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THE INFLUENCE OF BREEDING METHODS ON THE PRESERVATION AND IMPROVEMENT OF THE HORSES OF THE KUSTANAY BREED

ANNOTATION

The success of horse breeding is directly related to the organization of breeding. The article presents an analysis on improvement of breeding and sports features of horses of Kustanay breed in the process of development of breed from the moment of approbation. The aim was to determine the impact of the existing plant lines on the preservation and improvement of Artisanal horses. The estimation of stallions-producers on the quality of progeny was carried out and the applicants were determined as ancestors of new lines. To conduct research at the farm, three groups of young of different genotypes have been formed: I group of stallion-manufacturer Nauryztoy 9 (line 464 Neon), II group of stallion-manufacturer - stallion Preferans 5 (line 494 Forts) and III group - control (other lines). It has been found that the modern stock of horses of Artisanal breeds is characterized by superiority in the complex of features in the section of factory lines 464 Neon and 494 Forts over the peers of the control group - both on tribal and sports qualities. In this connection, stallions-makers: Nauryta 9 (512 Nag - 2146 Torquay 8) and Preferans 5 (525 Pegasus - 2101 Safari) on the assessment of the quality of the offspring correspond to the status of improving and can be assigned to lay two new lines in the bush horse breed.

The research was carried out within the framework of the scientific and technical program BR 10764999 “Development of technologies for effective management of the breeding process and conservation of the gene pool in horse breeding” 2021-2023 of the Ministry of Agriculture of the Republic of Kazakhstan.

Key words: *breeding, breeding methods, stallion manufacturer, type, exterior, performance, sports qualities*

Introduction. The success of the development of tribal horse breeding and sports horse breeding is directly related to the organization of skillful purposeful tribal breeding work, which will ensure the normal sale of products in an economic sense and, equally important, the conduct of effective breeding, which is significantly more complex in comparison with the breeding of other types of farm animals, and therefore more attention should be paid to the application of effective methods for improving horse breeds [1].

In recent years, the need for imported horse breeds has been increasing in Kazakhstan equestrian sports, and domestic breeds with prospects in this direction are experiencing a reduction in the number of breeding composition, a decrease in demand and interest in them. One of such valuable domestic breeds is the Kustanay, which is on the verge of extinction. The issue of increasing the number of horses is acute, and it must be solved in the shortest possible time, without delay, using the rich, centuries-old experience of tribal breeding methods and improvement [2].

Due to the historical peculiarities of the way of sports horse breeding, the following performance qualities are taken into account: agility, endurance, strong constitution, ability to quickly restore strength [3].

For a long time, after approbation in 1951, the Kustanay harness horse was widely used both for riding and in harness in agriculture, and more attention was paid to its use in equestrian sports. Thanks to many years of competent selection and tribal breeding work of specialists at the end of the fourth decade

of the XX century at the leading Kustanay stud farm (now "Kazakh Tulpariy" LLP), horses of the Kustanay breed fully satisfied the requirements for professional sports, as they had the correct exterior, strong constitution, endurance, efficiency, unpretentiousness with a balanced, calm temperament. The improvement of important features of the Kustanay breed in Soviet times was a success, but the period of independence of the Republic of Kazakhstan negatively affected the fate of the modern Kustanay horse. In the last decades of the 21st century, there has been a sharp reduction in the number of horses, which threatens the extinction of the breed as a breeding stock and the loss of one of the most valuable gene pool for the domestic horse breeding.

Taking into account the small number of members of the Kustanay breed, it is important to use every opportunity to preserve, increase the number and popularity of a unique, ancient domestic breed. Of course, it cannot be said that nothing is being done to revive the breed. In 2021, for the restoration, preservation and further improvement of the domestic harness horse breed, a "Road Map" for 2022-2027 has been developed and approved, which will draw additional attention to the domestic Kustanay horse breed and will contribute to the popularization of national equestrian sports.

One of the methods for preserving and further improving horses of the Kustanay breed is selection. A logical continuation of selection is selecting to correct undesirable characteristics of parents, combine valuable hereditary characteristics and their manifestation in future offspring. Selection and choice together constitute a breeding system, the practical methods of which shall be based on the general patterns of development of the optimal linear structure of the breed [4, 5, 6].

From the history of breeding and selection of farm animals, it should be noted that there are various forms of selection, such as mass and individual, unconscious and methodical, directional and stabilizing, direct and indirect, tandem, index, at independent levels, by individual characteristics, and others. Depending on the tribal breeding value of the mated individuals, improving and equalizing selection is distinguished, from similarities and differences between the mated individuals: homogeneous and heterogeneous, taking into account kinship – related and unrelated selection [4, 5, 7].

Working with the breed of farm animals of different species, it is necessary to purposefully use selection and choice. Since the basis for the selection of a breeding animal is the essence of the best parental genotypes. And the result of the genotype of the offspring, as a breeding animal, is revealed to one degree or another only by the end of its breeding use or even after its disposal. Therefore, according to many experts - leading breeders in horse breeding, it is possible not to wait for a direct assessment of the genotype, but to use for these purposes indirect, and hence to varying degrees probable methods of assessing breeding merits [8, 9, 10, 11].

At the moment, specialists and scientists of "Kazakh Tulpariy" LLP are actively involved in the development and implementation of a set of measures aimed at increasing the number of horses, increasing the intensity of tribal breeding, ensuring that the values of genetic (hereditary) shift of breeding traits for many generations to come are obtained at an early stage of growth and development of a horse. At the same time, special attention, as a factor influencing the effect of breeding in horse breeding, is paid to the combination of directional and stabilizing selection according to a set of traits due to the genotype: origin, type, measurements, exterior, performance [12].

In accordance with this, the goal was set to determine the impact of the established breeding lines on the preservation and improvement of the horses of the Kustanay breed. To solve the problem, the following tasks were set: to analyze the dynamics of breeding and sporting characteristics of horses of the Kustanay breed in the course of the evolution of the breed and to evaluate breeding stallions by the quality of offspring; to identify effective forms of selection and choice of the best breeding stallions as candidates for the formation of lines.

Research materials and methods. Research was carried out in the period of 2021-2023 on the basis of "Kazakh Tulpariy" LLP.

The objects of the study were the horses of the Kustanay breed for the entire period of the breed's development.

The materials of tribal breeding books for the entire period of improvement of the breed has been analyzed, including the main measurements: height at the withers, oblique length of the body, chest girth and pastern girth, as well as data on the working capacity and breeding use of horses of the Kustanay breed in the context of lines.

The main indicators of the expression of breeding and sporting characteristics were determined in the modern horse breed in the context of lines based on the results of assessing stud stallions for the quality of their offspring [13].

The assessment of sporting qualities was carried out on the basis of recommendations for the breeding and sports training of riding horses [14] and according to the instructions for the bonitation of tribal horses of breeding lines [15].

To track the results of the evaluation of stud stallions by the quality of offspring, three groups of young stock of different genotypes were formed: Group I of the stud stallion Nauryztoy 9 (line 464 Neon), group II of the breeding stallion Preferance 5 (line 494 Fort) and Group III – control group (other lines).

The research results were processed by the biometric method according to Merkuryeva E.K. [16] using the Microsoft Office Excel program.

Results and their discussion. During the period of improvement of the horses of the Kustanay breed from the moment of approbation in 1951 of the last century to the present time, there has been the use of these horses in such directions as breeding, sports and productive use. Throughout the studied period the requirements for animals, the level of development and equestrian sports, the scale of its spread changed, which impacted the methods of tribal breeding work in the leading stud farm of the country. During the selection and choice of horses in the producing stock, more attention was paid to such parameters as origin; type, measurements, exterior:elegance, size; endurance; performance: agility, jumping, correct movements at all paces, balance, endurance and good manners.

The most difficult period during the improvement of the Kustanay breed horses should be considered the last fifteen years: during this time, the number of total livestock of horses, as well as the participation of horses in equestrian sports, has significantly decreased. The structure of the breed composition also changed. This is due both to the loss of popularity of the Kustanay breed of horses among horse owners (due to the appearance of other breeds), and to the change in the number of the tribal breeding stock.

In order to determine the dynamics of the use of selection and choice based on a set of traits, characterizing the breeding and sporting qualities of horses of the Kustanay breed, we analyzed data for the period of testing and development of the breed at the present stage.

There were five main lines in the Kustanay breed – 30 Burelom, 45 Zaboy, 84 Zevs, 56 Diktor and 162 Torstnik. The line of 84 Zevs (main type) was the most widespread, 23% of the stock belonged to it; it was followed by the Zaboy line with an indicator of 15%; representatives of the lines of 30 Burelom (riding type), 162 Torstnik (main type) and 56 Diktor (riding type) had 7.8 and 9%, respectively. In 60-70, the Zaboy line became the leading one (33%), in 80-90. there is a change in the situation – the line 30 Burelom almost doubles its representation (from 7-11% to 23%), the influence of the lines 75 Zaboy and 84 Zevs drops sharply (to 5-12%), the lines 56 Diktor and 162 Trostnik retained the middle positions.

The absence of a permanent leader indicated changes in the direction of breeding work, i.e. a change in priorities in determining the type of horse desirable for breeding leads to a change in the leadership of the lines in the breed. During the approbation of the Kustanay breed, the selected characteristics were horse-drawn qualities (including traction power), which were shown by representatives of the line 84 Zebs (main type), partially by 75 Zaboy, then after 70's only frolic received the prevailing direction. This led to a focus on the top-type line - 30 Burelom. During the same period, a new line was laid in the breed – 464 Neon, also of the riding type. In the 90s, the formation of another riding type line was carried out – the 494 Fort line.

In the 2000s, three lines - 56 Diktor, 162 Trostnik and 75 Zaboy practically ceased to exist. Line 30 Burelom became the leading group - 21%. Two genealogical lines formed in the 80s and 90s also retained their presence. - 486 Triumpf and 494 Fort - 8% and 13%, respectively. Line 464 Neon had absolute numerical and qualitative superiority.

One of the important features in the breeding of horse breeds is the exterior of the horse, which has a great influence on performance. In the breeding structure of the Kustanay stud farm throughout the studied years, there were and are currently a large number of fairly large and correct-looking stallions and mares, which were widely used in breeding work to improve the breeding qualities of Kustanay horses, representatives of different types, breeding lines and brood families. It should be noted that since the beginning of the breeding of the Kustanay breed, the assessment of the exterior and constitutional features of full-aged horses has changed markedly, as shown in the Table 1.

Table 1 – Dynamics of measurements and indices of body built of horses of the Kustanay breed during the control period

	Measurements, cm	Indices of body built, %
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Group of horses	Height at the shoulder	Oblique Body Length	Heart-girth	Cannon bone girth	Of format	Of bone	Of blockiness	Of heart-girth
1951 (during approbation)								
Stallions	159,6	158,8	187	20,0	99,4	12,5	117,7	117,1
Mares	155,4	155,2	185,2	19,5	99,8	12,5	119,3	119,4
2000								
Stallions	160,2	159,6	187,4	20,4	99,6	12,7	-	-
Mares	157,4	156,1	185	19,5				
2022								
Stallions	163,3	162,5	188	20,6	99,5	12,6	111,6	121
Mares	160,3	158,8	185,6	20,1	99	12,5	116,8	115,7
Requirements for valuation instructions								
Stallions	160	-	186	20,5				
Mares	158	-	188	19,5				

So, according to Table 1 it follows that in comparison with the requirements of the valuation instructions (All-Russian Research Institute of Horse Breeding - 1991) [15], measurements of animals during recording periods exceed the breed standard.

Kustanay horses, due to their origin and due to the dramatic improvement in growing technology, training and testing, were distinguished by high endurance and speed. Kustanay horses are one of the fastest among half-blooded breeds and come second only to the Thoroughbred breed [17].

Analyzing the data of Table 2, it follows that the Kustanay breed is considerably superior to its speed to such breeds as the Budyonny horse [18,19, 20] and Akhal-Teke [21] and at all distances has a clear advantage over these breeds, with the exception of the Budyonny - at a distance 3200 m (3.29) is 0.01 fractions of a second less for horses of the Kustanay breed (3.30), and at a distance of 1000 m, the record for Kustanay horses is 0.00.3 less than that of the Akhal-Teke breed (1.04.1) and amounted to 1.04.4.

Table 2 – Records of horses of the Kustanay breed in comparison with other horse breeds (speed min., sec)

Breed	Distance, m												
	1000	1200	1400	1500	1600	1800	2000	2400	2800	3000	3200	4000	7000
Kustanay	1,04,4	1,14,0	1,27,0	-	1,40,6	1,54,4	2,07,4	2,34,7	3,06,0	3,19	3,30	4,37,0	8,18,8
Budyonny	1,06,0	1,14,4	1,34,2	1,36	1,43	1,54,8	2,09,9	2,35,9	3,19,6	3,19	3,29	4,40,0	8,25,5
Akhal-Teke	1,04,1	1,16,7	1,28,5	1,40,2	-	-	-	-	3,09,6	-	-	-	-
Thoroughbred breed	0,58,0	1,11,4	1,25	-	1,37	1,49	2,02,0	2,27,2	2,57,0	3,11,0	3,22,2	4,22,0	8,11

Thus, in terms of speed at distances of 1200 m, 1400 m, 1600 m, 1800 m, 2000 m, 2400 m, 2800 m, 4000 m and 7000 m, the Kustanay breed is in second place after the Thoroughbred horse.

These horses went through the entire test cycle - from 2 years to older age and showed the best results in the speed class. Year after year, the results for the horses' speed at the main distances improved, and if we add to this the excellent locomotion system, endurance, calm character, noble lines, then we can claim that we have a world-class breed. That is why a modern Kustanay horse, with results-oriented systems of rearing, education and training, will not be inferior in working capacity to horses of other half-bred and roadster breeds, and will surpass them in a number of distances.

Currently, Kazakh Tulpary LLP is working to appoint stud stallions as successors to factory lines formed in 1980-1990, such lines as: line 464 Neon and line 494 Fort.

In connection with this, we carried out a selection of offspring in the context of lines for breeding and sports qualities, which is based on the assessment of stud stallions for the quality of the offspring by ranking the offspring scores by the sum of ranks for type and origin, body conformation, measurements

and working capacity - based on the results of performances in flat racing, and during the training process - assessment of locomotory qualities.

The technique, accelerated by multifactor analysis, allows for the earliest possible assessment of young stud stallions not only by phenotype, but also by the level of development of sporting qualities in the offspring. In search of ways to solve this problem in a number of foreign countries (Germany, Poland), stallions and mares are tested not according to the results of racetrack tests, but according to the level of development of sports qualities identified during a short individual training at the age of 1.5-2 years [22, 23].

The ranking principle has significant advantages over the simple distribution of stallions by occupied places, since at the same time the assessment of a stallion depends on the severity of the trait in its offspring, and not on the number of assessable successors.

Table 3 presents an assessment of the offspring of the studied stud stallions from the lines: 464 Neon - stallion Nauryztoy 9 and 494 Fort - stallion Preference 5 in terms of the quality of the offspring, which was carried out based on the results of valuation the offspring according to several selected traits, allocated to two groups: Group I includes the traits: assessment of type, torso, limbs, measurements. Group II includes an assessment of the severity of sports qualities, each of which was assessed on a 10-point scale.

Table 3 – Dynamics of the assessment of the phenotype of the offspring in the context of breeds according to the first group of assessed traits, score

Torso (body)					Limbs (base)		Score	Stallion category
Head	Neck	Chest	Sides	Crupper	Front	Rear		
Group I Offspring of stallion Nauryztoy 9								
9,5±0,5	9,5±0,4	10,0	9,5±1,5	9,5±2,7	9,5±0,1	9,5±,8	9,5	Improver
Group II Offspring of stallion Preference 5								
9,2±1,2	9,5±3,1	9,0±0,3	9,2±1,8	9,5±1,3	9,5±0,5	9,5±,8	9,0	Improver
Group III Control								
8,5±4,2	9,0±2,8	8,5±0,5	8,0±2,6	9,0±0,5	8,0±0,8	8,5±1,7	8,0	Neutral

Based on the information in Table 3 - I and II groups of young stallions of Nauryztoy 9 received 9.5 points, and the group of stallions Preference 5 received 9.0 points. These indicators exceed the average level for young offsprings of other stallions taken into account in the control group III.

Table 4 continues the assessment of the studied offspring in terms of different genotypes by type and body conformation.

Table 4 – Dynamics of the intermediate assessment of the body conformation of the offspring in the context of lines according to the group I of assessed traits, score

Groups	Score for body conformation		
	M±m	δ	Cv
Group I classical distances (n=5)	7,5±0,13	0,52	6,92
Group II long distance (n=5)	7,5±0,16	0,52	7,01

From the data in Table 4 it can be seen that the young offsprings of group I trained for classical distances received an average score for body conformation (7.5±0.13), and for group II those trained for long distances (7.3±0.16), no significant difference was found between the compared groups.

Table 5 presents the summary results of the assessment of stud stallions for the quality of their offspring by type and body conformation.

Table 5 – Results of the final assessment by type and body conformation of the offspring in the context of lines according to the group I of evaluated traits

No.	Name	n=14	Score			Totalpoints	Rank
			Type	Body conformation	Measurements		
1	Nauryztoy 9	6	8	8	9	25	I
2	Preferance 5	8	8	8	9	25	I

Taking into account the obtained data of stud stallions based on the results of assessing the quality of the offspring by type and body conformation, according to the data in Table 6, it can be stated that the stud stallions occupy the following levels of excellence: The offspring of Nauryztoy 9 and Preference 5 are in the lead. During the assessment, the stallions received rank I - by category – improvers, elite class.

Table 6 presents the assessment of stud stallions based on the athletic performance of their offspring.

Table 6 – Results of assessment of the sports workingcapacity of the studied stud stallions, score

Group of horses Stallion name	Indicator						
	Locomotary characteristics						
	Number of steps per				Стильдвижения		Average score
	step	score	trot	score	Trot score	Gallop score	
Group I	32±2,5	9,3	17,4±1,8	7,5	4	4,5	6,3
Group II	30,5±2,4	9,0	18±3,5	6,5	4	4,6	6,0
Requirements for instructions	25-39	5-10	14-19	10-5	5	5	-

According to the data in Table 6, the offspring of stud stallions from the factory lines - 464 Neon and 494 Fort - meet these requirements for locomotary characteristics according to the instructions [15].

Conclusion. Throughout the course of the conducted research, it was established that in the process of assessing a set of traits based on zootechnical documentation, horses of the Kustanay breed for the entire period of its development were distinguished by the best breeding characteristics, not inferior to world breeds in terms of breeding and sporting qualities.

The results obtained by evaluating the breeding stallions in terms of the quality of offspring in the context of the factory lines 464 Neon and 494 Fort are superior over the peers of the control group - both in breeding and in the evaluation of the modern livestock in the context of the lines in terms of sporting qualities. In this connection, the breeding stallions: Nauryztoy 9 (512 Nag - 2146 Torki 8) and Preference 5 (525 Pegasus – 2101 Safari) are being improvers according to the quality of offspring and can be used to lay two new lines in the Kustanay breed of horses.

Taking into account the positive dynamics based on research results, two competencies have been developed:

- to preserve the modern linear structure of the Kustanay breed both in the near and far future, to use purebred breeding as the main method of breeding in combination with an effective form of stabilizing selection and homogeneous selection, which will significantly affect the implementation of the set goal and objectives of this scientific work;

- the horses of the Kustanay breed should again become in demand on the market as sports, as well as among private horse owners, equestrian schools and clubs, as one of the priority ways of development, contributing to an increase in livestock and popularization.

Summing up, it should be concluded that raising the problem of preserving and developing the Kustanay horse breed is timely and extremely necessary in the development strategy of tribal horse breeding in Kazakhstan, and, therefore, an important part in supporting the entire livestock industry.

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ТҮЙІН

Жылқы шаруашылығын дамытудың жетістігі селекциялық және асыл тұқымды жұмыстарды ұйымдастырумен тікелей байланысты. Мақалада сынақтан өткен сәттен бастап тұқымды дамыту процесінде Қостанай тұқымды жылқылардың асыл тұқымды және спорттық белгілерін жетілдіру бойынша талдау ұсынылған. Қостанай тұқымды жылқыларды сақтау мен жетілдіруге қалыптасқан зауыттық желілердің әсерін анықтау мақсаты қойылды. Асыл тұқымды айғырларды ұрпақтарының сапасы бойынша бағалау жүргізілді және үміткерлер жаңа желілердің ата-бабалары ретінде анықталды. Шаруашылықта зерттеу жүргізу үшін әртүрлі генотипті жас жануарлардың үш тобы құрылды: Наурызтой өндіретін айғырдың I тобы 9 (неонның 464-желісі), преферанс айғырының II тобы 5 (Форттың 494 – желісі) және III топ – бақылау (басқа сызықтар). Қостанай тұқымды жылқылардың қазіргі заманғы Саны бақылау тобының құрдастарынан – асыл тұқымды және спорттық қасиеттері бойынша 464 неон мен 494 бекіністің зауыттық желілері бойынша белгілер кешені бойынша артықшылығымен сипатталатыны анықталды. Осыған байланысты, өндіруші айғырлар: Наурызтой 9 (512 Наг-2146 Торки 8) және Преферанс 5 (525 Пегас – 2101 Сафари) ұрпақтарының сапасын бағалау бойынша жақсартушы мәртебесіне сәйкес келеді және қостанай жылқы тұқымына екі жаңа жол салу үшін тағайындалуы мүмкін.

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РЕЗЮМЕ

Успех развития коннозаводства напрямую связан с организацией селекционно-племенной работы. В статье представлен анализ по совершенствованию племенных и спортивных признаков лошадей Кустанайской породы в процессе развития породы с момента апробации. Была поставлена цель – определить влияние сложившихся заводских линий на сохранение и совершенствование лошадей кустанайской породы. Проведена оценка жеребцов-производителей по качеству потомства и определены претенденты, как родоначальники новых линий. Для проведения исследований в хозяйстве сформированы три группы молодняка разных генотипов: I группа жеребца-производителя Наурызтой 9 (линия 464 Неона), II группа жеребца-производителя – жеребца Преферанс 5 (линия 494 Форты) и III группа – контрольная (прочие линии). Установлено, что современное поголовье лошадей кустанайской породы характеризуется превосходством по комплексу признаков в разрезе заводских линий 464 Неона и 494 Форты над сверстниками контрольной группы – как по племенным, так и по спортивным качествам. В связи с чем, жеребцы-производители: Наурызтой 9 (512 Наг – 2146 Торки 8) и Преферанс 5 (525 Пегас – 2101 Сафари) по оценке качества потомства соответствуют статусу – улучшателей и могут быть назначены для закладки двух новых линий в кустанайской породе лошадей.

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