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## SELECTION AND BREEDING WORK WITH KAZAKH HORSE TYPE ZHABE IN PEASANT FARMS OF KAZAKHSTAN

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### **Abstract**

The article clarify the status of meat herd horses in farms of different forms of ownership in different natural and climatic zones of the Republic of Kazakhstan. The numerical composition of purebred horses of the Kazakh breed of the Zhabe type bred in the farms is analyzed.

The purpose of this scientific work is to improve the breeding and productive qualities of Kazakh breed horses of Zhabe type in the horse farms of Karaganda, Zhambyl and Pavlodar regions.

The novelty of the work is the development of the method of selection and breeding work to preserve and improve the heterozygosity of the Kazakh horse breed, with intensive breeding on a set of breeding traits.

The characteristics of the studied animals in 2010 and 2015 are given: the Seleti breeding type with three breeding lines: Braslet, Zadorny, Pamir, and Zymyran 101-76 line. A comparative study of average measurements, body weight and indices was carried out. In the basic farms of purebred Kazakh horses of Zhabe type, the animals of elite class made up 33,1%, the first class - 42,6%, the second class - 24,3%. All main stallions-producers of the farms (n=73) were assigned to the elite class. The results of the bonitation indicate the consolidation of breeding qualities and the sufficiency of the animals for further breeding work.

**Key words:** horse lines; breeding type; productive breeding; Zhabe type.

## **Introduction**

Nowadays, the horse breeding work is carried out systematically and purposefully with wide use of the achievements of science and best practices. The main aim of breeding work is to improve the breeding and productive qualities of the respective breeds. Breeding work involves not only the improvement of existing, but also the creation of new, highly productive breeds, lines and families. This requires good knowledge of breed structure, exact and full account of breeding horses of meat and dairy direction of productivity, evaluation of stallions-producers by quality of progeny, holding comprehensive bonitation, strict selection and scientifically grounded selection of pairs, wide use of the most valuable producers for expanded reproduction of breeding stock and perspective plans of breeding and pedigree work.

Breeding work is a complex of interrelated zootechnical and organizational measures aimed at improving the hereditary qualities of horses, producing offspring by using appropriate methods of breeding, selection and selection of animals with the highest productivity and the ability to transfer valuable economically useful features to posterity.

Properly organized breeding work allows to maintain the valuable properties of the progenitor line producers in the offspring, to preserve the qualities of outstanding animals and to protect lines from undesirable signs [1, p. 318-324].

In modern conditions of market economy, the productivity of farm animals is particularly acute. At present, with the growth of competitiveness in domestic productive horse breeding, continuous directed improvement of the Kazakh horse breed of Zhabe type is carried out. The Kazakh horse of Zhabe type is the national property of our republic, having scientific, economic, economic, historical, national-cultural value. Its genetic resources are too valuable not to be neglected. The Kazakh horse of the type Zhabe is one of the major offspring in the Kazakh breed, bred by many years of purposeful folk breeding, characterized by its multiplicity and prevalence almost all over the territory of the republic. The main purpose of breeding horses of the Zhabe type is to produce high-quality meat and milk with year-round grazing. It is known that the meat and milk productivity of a horse depends on the breed and individual

features of the animal, as well as feeding and housing conditions. In this connection, methods of raising productive indicators of horses by improving their hereditary qualities through selection and formation of new lines of stallions-producers of Kazakh horses of a type Zhabe is a specially actual problem at present time and in prospects [2, pp. 24-27].

Horses of certain lines should stand above the indicators of average level in the breed by their breeding quality and economic and useful traits. Widespread distribution of valuable lines, mainly through high-value producers has a positive effect on the breed as a whole. This is the main point of breeding horses by lines as the highest form of pedigree breeding and is by right the most effective

### **Materials and methods**

There are three methods of improving the quality of the horse stock in productive horse-breeding: breeding work with local horse breeds, taking into account the specifics of year-round grazing herds, organization of crossing of local mares with stallions of factory breeds to produce high-quality mixtures and establishing new lines of stallions-producers of meat and dairy direction of productivity. When breeding new lines of stallions-producers, which are used as improvers in productive horse breeding, the observance of new requirements for high body weight, quite high milk yield and adaptability to local climatic conditions of the obtained progeny should be taken into account.

Since the beginning of 1960 the breeding work with horses of the

method of improving the breed [3, p. 8-10. 4, p. 21-23. 5, p. 18-20].

The novelty of the work is the development of the method of selection and breeding work to preserve and improve the heterozygosity of the Kazakh horse breed, with intensive breeding on a set of breeding traits. Scientifically substantiated selection and breeding work stipulates the increase in number of breeding groups of stallions and mares of Kazakh horses which kept valuable biological, economically useful signs peculiar to the breed such as body weight, high meat productivity (250-280 kg) with 57-59% slaughter output, daily milk yield from 15 to 17 liters and output from 80-90% of foals per 100 heads of mares.

Zhabe type was carried out on the basis of breeding of massive animals with good meat forms. The purebred breeding method was taken as the basis. Improvement was carried out by purposeful reproduction, breeding and wide use of the best by origin, exterior, efficiency of individuals, their adaptation to all-year-round pasture and husbandry and strict culling of the animals which were the worst by these features. Targeted selection of breeding horses was facilitated by annual bonitation of animals according to the set of breeding traits [6]. The selection of high-value horses by origin and typical physique was based on knowledge of the composition of the population, genetic and phenotypic features of outstanding stallions and mares, which have a great influence

on the development of the offspring of Zhabe horses. The main breeding traits were: body measurements, correctness of exterior articles, good adaptability to all-year-round pasture and heifer breeding, high fecundity of mares.

## Results

Since 2008 the selection-breeding work with the Kazakh horses of Zhabe type has been conducted in farms "Baituyak" and "Abu" of Karaganda region and farm "Kalka" in Zhambyl region. In these farms the stallions-breeders purchased from the peasant farm "Senim" were used. These farms are also reproducers of the Kazakh horses of the Zhabe type. In the process of directed selection-

breeding work, highly productive genotypes of Kazakh Zhabe horses are created.

According to appraisal conducted in 2020, on all farms 308 heads (33,1%) of 930 mares were classified as elite, 396 heads (42,6%) as class I and 226 heads (24,3%) as class II. All sire stallions numbering 73 stallions met the requirements for elite class. The presented data allow us to say that the appraisal of mares and stallions, according to the main appraisal features is rather high and equal. This indicates the effectiveness of comprehensive breeding in these farms and the presence of horses with consolidated breeding qualities (Table 1).

Table 1 - Class composition of Kazakh horses of the Zhabe type by farms.

| Farms    | Stallions | Mares | Elite |      | I-st grade |      | II-nd grade |      |
|----------|-----------|-------|-------|------|------------|------|-------------|------|
|          |           |       | n     | %    | n          | %    | n           | %    |
| Senim    | 32        | 400   | 164   | 41,0 | 186        | 46,5 | 50          | 12,5 |
| Baituyak | 11        | 200   | 60    | 30,0 | 90         | 45,0 | 50          | 25,0 |
| Abu      | 10        | 150   | 39    | 26,0 | 57         | 38,0 | 54          | 36,0 |
| Kalka    | 20        | 180   | 45    | 25,0 | 63         | 35,0 | 72          | 40,0 |
| Total    | 73        | 930   | 308   | 33,1 | 396        | 42,6 | 226         | 24,3 |

Average indicators of measurements and body weight of adult stallions and mares of Zhabe type horses on peasant farms meet the requirements of the instruction on rating of local horses (Table 2).

Table 2 - Average measurements and body weight of Kazakh Zhabe type horses on peasant farms

| Farms      | Sex       | Quantity | Measurements, cm |                      |                     |                    | Body weight, kg |
|------------|-----------|----------|------------------|----------------------|---------------------|--------------------|-----------------|
|            |           |          | Withers height   | Oblique torso length | Chest circumference | Heel circumference |                 |
| «Senim»    | Stallions | 32       | 147,0            | 151,5                | 181,3               | 21,0               | 482,5           |
|            | Mares     | 400      | 142,5            | 147,6                | 179,3               | 19,0               | 440,5           |
| «Baituyak» | Stallions | 11       | 146,0            | 152,0                | 180,1               | 20,0               | 475,5           |
|            | Mares     | 200      | 142,2            | 148,1                | 178,5               | 18,5               | 438,0           |

|                  |           |     |       |       |       |      |       |
|------------------|-----------|-----|-------|-------|-------|------|-------|
| «Abu»            | Stallions | 10  | 145,5 | 151,6 | 179,4 | 19,5 | 468,2 |
|                  | Mares     | 150 | 141,6 | 147,5 | 177,8 | 18,2 | 431,5 |
| «Kalka»          | Stallions | 20  | 146,5 | 152,4 | 178,5 | 19,8 | 466,4 |
|                  | Mares     | 180 | 141,5 | 146,8 | 176,5 | 18,4 | 425,5 |
| Average by breed | Stallions | 73  | 146,2 | 151,8 | 179,8 | 20,0 | 473,1 |
|                  | Mares     | 930 | 141,9 | 147,5 | 178,0 | 18,5 | 433,8 |

The height at withers averaged 146,2 cm for foals, 151,8 cm of oblique torso length, -1 79,8 cm of chest circumference, 20,0 cm of metacarpal circumference and 473,1 kg of live weight, while mares have 141,9, 147,5, 178,0, 18,5 cm and 433,8 kg, respectively. The sire stallions used in the farms are rather large, massive and exceed the standard of the breed in terms of body measurements.

The highest height at withers is 147,0 cm for stallions from "Senim" farm

and the lowest one from "Abu" farm - 145,5 cm. A similar picture is observed in terms of the girth of the metatarsal, but there are no noticeable differences in other measurements. Average measurements of uterus of "Senim" mares were higher compared to those of "Kalka" farm, representatives of the remaining two farms had an intermediate position.



Stallion of Kalka farm Atasu 17-17, body weight 476 kg.

The average indices of measurements and body weight of adult stallions and mares of the Zhabe horses, in comparison with the standard of the breed are shown in Table 3.

Table 3 - Comparative characteristic of the constitution of horses of Zhabe type with the standard of the breed

| Scores                               | Stallions      |                  |              | Mares          |                      |              |
|--------------------------------------|----------------|------------------|--------------|----------------|----------------------|--------------|
|                                      | Breed standard | Stallions (n=73) | Result, +, - | Breed standard | Horse trains (n=930) | Result, +, - |
| Withers height, cm                   | 143            | 146,2±0,59       | +3,2         | 140            | 141,9±0,46           | + 1,9        |
| Oblique torso length, cm             | 148            | 151,8±0,61       | +3,8         | 146            | 147,5±0,54           | +1,5         |
| Chest circumference, cm              | 177            | 179,8±0,68       | +2,8         | 175            | 178,0±0,57           | + 3,0        |
| Heel circumference, cm               | 19,0           | 20,0±0,11        | +1,0         | 18,0           | 18,5±0,08            | +0,5         |
| Weight, kg                           | 430            | 473,1±5,09       | +43,1        | 410            | 433,8±4,62           | +23,8        |
| Massiveness index, kg/M <sup>3</sup> | 147,3          | 151,4            | +4,1         | 149,6          | 151,8                | + 2,2        |

The data in Table 3 show that the average measurements and body weight of the mares exceed the standard of the breed: chest circumference by 1.0 cm, heel circumference by 0.5 cm, body weight by 13.8 kg. There is some decrease in the withers by 0,1 cm, oblique length of the body by 0,5 cm. The stallions exceed the standard of the breed respectively by 1.8-2.8 cm

### Discussion

The Horse Breeding Department of the Kazakh Research Institute animal husbandry and fodder production has been conducting scientifically-based breeding work with Kazakh horses of the Zhabe type for many years, i.e. identifying individuals with high genetic potential and creating factory lines based on them. For the full-scale development of herd horse breeding

and 33.1 kg. According to the massiveness index stallions have a higher index by 4,0 and mares by 5,3 kg/m<sup>3</sup>.

The selection of stallions and mares, which are close to the conditional average of the variation series (standard) by the sum of the normalized deviations of body measurements, provides the optimum indices of all breeding traits.

and improvement of breeding and productive qualities of horses, it is necessary to carry out breeding work with horses of local breeds. Selection and breeding work with Kazakh horses of the Zhabe type in the breeding farm "Senim", the former state farm "Aktau" of the Zhanaarkinsky district of the Karaganda region was started in 1980.

Kazakh horses of the Zhabe type, which were available on the farm were characterized by low growth, broad-bodied exterior, characteristic of steppe horses. The height of mares at the withers averaged 136.5 cm. In 1971-1972, to improve the breeding and productive qualities of the livestock of line horses, mares and stallions were purchased from the Mugalzhar stud farm from Aktobe region, where breeding work was carried out by Yu.N.Barmintsev, A.I.Belyaev [7, pp. 6-13. 8, pp.39-41]. At the initial stage of selection and breeding work (1971-1972), the mass selection was used. It was conducted on the following grounds: taking measurements, studying the type of physique, body weight, adaptive qualities. During this period, along with mass selection, individual selection was already carried out. The selection of animals was carried out according to a set of characteristics, culling animals with low body weight and unsatisfactory adaptability to herd maintenance. As a result of selection and breeding work by 1997 purebred mares of Kazakh horses of the Zhabe type already had higher measurements (140,5-146,4-176-18,5 cm) and body weight (425 kg).

In the subsequent years (1997-2012) during working with horses in "Senim" farm, special attention was given to selection of parental pairs taking into account their phenotype and genotype. The selection of mares to stallions was aimed at fixation of wide-bodied, massive build, high adaptability to pasture-tramps and at development of such properties as growth and body weight. To consolidate these desirable traits, the

best mares were assigned to the best sires.

In 2015, in the conditions of Central Kazakhstan on the breeding farm "Senim" located in Zhanaarkin district of Karaganda region, a highly productive breeding line Zymyrana 101-76 (patent No.600) was created and tested. Stallions of the given line were characterized by the height at withers (146,1 cm), length of a body (152,9 cm) i.e. which exceeded a height at withers on 6,8 cm, the large chest circumference(186,7 cm), on boneiness (20,1 cm), high body weight (481,5 kg) and massiveness (massiveness index 154,8). In the mare, these indicators respectively were 142.8-150.6-182.7-18.8-457.3 kg and massiveness (157.1).

Currently, the line Zymyran 101-76 has left numerous offspring: 6 grandchildren, 11 great-grandchildren, 11 great-great-grandchildren. The descendants of the horses of the line Zymyrana 101-76 are characterized by the proportionate body head; the short muscular neck; the long deep body; the muscular croup; the strong dry, rather short legs with strong hooves. An important quality of the offspring is high body weight, regularity of build and massiveness (Figure 1). The genetic potential in body weight of stallions reaches 530 kg, and in mares 485 kg [9, p. 105-110]. At the present time 20-25 stallions of Zymyrhan's line stallions at the age from 1,5 till 5,0 years old are sold to commodity farms annually.

The following stallions are continuers of Zymyran line: Sholak 21-02 with parameters of measurements and body weight equal 146-156-190-19,5-



508 kg, the breeding stallion Altynker 11-04 had 492 kg of body weight; Jenil 17-06 had measurements and body weight 145-155-186-19,5-515 kg respectively.

Similar research work is being carried out in the Pavlodar region. Research breeding and pedigree work with Kazakh horses of the "Zhabe" type with year-round pasture-to-be husbandry by purebred breeding and purposeful selection and selection, in 2010 in Northeast Kazakhstan in the stud "Altai Karpyk Saidaly Sarytoka" was created and tested "Seletinskaya" breeding type horses with three breeding lines: Braslet, Zadorny, Pamir. The average dimensions and body weight of the Seletti breeding type were 145.2-1451.5-184.3-19.5-461.4 kg for stallions, and 143.1-149.3-180.2-18.5-447.1 kg for mares respectively [10, p. 112-125, 11 p. 52-69, 12 p. 48-51].

The mares of the Seleti factory type exceed the original experimental group of 1970 in withers height by 6.6 cm, oblique length of the body by 8.2 cm, chest circumference by 9.0 cm, and in body weight by 66.7 kg. The stallions of the Seleti factory type increased their height at withers by 6.1 cm, oblique torso length by 6.2 cm, chest circumference by 11.7 cm, and body weight by 48.8 kg, respectively. The stock of stallions and mares of the Seleti factory type of Kazakh horses differs from the initial groups of horses by high body weight [13, p. 47-56, 14, p. 146-160, 15, p. 5-8]. Previous studies on Zhabe horses focused on the preservation of the breed, the characterization of genetic diversity, and the study of meat productivity along with

morphobiochemical indicators [16, pp. 11-13, 17, p. 59, 18, pp. 169-173, 19, pp. 92-99, 20, pp. 169-172].

Purposeful breeding of horses of the Zhabe type began in 1931, the formation of the breeding nucleus took place in 1934-1936. The breeding work was aimed at preserving the appropriate horses of the Zhabe type, its valuable constitutional features with a simultaneous increase in their growth, improvement of certain articles of the body of their exterior. For this purpose, the Embensky stud farm was organized in the Temir district of the Aktobe region (nowadays - "Mugalzhar-99" LLP).

The herd was equipped with mares purchased from the local population and accepted from the Temir Agricultural Experimental Station. Eleven typical stallions were selected out of the diverse herd. They have made the pedigree nucleus of the Kazakh horses of the "Zhabe" type. The main attention during the breeding was paid to the large size of horses, the correctness of exterior articles, adaptability to all-year-round pasture keeping and high fertility of breeding stock. Four stallions - Zamok, born in 1927, Pisatel, born in 1928, Berkut, born in 1929 and Zaur, born in 1929 were ancestors of genealogical lines. As a result of breeding work by 1953 purebred mares of the Zhabe type had larger measurements than those of their ancestors. They possessed good health and the ability to acclimatize quickly in all natural-climatic zones of our country - from steppe, semi-desert zones to northern regions of the Republic. With year-round

grazing they produced cheap, highly nutritious products - horse meat, mare's milk [21, p. 263, 22].

Breeding farms of Kazakhstan are working to increase the number of linear horses of the Kazakh breed of the Zhabe type. Targeted selection and pedigree work to improve the

### **Conclusion**

The high demand of the local population for horse breeding products, as well as the availability of large tracts of natural pastures suitable for breeding horses in all regions of the republic contributes to the development of horse breeding in the republic. Improvement of productive and adaptive qualities of the Kazakh horse breed is carried out by selection and breeding of highly productive lines.

At present, certain positive results have been achieved. The analysis of the effectiveness of the purebred breeding method by lines, while preserving and improving the various inbreeding types of the Kazakh horse breed makes it possible to establish the specific features of the breeding process with lines with a limited gene pool of animals.

The analysis lines in local purebred Kazakh horses of the "Zhabe" type shows that their main breeding nucleus is concentrated in the stable "Senim" and the stud "Altai Karpyk Saidaly Sarytoka", where the purposeful selection and breeding work on a scientific basis is carried out.

Thus, science-based breeding research with the Kazakh horse breed ensures high efficiency of the ongoing work for the development of the horse breeding industry.

In the future, purebred breeding and increasing the number of pedigree horses of the Kazakh breed in affiliated farms of Kazakhstan will contribute to maintaining the intra-breed diversity of the gene pool in the whole industry.

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## **ҚАЗАҚСТАННЫҢ ШАРУА ҚОЖАЛЫҚТАРЫНДАҒЫ ЖАБЫ ТИПТІ ЖЫЛҚЫЛАРЫНА ЖҮРГІЗІЛГЕН СЕЛЕКЦИЯЛЫҚ - АСЫЛДАНДЫРУ ЖҰМЫСТАРЫ**

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### **Түйін**

Қазақ тұқымды мал шаруашылығымен ғылыми негізделген селекциялық-асылдандыру жұмыстары, нарықтық қатынастардың өзгеру жағдайында, оны жетілдірудің қажетті тиімділігін, сонымен қатар өнімділігі жоғары жылқы

малының өсімін сақтау мен көбейтуді қамтамасыз етеді. Асылдандыру жұмыстың мақсаты-Қарағанды, Жамбыл және Павлодар облыстарындағы жылқы шаруашылықтарында қазақы тұқымды жабы типті жылқылардың асыл тұқымдық және өімділік қасиеттерін жақсарту. Селекциялық белгілердің кешені бойынша қарқынды селекция кезінде қазақ жылқы тұқымының гетерозиготалығын сақтау және арттыру бойынша селекциялық-асыл тұқымдық жұмыс әдісін әзірлеу жұмыстың жаңалығы болып табылады. Отандық қазақы жылқы тұқымын жан-жақты сақтау керек, өйткені оның республикадағы жылқы шаруашылығының генофонды үшін маңызы зор. Жаңа зауыттық аталық ізді жылқылардың төлдерін өсіру асыл тұқымдылық жағынан құнды және жас малдарды сатып өткізу кезінде экономикалық жағынан тиімді болып шықты. Республикада жылқы шаруашылығының дамуына жергілікті халықтың жылқы шаруашылығы өнімдеріне деген сұранысы жоғары, сондай-ақ еліміздің барлық аймақтарында жылқы өсіруге қолайлы табиғи жайылымдардың кең аумақтарының болуы ықпал етуде. Жабы типті қазақ жылқылары үшін жыл бойына табиғи жайылымдарды пайдалана отырып, арзан жылқы ет өнімін өндіру мақсатында өсіріледі. Жалпы базалық шаруашылықтарда қазақы тұқымды жабы типті жылқылар саны-930 бас бие, оның элитасы-33,1%, бірінші класы-42,6%, ал екінші класы-24,3% құрады. Шаруа қожалықтарындағы барлық негізгі өндіруші айғырлар саны-73 бас, оның барлығы класы элитаға жатқызылды. Бағалау көрсеткіш нәтижелері бойынша, селекциялық-асыл тұқымдық сапасы мен мал басынының жеткіліктілігіне орай одан әрі селекциялық-асылдандыру жұмыстарды жүргізуге болатындығын көрсетеді.

**Кілт сөздер:** жылқы аталық із, зауыттық тип, өнімді жылқы шаруашылығы, жабы типі.

## **СЕЛЕКЦИОННО-ПЛЕМЕННАЯ РАБОТА С КАЗАХСКИМИ ЛОШАДЬМИ ТИПА ЖАБЕ В КРЕСТЬЯНСКИХ ХОЗЯЙСТВАХ КАЗАХСТАНА**

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### **Аннотация**

В статье рассматривается состояние мясных табунных лошадей в хозяйствах разных форм собственности в различных природно-климатических зонах Республики Казахстан. Проанализирован численный состав чистопородных лошадей казахской породы типа жабе разводимых в хозяйствах Республики. Целью племенной работы является улучшение племенных и продуктивных качеств лошадей казахской породы типа жабе в коневодческих хозяйствах Карагандинской, Жамбылской и Павлодарской областей. Новизной работы является разработка метода селекционно-племенной работы по сохранению и повышению гетерозиготности казахской породы лошадей, при интенсивной селекции по комплексу селекционируемых признаков. Приведена характеристика лошадей выведенных и апробированных в 2010 и 2015 годах: селетинского заводского тип с тремя заводскими линиями: Браслета, Задорного, Памира, а также линии Зымырана 101-76. Проведено сравнительное исследование средних промеров, живой массы тела лошадей и определение индексов телосложения на нынешнем этапе разведения. В базовых хозяйствах чистопородных казахских лошадей типа жабе численностью 930 голов кобыл, животные класса элита составляли 33,1%, первого класса- 42,6%, второго класса -24,3%. Все основные жеребцы-производители хозяйств (п=73) отнесены к классу элита. Результаты бонитировки указывают на консолидацию селекционно-племенных качеств и достаточность поголовья лошадей для дальнейшего ведения селекционно-племенной работы.

**Ключевые слова:** линия лошадей; заводской тип; продуктивное коневодство; тип жабе.