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ЛЬВІВСЬКОГО НАЦІОНАЛЬНОГО УНІВЕРСИТЕТУ ВЕТЕРИНАРНОЇ МЕДИЦИНИ ТА БІОТЕХНОЛОГІЙ імені С. З. ҐЖИЦЬКОГО

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вул. Пекарська, 50, м. Львів, Україна, 79010
тел. +38 (032) 2392622, +380681362054
E–mail: admin@vetuniver.lviv.ua, bvh@ukr.net

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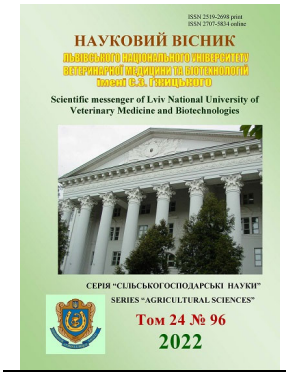
Editorial address:
Stepan Gzhytskyi National University of Veterinary Medicine and Biotechnologies Lviv,
79010, Lviv, Pekarska str.,50
tel. +38 (032) 2392622, +380681362054
E–mail: admin@vetuniver.lviv.ua, bvh@ukr.net



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The state of the horse breeding industry and the evaluation of horses at the state enterprise dibrivka stud farm 62

H. Ohorodnichuk✉

Vinnytsia National Agrarian University, Vinnytsia, Ukraine

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Vinnytsia National Agrarian University, Soniachna Str., 3, Vinnytsia, 21008, Ukraine.
Tel.:+38-097-449-63-31
E-mail: ohorodnichukhalina@gmail.com

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Preservation of genetic resources of the horse breeding industry at the State Enterprise Dibrivka Stud Farm is currently relevant, as there is a reduction in the number of valuable breeds of horses and the destruction of their gene pool in Ukraine. The purpose of the work was to research the state of the horse breeding industry and to conduct a quality assessment of horses at State Enterprise Dibrivka Stud Farm 62, Dibrivka village, Myrhorod district, Poltava region, in order to establish effective operation of the enterprise. State Enterprise Dibrivka Stud Farm 62 breeds the Orlov Trotter, Russian Trotter and Novoolexandrian Draught breeds. It was observed that stallions and mares (their height at the withers, length of the body, chest circumference, cannon bone circumference) of the Orlov Trotter breed, Russian Trotter breed and Novoolexandrian Draught breed correspond to the elite class and mostly predominates it in breeding value and economic purpose of stallions and breeding mares at the horse farm. At State Enterprise Dibrivka Stud Farm 62 the population of stallions and mares received a high rating by the main points (origin, type, exterior, and measurements); it was 5.5–9. It indicates a high genetic potential of the herd and a purposeful breeding work with it. It is necessary to improve the feeding of horses (increase the supply of good quality hay, concentrated feed, diversify the diet of breeding stallions, improve the condition of pastures) in order to use the genetic potential of animals effectively.

Key words: *Dibrivka Stud Farm, grading, stallions, mares, population, keeping, feeding.*

Introduction

State Enterprise Dibrivka Stud Farm 62 has unique genetic resources of breeding horses of the Orlov Trotter, Russian Trotter and Novoolexandrian Draught breeds. However, the number of breeding horses is declining from year to year despite its uniqueness.

Scientific and technological progress, the profitability of breeding horses for meat and other products, the development of equestrian sports in Ukraine gives grounds to claim that the development of horse breeding in the public sector is not a priority. Horses have lost their value as the main draft animals in the agricultural sector, horse breeding products are expensive for the average consumer, the consumption of these products is not traditional for Ukraine. Gambling is prohibited. As a result, the obtaining income from the participation of horse racing is impossible.

Horse breeding has become unprofitable. Demand for horse breeding products has decreased. This has reduced the commercial interest of both pedigree buyers and investors. Horse farms have large losses from the breeding industry. As a result, they are constantly reducing livestock (Hadzalo et al., 2016; Suprun, 2020).

It is necessary to improve the selection and breeding work (Denny, 2017; Al Abri et al., 2021), to create the necessary conditions for feeding and keeping horses and to attract state support to get the horse breeding out of the current conditions.

Stud farms and breeding farms play a leading role in improving horse breeds and improving the quality of horse breeding (Clayton, 2016; Shih, 2019; Musiał et al., 2019; Muñoz et al., 2021). They are the main suppliers of breeding stallions, mares, and foals. It should be noted that the share of horse breeding is very low; it is only 1.2 % of the total horse population. That's why the population of valuable horse breeds is reduced, the general

gene pool is depleted, some horse breeds are lost (Tkachova, 2011).

According to Leonid Posternak (Posternak, 2017), Dibrivka Stud Farm is one of the basic farms of the Orlov Trotter, these horses were ridden by kings. For example, in 2008 Russia was represented by a stallion Aphorism born in Dibrivka at the competitions in Vincennes (France). It was prepared in Odessa. When the trotters ran, the collection from the tote was 34 thousand euros. 5 million euros were offered at auction for some horses of the Russian trotter breed from Ukrainian stud farms.

Nowadays the issues of preservation of genetic resources of horses and effective work of State Enterprise Dibrivka Stud Farm 62 remain unresolved.

The horse breeding industry has suffered significant losses in Ukraine for 14 years. The number of breeding horses has decreased by 58 %. However, the number of breeding stock has increased in Poltava, Cherkasy and Khmelnytskyi regions. Some farms engaged in horse breeding did not compete; they were reorganized or lost the status of breeding farms (Tkachova, 2011; Suprun, 2020).

Ukrainian horse breeding reserves are not fully used. The level of horse breeding lags behind the leading countries of Western Europe and America, which limits the participation of Ukrainian horsemen in international competitions and reduces the export potential of breeding and sport horses. Because of the difficult financial situation, reduced efficiency of horse breeding development, violations of horse breeding technologies and insufficient scientific support of the industry testing of horses at racetracks was suspended by most breeding breeders at some stud farms, reproduction and quality of young animals have decreased (Hopka et al., 2004; Tkachova, 2011; Posternak, 2017).

The aim of the publication was to research the horse breeding industry state and provide a rating assessment of breeding stallions and breeding mares at State Enterprise Dibrivka Stud Farm 62, Dibrivka village, Myrhorod district, Poltava region in order to establish effective operation of the enterprise.

Materials and methods

Statistical reporting of the farm, rating information, observations were used to analyze the state of development of horse breeding at State Enterprise Dibrivka Stud Farm 62.

We used PC and computer programs for statistical processing of Microsoft Excel in mathematical processing of grading results of stallions breeding mares of the Orlov Trotter breed, Russian Trotter breed and Novoolexandrian Draught breed. The difference between the groups was evaluated by Student's test and considered probable at * – $P < 0.05$; ** – $P < 0.01$, *** – $P < 0.001$.

Results and discussion

According to the State Statistics Service Livestock of Ukraine, the total number of horses has decreased by 92.4 thousand heads or 29 % in Ukraine for 5 years (Tvarynnytstvo Ukrainy 2019), Table 1.

The same situation is observed at State Enterprise Dibrivka Stud Farm 62. The horse population has decreased by 25 % for 3 years, despite the fact that the company was one of the largest stud farms in Ukraine and was founded in 1988. Nowadays the enterprise is breeding the Orlov Trotter, Russian Trotter and Novoolexandrian Draught breeds. They are the main breeds zoned in Ukraine.

Table 1
Horse population in Ukraine in 2016–2020

Indicator	Year				
	2016	2017	2018	2019	2020
Horse population on January 1, thousand heads	316.8	291.5	264.9	244.0	224.4

Horse population of State Enterprise Dibrivka Stud Farm 62 is 228 heads, i.e. 100 heads of Orlov Trotter, 75 heads of Russian Trotter and 53 heads of Novoolexandrian Draught breeds. Thus, the Orlov Trotter breed has the largest share of the total population, it is 44 % (Fig. 1).

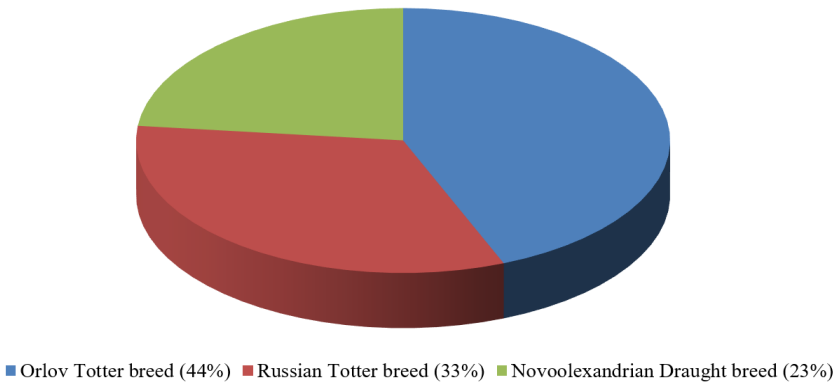

Fig. 1. Breed structure of population

Orlov trotters are big horses. The height at withers is 157–170 cm, average weight is 500–550 kg. In appearance, the Orlovs are characterized by a big head, large expressive eyes, a long and naturally arched neck set high, prominent withers and broad croup. The body is muscular. The legs are strongly built, with prominent joints and clearly defined tendons. The colors of Orlovs are grey, black, bay or chestnut.

The Orel trotter is a unique breed having no analogues in the world. In addition to trotting races, the large and neat Orel trotter can be successfully used in almost all equestrian sports, i.e., dressage, show jumping, driving and amateur riding.

The Russian Trotter originated from cross-breeding of native Orlov Trotter horses with imported American Standardbred. Horses of this breed are characterized by a strong constitution, well-developed muscles and tendons. The main colors are chestnut, black, and red. Horses have a high liveliness, good lynx, some of them are prone to walking. In terms of liveliness, the Russian trotter surpasses the Orlov trotter. Almost all the absolute records were set by the Russian trotter. In 1975 a Union record of liveliness was set at 1,600 m; it was 1 min 58.7 seconds. Breeding work is carried out to improve horse liveliness at Dibrivka Stud Farm.

In the early 90s they begun to breed Novoolexandrian Draught horses at Dibrivka Stud Farm. The representatives of this breed have the correct exterior, small but massive, harmonious body structure, energetic and balanced temperament. Colors are red, grey and black. Average measurements of stallions are 154 cm (height at the withers), 165 cm (body length/barrel), 207 cm (chest circumference), 23.5 cm (cannon bone circumference), and for breeding mares are 150 cm, 159 cm, 193 cm and 21.0 cm respectively. Live weight of stallions is 590 kg, live weight of mares is 560 kg. Maximum draft force is 669 kg.

Mares produce 2,500–3,000 kg of milk per lactation. The foal output per 100 mares is 85–90 %. Animals are undemanding to food; they are used in agricultural work; hey are also used to improve productive horse breeding.

At State Enterprise Dibrivka Stud Farm 62 evaluation of horses is carried out according to the current instruction (approved in 2003). The main principles of evaluation are complexity, details in determining the breeding value and purpose of horses.

The 2-year horses are estimated by origin, type, measurements, exterior for the first time; 2.5-year horses are estimated by working capacity. Horses are graded annually up to seven years of age. 7-year horses are graded by the quality of the offspring. Later, the rating data is updated every three years as information on the quality of offspring.

Horses are evaluated on a whole set of features, special attention is paid to the body structure and exterior because the selection work is aimed at the production of large horses, with the right exterior and high efficiency.

Data obtained in 2021 by horse grading at State Enterprise Dibrivka Stud Farm 62 (Table 2) confirm the breeding work results. Thus, the average measurements of stallions of Orlov trotters in the farm the planned indicators for height at the withers by 5 cm, body length by 2.3 cm, chest circumference by 3.3 cm, and cannon bone circumference by 3 cm. The maximum indicators of the elite class have been taken as planned (Kukla, 2012).

The mares of the Orlov trotter breed also outperform the planned indicators in height at the withers by 3.6 cm, body length by 3.4 cm, chest circumference by 2.5 cm and cannon bone circumference by 0.2 cm.

Stallions of the Russian trotter breed also outperform the planned indicators by 2.0 cm, 4.0 cm, 3.5 cm, and 0.5 cm, respectively. The mares of the Russian trotter breed have shorter chest circumference by (3.8 cm) and cannon bone circumference by (0.15 cm) than the planned indicators.

Measurements of stallions and mares of Novoolexandrian Draught breed were also higher than planned, except mare's chest circumference, it was shorter by 7.4 cm.

Table 2
Characteristics of growth of stallions and mares at State Enterprise Dibrivka Stud Farm 62

Gender and age groups	Measurements			
	Height at the wither	Body length	Chest circumference	Cannon bone circumference
Orlov Trotter breed				
Stallions	165.0 ± 2.02	167.3 ±1.80	187.3 ±1.51	21.3 ± 0.51
Planned indicators for stallions	160 and more	165 and more	184 and more	20 and more
Mares	161.6 ±2.50	163.4 ±4.11	181.5 ±1.94	20.2 ± 0.41
Planned indicators for mares	158 and more	160 and more	184 and more	20 and more
Russian Trotter breed				
Stallions	162.0 ±3.00	164.0 ±1.54	187.5 ±2.7	20.5 ± 0.34
Planned indicators for stallions	160 and more	160 and more	184 and more	20 and more
Mares	161.4 ±2.71	162.9 ±1.82	180.2 ±3.40	19.85 ± 0.41
Planned indicators for mares	158 and more	160 and more	184 and more	20 and more
Novoolexandrian Draught breed				
Stallions	158.0 ±1.47	170.0 ±2.04	205.6 ±2.56	23.6 ± 0.28
Planned indicators for stallions	152	162	200	22.5
Mares	155.8 ±3.01	166.1 ±4.12	189.6 ±3.65	22.0 ± 0.56
Planned indicators for mares	150	160	197	21.5

In general, it should be noted that stallions and mares are large in size, correspond to the elite class and mostly outnumber the planned indicators at State Enterprise Dibrivka Stud Farm 62.

It was found that their rating assessment differed slightly from the planned indicators assessing the breeding value and economic purpose of stallions and mares at the farm (Table 3). The stallions of the Orel trotter breed are less than planned in terms of origin (-2.3) and type (-0.4), and in terms of exterior, measurements and work ability are at the appropriate level.

Table 3
Rating assessment of horses at State Enterprise Dibrivka Stud Farm 62

Gender and age groups	Origin	Type	Exterior	Measurements	Efficiency
Orlov Trotter breed					
Stallions	8.70 ± 0.31	8.60 ± 0.55	8.3 ± 0.77	9.00 ± 0.62	8.00 ± 0.69
Planned indicators for stallions	10	9	8–9	9	8
Mares	8.80 ± 0.61	6.20 ± 0.45	8.10 ± 0.87	8.70 ± 0.65	6.90 ± 0.29
Planned indicators for mares	9	8	7–8	8	7
Russian Trotter breed					
Stallions	9.00 ± 0.77	8.00 ± 0.72	8.00 ± 0.81	8.50 ± 0.66	9.00 ± 0.46
Planned indicators for stallions	10	9	8–9	9	8.0
Mares	8.00 ± 0.44	8.40 ± 0.53	8.20 ± 0.75	8.60 ± 0.52	7.50 ± 0.38
Planned indicators for mares	9	8	7–8	8	7
Novoolexandrian Draught breed					
Stallions	8.30 ± 0.52	8.00 ± 0.62	8.00 ± 0.47	8.30 ± 0.37	-
Planned indicators for stallions	8	8	8	8	6
Mares	8.40 ± 0.55	7.80 ± 0.73	8.00 ± 0.67	8.00 ± 0.39	5.50 ± 0.97
Planned indicators for mares	8	7	7–8	7	6

Mares of the Orlov Trotter breed exceed the planned indicators by exterior (+0.1) and measurements (+0.7), and do not correspond to the planned ones by origin (-0.2), by type (-1.8) and by efficiency (-0.1).

Stallions of the Russian Trotter breed in terms of exterior and workability, mares by type, exterior, measurements and efficiency correspond to the maximum assessment of the elite class.

Stallions and mares of the Novoolexandrian Draught breed correspond to the elite class by all points, except for working efficiency. The stallion efficiency has not been researched; mare efficiency was less (1.0).

The stallions and mares of State Enterprise Dibrivka Stud Farm 62 have a high rating by the main points (5.5–9). It indicates a high genetic potential of the herd and a purposeful breeding work with the herd.

The efficiency of working and breeding horses is largely due to the conditions of their feeding and keeping. Horses are fed coarse, concentrated and succulent feed. Coarse feed is one of the main components of the diet of horses and accounts for up to 50 % of the total nutritional value of the diet.

The best roughage for horses is hay harvested during the flowering period of grasses, when they have the greatest nutritional value. The best varieties of hay are meadow grass and sown grasses. Timothy grass is the best hay for horses. 1.5–2 kg of hay should be fed per 100 kg of live weight of a horse. In this farm, part of the hay is harvested on their own, the other part is purchased. The quality of the hay fed to the animals wants to be better. Part of the hay is replaced with straw; its quality is also questionable.

Fodder beets are also used for feeding of horses. Oats are used as a concentrated feed for horses. Germinated grain (oats, wheat) is fed at the rate of 0.4–0.8 kg per head to enrich the body of young and lactating mares with vitamins A, D, and E. The percentage of concentrated feed in the diets of horses has decreased recently because of underfunding, it has a negative impact on the development of horses and their further application. Chicken eggs, carrots and premixes are not included in the stallions' diet. There are interruptions with the centralized water supply.

Green grass of natural or sown pastures is a valuable food for horses of any age. In summer, the horses are on pasture located near the stud. In May, organic and biologically active substances, macroelements and microelements are in the most accessible state for assimilation. Additional feeding with green fodder from feeders is carried out because the productivity of pastures is low.

State Enterprise Dibrivka Stud Farm 62 uses the stable-pasture method of keeping horses. Buildings for horses are built of brick. There are playgrounds near the buildings. Horses are kept individually or in groups depending on the production purpose and age. As a rule, stallions, mares with foals, weaned foals and young animals are kept individually. No shortcomings of keeping were identified.

Conclusions

1. State Enterprise Dibrivka Stud Farm 62 specializes in breeding Russian Trotters, Orlov Trotters, and Novoolexandrian Draught horses.

2. Stallions and mares (their height at the withers, length of the body, chest circumference, cannon bone circumference) correspond to the elite class and mostly predominates it.

3. At State Enterprise Dibrivka Stud Farm 62 the population of stallions and mares received a high rating by the main points (origin, type, exterior, and measurements); it was 5.5–9. It indicates a high genetic potential of the herd and a purposeful breeding work with it.

4. It is necessary to improve the feeding of horses (increase the supply of good quality hay, concentrated feed, diversify the diet of breeding stallions, improve the condition of pastures) in order to use the genetic potential of animals effectively.

Conflict of interest.
The authors state that there is no conflict of interest.

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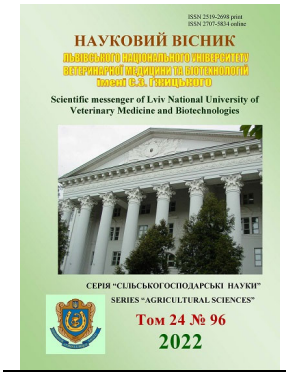

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