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INFLUENCE OF MORPHOFUNCTIONAL PARAMETERS OF MARES OF NOVOOLEXANDRIVSKII DRAFT ON THEIR MILK PRODUCTIVITY

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The research is devoted to determining the relationship of milk productivity of mares of the Novoolexandrivskii Draft with their morph functional indicators: torso and udder measurements. in two independent experiments (in two different farms), the indicator of milk productivity of mares of the Novoolexandrivskii Draft was studied depending on morph functional indicators – torso and udder measurements. the highest level of milk productivity was established in large-type mares by height at the Withers (150 cm) and chest circumference (190 cm). At the same time, minor correlations were established between the indicator of milk productivity and height at the withers ($r=0.112$) and oblique trunk length ($r=0.109$). In the second experiment, milk productivity was most correlated with chest circumference ($r=0.280$), metacarpal circumference ($r=0.245$), and trunk circumference ($r=0.232$). Body measurements of the studied mares are quite closely related: height at the withers \times circumference of the body ($r=0.811$), circumference of the body \times circumference of the metacarpus ($r=0.573$), chest circumference \times circumference of the metacarpus ($r=0.559$), height at the withers \times circumference of the metacarpus ($r=0.520$). By determining the development indicators of foals from Mares of various types, it was established that both foals and mares obtained from large-type mares prevailed over peers obtained from small-type mares by live weight in the development periods from birth to 18 months of age.

It was found that large-type mares are also characterized by higher indicators of udder girth and length, while small-type mares predominated in udder depth. Positive correlation coefficients of the average bond strength were found between the milk productivity of mares and udder circumference ($r=0.370$) and udder length ($r=0.301$), with udder depth the bond is weak and negative ($r=-0.113$). A fairly strong relationship was found between udder measurements: girth \times length ($r=0.665$), length \times depth ($r=0.570$), girth \times depth ($r=0.361$). The udder girth index significantly and positively correlated with the indicators of body structure indices: format ($r=0.654$), massiveness ($r=0.514$), Bony ($r=0.391$). The udder length index is positively and significantly correlated with the bony index ($r=0.486$) and format index ($r=0.323$).

Keywords: horses (*Equus caballus*), Novoolexandrivskii Draft, milk productivity, body measurements, udder parameters.



ВПЛИВ МОРФОФУНКЦІОНАЛЬНИХ ПАРАМЕТРІВ КОБИЛ НОВООЛЕКСАНДРІВСЬКОЇ ВАГОВОЗНОЇ ПОРОДИ НА ЇХ МОЛОЧНУ ПРОДУКТИВНІСТЬ

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Дослідження присвячені визначенню взаємозв'язків молочної продуктивності кобил новоолександрівської вагОВОЗНОЇ породи з їх морфофункціональними показниками: промірами тулуба і вим'я. У двох незалежних дослідках (у двох різних господарствах) вивчали показник молочної продуктивності кобил новоолександрівської вагОВОЗНОЇ породи залежно від морфофункціональних показників – промірів тулуба і вим'я. Встановлено вищий рівень молочної продуктивності у кобил крупного типу за висотою в холці (<150 см) та обхватом грудей (<190 см). При цьому встановлено незначні кореляційні зв'язки між показником молочної продуктивності та висотою в холці ($r=0,112$) та косою довжиною тулуба ($r=0,109$). У другому досліді показник молочної продуктивності найбільше корелював з обхватом грудей ($r=0,280$), обхватом п'ястка ($r=0,245$) та навкісною довжиною тулуба ($r=0,232$). Проміри тіла досліджених кобил досить тісно пов'язані між собою: висота в холці × навкісна довжина тулуба ($r=0,811$), навкісна довжина тулуба × обхват п'ястка ($r=0,573$), обхват грудей × обхват п'ястка ($r=0,559$), висота в холці × обхват п'ястка ($r=0,520$). Визначенням показників розвитку лоша від кобил різних типів встановлено, що і жеребчики і кобилки, одержані від кобил крупного типу, переважали ровесників, одержаних від кобил дрібного типу за живою масою по періодах розвитку від народження до 18-місячного віку.

Встановлено, що кобили крупного типу характеризуються також вищими показниками обхвату і довжини вим'я, за глибиною вим'я переважали кобили дрібного типу. Виявлені позитивні коефіцієнти кореляції середньої сили зв'язку між молочною продуктивністю кобил та обхватом вим'я ($r=0,370$) і довжиною вим'я ($r=0,301$), з глибиною вим'я зв'язок слабкий і негативний ($r=-0,113$). Між промірами вим'я виявлено досить міцний зв'язок: обхват × довжина ($r=0,665$), довжина × глибина ($r=0,570$), обхват × глибина ($r=0,361$). Показник обхвату вим'я значно і позитивно корелював із показниками індексів будови тіла: формату ($r=0,654$), масивності ($r=0,514$), костистості ($r=0,391$). Показник довжини вим'я позитивно і значно корелює з індексами костистості ($r=0,486$) і формату ($r=0,323$).

Ключові слова: коні (*Equus caballus*), новоолександрівська вагОВОЗНА порода, молочна продуктивність, проміри тіла, параметри вим'я.



Introduction. Horses have long not played the role of the main labor force in agricultural production, although cattle (DAP) is recognized as one of the 14 renewable energy sources selected by the UN Conference on new and renewable energy, held in Nairobi in 1981 (Spugnoli P. & Dainelli R., 2012). According to the food and Agriculture Organization of the United Nations FAO (Elcio P. et al., 2007; Miraglia N., 2015), about 300 million people are used in the world. working animals (horses, donkeys, mules, cows, camels) that provide life support for 300-600 million people., especially in poor regions where working animal energy is an important energy resource (Asmare B. & Yayeh Z., 2017; Burn C.C. et al., 2010; Miraglia N. et al., 2020; Romaniuk K. et al., 2019).

Horses of heavy breeds originate from large fighting horses of the Middle Ages, whose task was to carry soldiers in metal armor, while they themselves had metal protection from Spears and arrows of opponents (<https://www.horsejournals>). In the future, heavy horses were used to move cannons and other combat weapons and cargo, as well as used in agricultural work (Stephens T.D. & Splan R.K., 2013). As the agricultural implements became heavier and the amount of work increased at the same time, the horses needed to get bigger and stronger. Heavy horse breeding reached a special heyday in the late XIX – early XX centuries with the development of industry and transport. Horses were used for logging, mining, railway construction, roads, etc., as well as for transporting metro cars and horse-drawn trams. In the first World War, heavy horses were indispensable tools for transporting artillery and ammunition. Historically, the use of horses as productive animals has been proven since their domestication by primitive humans (Langlois B., 2011).

With the development of mechanical engineering, the need for heavy horses almost disappeared and because of this, many breeds of horses with a unique genotype (Hudson R.S. & Cole C.L., 1939). However, in many countries, local breeds of heavy trucks are part of the traditions and are preserved at the level of national heritage. Thus, the following breeds are preserved horses: Arden, Belgian, Clydesdale, Shire, Percheron, Breton, Suffolk, etc. A good example is the Clydesdale Outpost program, which aims to preserve the Clydesdale horse breed, its unique characteristics and genetic originality (<https://www.clydesdaleoutpost>). Draft horses are used in the production of organic agricultural products, for recreational purposes, equestrian tourism, logging and other works where the use of equipment is impossible or impractical. Some ethnoreligious communities (Mennonites, Amish, etc.) abandon modern intensive technologies and use horse-drawn harnesses in everyday life. Original breeds of heavy horses are used in cultural and traditional events in many countries (<https://www.horsejournals>).

Noteworthy are the productive breeds of Asian horses, which are often direct descendants of relict horses tamed by nomadic tribes, and are characterized by high adaptability to the harsh conditions of year-round herd maintenance. These are Kazakh horses of the Jabe type, the Aday branch of Kazakh horses, the Kabinsky meat type of the Kazakh horse, the Kushum and mugalzhar breeds (Iskhan K. Zh. et al., 2019; Pabat V.O. & Goncharenko I.V., 2019; Sansyzbaev et al., 2024; Turabaev, 2015).

Original breeds of heavy horses are used in cultural and traditional events in many countries: various shows, folk festivals, competitions, cargo transportation championships, tourism, historical reconstructions (Sawers L., 2003; Rzekęć A. et al., 2020). In addition, heavy breeds have become the genetic basis of many modern sports horse breeds (Asmare B. & Yayeh Z., 2017; Edmonds J. L., 1940; Garre A., 2022).

Ukraine is the originator country of a unique heavy-duty breed – Novoalexandrivskii Draft, created by the efforts of domestic scientists and breeders. The best heavy breeds of Europe appeared in Ukrainian farms in the 1860s and 1880s with the development of Agriculture and industry. On the genetic basis of Belgian Ardennes



and Brabansons, French Percherons, Scottish Clydesdales and local horses well adapted to the climatic conditions of Ukraine, for more than a century, the new Alexander heavy breed (recognized in 1998) (Liutykh S.V., 2002; Program, 2014).

The growing popularity of «green» or organic food production gives a new impetus to the restoration of the popularity of Draft horses (Aguilera E. et al., 2019; Rzekęć A. et al., 2020). The use of Novoalexandrivskii Draft is also not limited to transport and agricultural use, the breed is successfully used for the production of milk and koumiss. Mare's milk has a high nutritional value and practically does not contain allergenic proteins, and therefore can be a raw material for the production of children's and dietary food products, medicines and cosmetology products (Businesso L. et al., 2000; Centoducati P., 2012; Jastrzębska E. et al., 2017; Pieszka M. et al., 2016; Ranadheera C. S. et al., 2018; Romaniuk K. et al., 2019; Yakunin A. V. et al., 2017). It is worth noting that in developed economies, the production of mare's milk on organic farms is one of the most promising areas of animal husbandry. This production is highly profitable, does not require significant expenditures of funds, energy and human resources, and is safe for the environment, because it involves organic, natural animal husbandry. The high identity of the chemical composition of mare's milk to female milk gives grounds for its widespread use in baby food, both complementary feeding of infants on artificial nutrition and the production of dairy products with prebiotic qualities for children of all age groups (Pieszka M. et al., 2016; Romaniuk K. et al., 2019; Yakunin A. V. et al., 2017). In Finland, Germany, and Kazakhstan, mare's milk has been widely studied in pediatrics, and technologies for its processing and long-term storage have been developed. So, in Germany (TM «Saumalmilk», TM «Zollmann», GmbH & Co Kazakhstan (Kazakh Academy of nutrition) uses sublimation technology, which makes it possible to obtain powdered milk of mares, which corresponds to 99% of its fresh counterpart. The best example of profitable productive horse breeding can be considered the farm «Kurgestüt Hoher Odenwald» in Germany, where 400 mares (such as a small heavy truck) are kept on 450 hectares of land, there is a deep freezing shop and a milk sublimation shop for the production of koumiss, other bio-products and cosmetics (<https://www.demeter-bw>). The technology of obtaining powdered milk allows you to sell bio-koumiss from this farm under its own trademark «Zollmann» throughout Europe. The high profit of this production is evidenced by the fact that the cost of 200 ml of bio-koumiss is 4.90 euros (<https://www.stutenmilch>).

In Ukraine, an interesting example of popularizing productive horse breeding is the company «Dendoff Agro Family», which in the Tetiivskii District of the Kiev region founded the trademark MLK PWR ("Milk Power") for the production of koumiss and other products from the milk of mares and cows (Balagura B.; 2019).

So, the study of milk productivity of mares is an urgent task in the future development of the industry and productive horse breeding in particular. Like any quantitative trait, the milk productivity of mares is formed under the influence of various factors, determining the strength of which is the task of researchers to predict and improve productive traits. It is known that the milk productivity of livestock is closely related to the size of the body and udder (Polupan Yu., 2024). There are few similar data on horses in our country (Yusyuk T. A., 2017; Yusyuk T. A., Gopka B. M., 2018).

The aim of the work was to determine the milk productivity of mares of the Novoalexandrivskii Draft Horse in Ukraine, and the impact of body and udder measurements on it.

Materials and methods. On Mares of the Novoalexandrivskii Draft of Stud «Lann» of Donetsk region (n=32) and the Dibrivskii Stud of Poltava region (n=16), experiments were conducted to study the indicators of milk productivity of mares



depending on their morph functional parameters (body and udder measurements). For the experiment, healthy mares were selected that safely gave birth to healthy foals. Control milking operations were carried out using DDU-2 portable milking machines during the milking season of mares for kumiss production (May-September). Mares were milked three times during the day with an interval of 2 hours, the duration of milking is up to 2 minutes. During milking, the foals were in the milking parlor in a separate close visibility of the mares, which contributed to the milk return reflex and the nervous balance of the mares and foals. Foals on the day of control milking received the required amount of milk through artificial drinking, which did not affect their condition. After each milking, the amount of milk in the bucket was measured, and the total daily milk yield was determined as the sum of all milks per day. Milk productivity was determined based on the results of control milks for the entire milking season. The relationship of milk productivity of mares with body measurements and udder parameters was established. Body measurements were determined – height at the withers and circumferential length of the body – with a measuring stick, chest circumference and metacarpal circumference – with a measuring tape. Based on the obtained indicators, the indices of body structure were calculated: format and massiveness. Udder parameters (girth, length, depth) were measured with a measuring tape. The relationships between the studied indicators were determined by calculating the correlation coefficient (r).

Indicators of the development of foals obtained from large and small mares by live birth weight and at 1, 3, 6, 9 and 18 months of age were also determined.

All experimental studies were conducted in accordance with modern methodological approaches, requirements and standards (DSTU ISO/IEC 17025:2019, 2021), directive 2010/63/EC (2010), the procedure for conducting animal testing in research institutions (Law of Ukraine No. 249, 2012) and in accordance with the provisions of the European Convention for the protection of vertebrates used for experimental and other scientific purposes (Strasbourg, 1985).

Research results. The first experiment to study the indicator of milk productivity of mares of the Novoolexandrivskii Draft depending on morph functional indicators was conducted in Stud «Lann» of the Donetsk region ($n=32$). Control milking was performed during the main lactation season in May-September. According to measurements, mares were divided into gradations according to height at the withers: Group I – small (150 cm), Group II – large (150 cm) and chest circumference – group I – small (190 cm), Group II – large (190 cm).

Indicators of milk productivity of mares of various types: small (group I) and large (group II) are shown in Table 1.

A higher level of milk productivity was established in mares of large type and with a higher live weight. At the same time, the analysis of correlation coefficients did not establish a significant relationship between the studied indicators. The highest relationship was found between milk productivity and height ($r=0.112$) and oblique trunk length ($r=0.109$). Higher ligaments were established between body measurements: height \times circumference of the trunk ($r=0.811$), circumference of the trunk \times circumference of the metacarpus ($r=0.573$), chest circumference \times circumference of the metacarpus ($r=0.559$), height \times circumference of the metacarpus ($r=0.520$).



Table 1

Indicators of measurements, live weight and milk productivity of experimental mares of the Novoalexandrivskii Druft Horse

Groups of mares by body measurement type		Body measurements, cm				Live weight, kg	Milk productivity, l
		height	body length	chest circumference	metacarpal girth		
I (n=20)	M±m	146,9 ±0,51	156,5 ±0,93	188,8 ±1,77	21,17 ±0,19	660,9 ±6,20	684,0 ±66,8
	Cv, %	1,21	2,05	3,25	3,08	3,25	33,8
II (n=12)	M±m	154,4 ±0,51	162,8 ±0,70	192,1 ±1,84	21,70 ±0,13	673,9 ±6,29	761,0 ±72,7
	Cv, %	1,46	1,93	4,28	2,63	4,17	42,7
Together (n=32)	M±m	151,9 ±0,75	160,4 ±0,78	190,9 ±1,34	21,5 ±0,11	669,1 ±4,64	732,1 ±51,6
	Cv, %	2,78	2,74	3,97	3,01	3,93	39,9

Indicators of the development of foals obtained from mares of various types are established (table 2). Both stallions and mares obtained from large-type mares outnumbered peers obtained from small-type mares in live weight at all developmental periods.

Table 2

Dynamics of development of foals obtained from mares of various types

Age, month	Type of mares							
	Group I (Small)				Group II (large)			
	Stallions		Fillies		Stallions		Fillies	
	M±m	Cv, %	M±m	Cv, %	M±m	Cv, %	M±m	Cv, %
3 days	64,2 ±0,38	1,46	63,5 ±0,32	2,63	66,5*** ±0,58	2,48	64,7** ±0,61	2,14
1	79,4 ±0,46	2,54	77,8 ±0,63	2,56	88,6** ±1,51	2,98	79,4*** ±1,28	2,22
3	139,6 ±0,98	2,57	128,9 ±1,01	2,68	143,1** ±2,25	3,24	138,6*** ±2,08	3,11
6	246,7 ±3,18	2,89	229,2 ±3,10	2,74	256,4** ±3,18	5,36	338,4** ±3,78	6,28
9	331,2 ±3,58	3,11	318,5 ±3,17	3,16	356,4** ±4,12	7,11	324,9** ±4,01	6,57
18	578,4 ±5,48	6,37	556,9 ±4,81	5,21	595,9* ±6,42	9,24	529,3* ±5,67	8,21

Note: * - $p \leq 0.05$; ** - $p \leq 0.01$; *** - $p \leq 0.001$



In order to verify the obtained data, a study was conducted on Mares of the Dibrivskii Stud (n=16). In addition to indicators of milk productivity and body measurements, udder measurements (centimeters) are determined: girth, length, depth.

Indicators of milk productivity of mares of various types: small (group I) and large (group II) are shown in Table 3.

Table 3

Indicators of body measurements and body structure indices of mares of the Novoalexandrivskii Draft Horse

Groups of mares by body measurement type		Body measurements, cm				Body structure indices, %			Milk productivity, l
		height	body length	chest circumference	metacarpal girth	format	massiveness	bone dirt	
I (n=7)	M±m	148,1 ±0,34	156,7 ±0,78	191,9 ±2,41	21,6 ±0,34	105,8 ±0,68	129,5 ±1,59	14,6 ±0,21	2761,0 ±280,0
	Cv, %	0,61	1,31	3,32	4,16	1,69	3,27	3,76	26,83
II (n=9)	M±m	152,2 ±0,94	159,7 ±1,55	193,4 ±2,53	22,1 ±0,29	104,9 ±0,72	130,4 ±3,73	14,5 ±0,17	2872,7 ±191,26
	Cv, %	1,85	2,90	3,92	3,88	2,05	8,59	3,44	19,97
Together (n=16)	M±m	150,4 ±0,75	158,4 ±0,98	192,8 ±1,72	21,91 ±0,22	105,3 ±0,49	130,0 ±2,15	14,6 ±0,13	2761,3 ±161,77
	Cv, %	1,99	2,48	3,58	4,02	1,89	6,63	3,47	23,43

The milk productivity of the studied mares for 150 days of lactation averaged 2448.81±163.6 kg of milk with limits lim=1603-3792 kg. The height of the studied mares averaged 150.4±0.75 cm, which means that horses of the Novoalexandrivskii Draft Horse belong to small heavy horses close to the Ardennes. The circumferential length of the body – 158.4±0.98 cm – significantly exceeds the height at the Withers, which indicates a distinct harness type. Average chest circumference (192.8±1.72 cm) and metacarpal circumference (21.9±0.22 cm) indicate the desired massiveness and bony nature of the studied mares. Udder parameters averaged: girth-65.6±1.25 cm, length – 19.7±0.44 cm, depth – 18.4±0.33 cm.

It was found that mares whose height exceeded 150 cm (large type) were characterized by significantly higher milk yield during lactation than smaller mares (by 111.7 liters, p<0.01), which confirms the data obtained in the first experiment. It was found that the indicator of milk productivity of mares of the Novoalexandrivskii Draft Horse with different strength and value is reliably (P<0.05) associated with body measurements: height (r=0.511), body circumference (r=-0.033), chest circumference (r=0.200), metacarpal circumference (r=0.130) (table 4).



Table 4

Correlations between milk production, body measurements, and udder measurements

Indicators	milk productivity	udder girth	udder length	udder depth	height at the Withers	trunk circumference	Chest circumference	Metacarpal circumference	format Index	massiveness Index
Udder circumference	0,370									
Udder length	0,301	0,665								
Udder depth	-0,113	0,361	0,570							
Height at the withers	0,132	-0,175	-0,126	0,140						
Body circumference	0,232	0,352	0,145	0,232	0,661					
Chest circumference	0,280	0,228	0,310	0,224	0,465	0,761				
Metacarpal circumference	0,245	0,263	0,371	0,557	0,486	0,628	0,688			
Format index	0,175	0,654	0,323	0,157	-0,190	0,612	0,503	0,311		
Massiveness index	0,096	0,514	0,245	0,449	-0,006	0,420	0,434	0,510	0,556	
Bone dirth index	0,194	0,391	0,486	0,545	-0,010	0,343	0,515	0,868	0,461	0,570

It was found that large-type mares are also characterized by higher indicators of udder girth and length, while small-type mares predominated in udder depth (table 5).

It is proved that the milk productivity of the studied Mares of the Novoolexandrivskii Draft Horse is related to the measurements of their udder. positive correlation coefficients of the average strength of the relationship between the milk productivity of mares and the udder circumference ($r=0.370$) and the udder length ($r=0.301$) were revealed, with the udder depth the relationship is weak and negative ($r=-0.113$). A fairly strong relationship was found between udder measurements: girth \times length ($r=0.665$), length \times depth ($r=0.570$), girth \times depth ($r=0.361$).

The udder girth index significantly and positively correlates with the indicators of body structure indices: format ($r=0.654$), massiveness ($r=0.514$), Bony ($r=0.391$). The udder length index is positively and significantly correlated with the bony index ($r=0.486$) and format index ($r=0.323$).

The milk productivity of mares of different breeds is poorly understood, however, this indicator is important in terms of the development of the market for organic food, medicines and cosmetics.



Table 5

Indicators of udder measurements and milk productivity of mares of the novoaleksandrovskaya heavy-duty breed

Groups of mares by type		Udder measurement, cm			Milk productivity, L
		girth	length	depth	
I (n=7)	M±m	65,22±1,71	19,44±0,41	18,56±0,52	2761,0±280,0
	Cv, %	7,85	6,36	8,46	26,83
II (n=9)	M±m	66,14±1,98	20,00±0,87	18,14±0,39	2872,7±191,26
	Cv, %	7,93	11,55	5,67	19,97
Together (n=16)	M±m	65,63±1,26	19,69±0,44	18,38±0,33	2761,3±161,77
	Cv, %	26,65	8,84	7,27	23,43

Discussion. According to the results of our research, the influence of morph functional parameters of mares of the Novoalexandrovskii Draft Horse on their milk productivity is proved.

Studies of the level of milk productivity of mares of large type (height 150 cm and above and chest circumference 190 cm and above) and small type (height at the withers less than 150 cm and chest circumference less than 190 cm) have established an advantage in terms of milk yield for lactation of large mares (by 111.7 l, $p < 0.01$). At the same time, low positive correlations were established between the indicator of milk productivity and height at the withers ($r = 0.112$) and oblique trunk length ($r = 0.109$). Body measurements of dairy mares significantly correlate with each other: height at the withers × circumference of the body ($r = 0.811$), circumference of the body × circumference of the metacarpus ($r = 0.573$), chest circumference × circumference of the metacarpus ($r = 0.559$), height at the withers × circumference of the metacarpus ($r = 0.520$).

It should be noted that foals of both sexes obtained from large mares were also larger from birth to 18 months of age. The obtained data coincide with the research of T. A. Yusyuk (Yusyuk T. A., 2017) relatively high correlation rates between foal size and their mothers' milk productivity ($r = 0.79$, $p < 0.05$).

Positive correlation coefficients of the average bond strength were found between the milk productivity of mares and udder circumference ($r = 0.370$) and udder length ($r = 0.301$), with udder depth the bond is weak and negative ($r = -0.113$). A fairly strong relationship was found between udder measurements: girth × length ($r = 0.665$), length × depth ($r = 0.570$), girth × depth ($r = 0.361$). The udder girth index significantly and positively correlates with the indicators of body structure indices: format ($r = 0.654$), massiveness ($r = 0.514$), Bony ($r = 0.391$). The udder length index is positively and significantly correlated with the bony index ($r = 0.486$) and format index ($r = 0.323$).

In most European countries, environmental issues are not yet considered important enough for stakeholders environmental issues are not yet considered important enough for horse breeding stakeholders. However, thanks to their "green" assets, horses can play an active role in the environmental transition and debate, both independently and as a supplement both independently and as an addition to other economic Productions and services (Rzekęć A. et al., 2020), which is the Economic key to preserving horses of local



populations. In this context, one of the most promising areas of horse use is the production of hypoallergenic mare's milk and processed products.

Conclusions. A higher level of milk productivity was established in mares of the novoaleksandrovskaya heavy-duty breed of large type (height at the withers 150 cm, chest circumference 190 cm) with a low level of correlation ($r=0.112$ with height at the withers, $r=0.109$ with the circumferential length of the body). Foals of both sexes obtained from large mares outnumbered peers obtained from small mares by live weight at all developmental periods (from birth to 18 months of age).

The influence of udder parameters on the indicator of milk productivity of mares is proved. Positive correlation coefficients of the average strength of the relationship between the milk productivity of mares and udder circumference ($r=0.370$) and udder length ($r=0.301$) were found.

Expanding the range of use of horses of heavy breeds as productive animals that produce hypoallergenic dietary milk is an economic guarantee for the preservation of horses of local populations.

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