is characterized by better indicators of control slaughter: at 18 months of age, slaughter weight made 371.9 kg and 293.6 kg (or > at 78.3 kg at P > 0.001) and carcass weight, respectively, 194.7 kg 154.6 kg (or > to 40.1 kg for P > 0,001) than in the control heads of the toad.
3. Morphological composition of carcasses of crossbred calves testifies to their high meat qualities: yield pulp in their 18 months was 35.6 kg more than the toad and totaled 163.2 kg to 127.6 kg (P > 0.01) with no significant difference in the yield of bones and fat. Their meat had an increased content of essential amino acids (tryptophan to 110.3 mg % vs 100.4 mg %), and non-essential amino acids, on the contrary, decreased a little (hydroxyproline to 15.7 against 16.4), which improved protein quality indicator of meat (B. K. P.) - 6.39 against 6.72 mg/g protein nitrogen.
4. In terms of quality of fats in experimental animals revealed no significant difference: the temperature of the melting amounted in hybrids – 31.2°C, in toad – 31.8°C, iodine value of 92.6% and 92.3% respectively.
5. Analysis of biochemical parameters of meat, serum, dynamics of growth and development, assessment of General condition after the first wintering in the horse herd conditions of the region where it's grown confirms the proximity of the biological features of animals and evidence of high adaptive properties of the crossbred calves.
6. There was a positive correlation in hybrids (respectively from toad) between live weight and carcass weight +0.99 (+0.99), height at withers and weight of the carcass of +0.60 (+0.25), body length and carcass weight +0.76 (+0.61), chest girth and carcass weight +0.87 (+0.91) and the metacarpus and carcass weight, up +0.69 (+0.56), which can be used in breeding of young horses with the aim of improving meat productivity.
7. The amount of profit from growing crossbred calves up to 18 months of age is 67.8 thousand Tenge against 49.4 thousand Tenge/head.

5 Suggestions for production

1. Recommend crossing mares with stallions of Novoaltaysk breed type toad. Hybrids have increased vigor of growth, significant meat qualities and high adaptability to year-round grazing horse content.
2. Crossbred animals with well-expressed meat forms, well adapted to year-round grazing horse content need to be used for further selection and breeding work on the creation of local meat-type horses of Kazakh breed.

Literature:

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