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Hematological and clinical indicators of foals of the Karabayir breed and its hybrids with the Friesian breed

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Abstract. In this article, an optimal storage technology based on the scientific and practical basis of the first-link hybrid generation foals obtained from the cross-breeding of the Frisian breed stallion imported with bias of the Karabakh breed in sharply changing (Continental) and hot climates of Uzbekistan has not been developed.

In addition, the influence of the technology of keeping hybrid offspring from these breeds in hot climates on the growth development of young tawny has not been studied in Special Studies and recommendations for practice have not been made.

The impact of the technology on the storage of this duraygay generation on growth development indicators was studied for the first time in research in the hot climate of Uzbekistan.

As a result of our experiments, it turned out that the levels of all indicators of blood and serum content in the toys of Experimental Group III were observed to be higher than those of toylarnink in groups I and II.

The erythrocyte content in the blood of thoys in Experimental Group III was 1,7 and 0,88 units, leukocyte content was 1,79 and 0,86 units, and hemoglobin was 39 and 17 units, respectively, compared to their counterparts in groups I and II.

The results of our scientific research were dominated by Group III rats, which were kept in the conditions of "stable-pasture" technology, even on all analytical indicators of the content of blood serum toads.

Keywords. Breed, natural climatic conditions, the stable, stables-pasture, meadow, continental, blood composition, morphologic, biochemical, hematological indicators, breathing, body temperature, erythrocyte, Leukocyte, platelet, common protein.

Introduction. The Friesian horse breed is completely different from other breeds with its attractiveness and unique beauty of body structure. According to the results of the study of many scientific sources, keeping foals in different ways has a significant impact on their growth development [1-2].

Regardless of whether horses are raised in pastures or kept in stables, it is of great scientific and practical importance to create optimal storage conditions for them based on science. For the horse to always be healthy and able to work at a high level, it is important to take into account the horse's breed, breed, direction of production, region of origin, and the load given, in addition to proper feeding and care, as well as creating optimal storage conditions. How to keep horses is chosen depending on where they are kept, the natural and climatic conditions of the place where the horses are kept, and the direction of breeding. The method of keeping horses in pasture

conditions has been used since ancient times until now. This method is economically very effective and cheap, horses are fed with natural grasses and bred in natural conditions [3-5].

In winter, thoroughbred stallions, colts, and training young mares are kept in stables to protect them from cold and rain, and other types of horses are kept in light-built stables. When horses are kept in a "stable" in horse breeding, each horse is kept in a separate place (dennik) [6].

Also, the influence of the technology of keeping hybrid offspring in hot climates on the growth development of young foals has not been studied in special studies, and recommendations for practice have not been given. The influence of the technology of keeping these hybrids on the growth and development indicators was studied for the first time in the hot climatic conditions of Uzbekistan. The purpose and tasks of the work. The purpose of the research is to develop an optimal technology for accelerating their growth development in order to preserve and reproduce the hybrid offspring obtained from crossing the imported Friesian stallion with the Karabayir heifers in the hot climate of Uzbekistan [7-9].

Object and subject of the research. Currently, there are different methods of which:

- clinical indicators of foals (body temperature, breathing and heart rate) E.A. Studied according to the style of Arzumanyan (1957);

- blood indicators are studied from 3 heads from each group, in which the amount of erythrocytes and leukocytes was studied in the Goryaev chamber, in the hemoglobin Sali method [10];

During 2020-2022, scientific research will be conducted at the “Temurbek Caravan” farm in Kyziltepa district, Navoi region of the Republic of Uzbekistan. As the object of the experiment, foals of the Karabayir breed and their crossbreeding with the Friesian breed were selected. The feeding of the foals in the experimental groups was organized based on the ration received in farm conditions, taking into account their live weight, age, and physiological condition.

For the experiment, based on the requirements of similar characteristics, taking into account the live weight, age, and birth dates, 12 foals of different breeds were selected and 3 groups were formed. In each group, 2 more foals were selected: Karabayir breed (n=6) and Karabayir-Friesian hybrids (n=6). Scientific novelty level of research results. The impact of the technology of keeping first-generation hybrid foals obtained from crossbreeding imported Friesian stallions with Karabayir bred mares in our republic's sharply changing (continental) and hot climate conditions on their growth development was studied in special studies, and practical recommendations were given in this regard.

Determining the level of study of the topic. Published scientific articles, scientific sources, materials from conferences, reports, and other scientific works of local and foreign scientists in the field of horse breeding were analytically studied. In this, the main attention was paid to the effectiveness of optimal methods of keeping horses, breed, age, origin, natural climatic conditions of the distribution areas, nutrition, and endurance of horses. The results of similar research conducted in

countries with a developed horse-breeding network related to storage technology were studied in detail in comparison with the climatic conditions of Uzbekistan.

However, the effect of storage technology on the growth development of the hybrid offspring obtained from the crossing of the Karabayir breed with the Friesian stallion has not been studied in special studies. This determines the scientific novelty of the research and proves its relevance.

The morphological and biochemical composition of the blood of foals in the experimental groups was studied in the research. Blood is in constant motion in the body, flows through tissues and organs, washes them and actively participates in their vital activity. It also provides the functional activity of the whole organism and is the internal environment of the body. Together with blood and lymph, it forms an integrated fluid circulation system in the body. This system ensures the connection between the chemical changes of substances in different organs and tissues. Blood performs a number of vital tasks in the body: feeding cells, breathing, protection, maintaining water balance in tissues, maintaining body temperature, etc. Blood is functionally related to the rate of growth acceleration and productivity of animals and ensures the viability of all cells in the body. Therefore, hematological indicators of blood composition are of great importance in the study of the interior of horses and their evaluation.

The composition of blood varies depending on the horse's age, sex, physiological state, feeding conditions, season, etc. In a healthy organism, all random variations in blood composition are controlled by the neurohumoral systems. Also, various effects on the body are reflected in the composition of the blood, that is, its composition changes in a positive or negative direction.

The biological characteristics of animals, including horses, their constitution, and economic indicators directly depend on the level of metabolic processes in the body. The physiological state of the organism and the rate of metabolism is characterized by the morphology and biochemical composition of blood, which are indicators that directly reflect the characteristics of growth, development, and productivity. When studying the composition of blood, the number of erythrocytes and leukocytes, the formula of leukocytes (expressing the number of leukocytes in percentages), the amount of hemoglobin, the blood alkalinity index, the number of proteins, lipids, sugar, and other substances are paid attention to. The most important indicator is the total amount of blood in the body, although it is difficult to determine without slaughtering the animal. At present, age-related changes in hematological parameters of blood composition have been thoroughly studied by scientists.

In particular, by scientists from the field in Uzbekistan on improving breeding and breeding indicators of horses of the karabayir breed, studying the growth development of foals A.K.Likhov, A.P.Afanasev, M.K.Sokhtaev (1970) and others conducted scientific research. [11].

Erythrocytes (red blood cells) in the blood play an important role in maintaining the homeostasis of the animal body. Erythrocytes are carriers of hemoglobin, provide the body with oxygen, carry carbon dioxide from the tissues to the lungs, participate in the regulation of acid-alkaline balance, and transport amino acids, and lipids to the

tissues, adsorbs toxins (harmful substances), and maintains ion balance in blood and tissues.

It is important to study the blood parameters of animals in relation to breed, productivity, and constitutional characteristics.

It is emphasized by the scientists of the field that the amount of erythrocytes in the blood of salt-ridden horse breeds is much higher than that of heavy-load horse breeds. In particular, it is possible to indicate such horse breeds as golshtin, German, Oldenburg, Budyonny.

Table 1.

Hematological and biochemical indicators of blood serum of 12-month-old foals in experimental groups.

Indicators	Physiological norm	Groups		
		I (in the dennik)	II (in the stable)	III (in the stable-pasture)
Erythrocytes x10^{12}/l	6,0-9,0	7,30±2,56	8,12±1,66	9,0±3,02
Leukocytes x10^{9}/l	4,8-7,7	5,90±1,15	6,83±2,13	7,69±1,09
Platelets x10^{9}/l	160-190	170±3,12	183±4,00	189±3,84
Hemoglobin g/l	80,0-140,0	100±2,16	122±1,77	139±1,63
Hematocrit, %	35,0-45,0	36,2±0,75	37,5±0,81	44,8±0,68
Color indicator	0,8-0,95	0,83±0,09	0,86±0,07	0,94±0,08
СОЭ, mm/sek	3,0-4,8	3,16±2,03	4,43±3,12	4,76±1,19
Blood serum:				
Total protein, g/%	70,0-78,0	71,18±3,11	74,90±2,51	77,92±1,95
Sodium(Na), mmol/l	124,0-145,0	130,22±1,44	133,45±2,05	144,91±3,01
Calsium(Ca), mmol/l	2,50-3,55	2,48±2,12	3,05±1,45	3,52±2,51
Phosphorus(P), mmol/l	0,81-1,55	0,84±0,05	1,41±0,89	1,55±0,66
Chlorine(Cl), mmol/l	97-108	98±0,05	102±0,02	107±0,07
Ferrum(Fe), mmol/l	18,0-24,6	18,66±0,22	20,12±0,15	23,10±0,19
Copper(Cu), mmol/l	3,51-7,08	5,44±0,15	6,55±0,31	6,95±0,17
Cobalt(Co), mmol/l	0,43-0,85	0,62±0,03	0,79±0,07	0,82±0,02
Magnesium(Mg), mmol/l	0,67-1,07	0,82±0,06	0,96±0,04	1,01±0,05
Bilirubin, mmol/l	13,7-27,3	18,8±1,10	24,55±0,89	27,03±0,97

The high amount of elements formed in the blood: dry matter, sugar, glutathione, and globulins are associated with high agility and work performance in horses, and on the contrary, the lack of these substances is associated with a decrease in heart rate and breathing rate when the horse is at rest.

The less developed the animal's skeleton, the more immature forms of neutrophils in the blood, and the fewer lymphocyte cells responsible for immunity. In this case, animals are less resistant to the effects of harmful factors.

Analysis of blood composition in horse breeding provides early prediction of diseases in horses, and knowledge of individual characteristics of horses. Blood is

considered the internal environment of the body, and it describes the functional level of hematological indicators.

In the research, the hematological and biochemical parameters of the blood serum of the foals in the experimental groups were studied.

In the data presented in Table 1, the blood serum sample of 12-month-old foals in the experimental groups was calculated based on the results of analytical re-examination 3 times, and the average indicators are presented.

Table 2.

Morphology of blood composition in different physiological states of 18-month-old mares in experimental groups indicators

Groups	n	Physiological condition					
		At a rest			After acting actively		
		Erythrocytes, mln/mg³	Hemoglobin, unit Sali	Hemocrit, %	Erythrocytes, million/mg³	Hemoglobin, unit Sali	Hemocrit, %
I	12	7,42	115	40,7	8,10	125	42,7
II	12	7,69	128	41,0	8,29	132	43,1
III	12	8,15	131	43,6	9,00	140	45,6

According to Table 2, when the blood of foals explored, after exercising actively, had higher blood morphological parameters than foals of all groups at rest.

In addition, the number of erythrocytes in III-group mares with active activity reached 0.90 and 0.71 units, hemoglobin amount 15 and 8 units, and hematocrit 2.9 and 2.5% higher, respectively, compared to their counterparts in the I and II groups.

According to the analysis of the data in Table 1, it was observed that all indicators of blood and blood serum in mares of experimental group III were higher than those of mares of the I and II groups.

In particular, the number of erythrocytes in the blood of foals of the III-experiment group increased by 1.7 and 0.88 units, the number of leukocytes by 1.79 and 0.86 units, and hemoglobin by 39 and 17 units, compared to their counterparts in groups I and II, respectively.

III-group foals kept in conditions of "stable-pasture" technology achieved superiority in all analytical parameters of blood serum of foals in the research.

Thus, all parameters of blood and blood serum content of foals of the III group kept under the conditions of "stable-pasture" technology were the highest compared to their counterparts of the I and II groups. This technology is the most optimal and

effective, and it made the foals of this group go through the metabolic processes at the standard level during all periods of growth and development and ensured their growth development.

Morphological indicators of blood composition of 18-month-old mares in different physiological states (at rest and active movement) were studied in the experimental groups (Table 2).

In conclusion, compared to foals kept in "dennik (cage)" conditions in group I, foals kept in "stable-pasture" conditions in the group III were distinguished by higher morphological indicators of blood.

This indicates that III-group mares will have high productivity in the future and rapid growth development.

In the research, the clinical parameters of foals in the experimental groups were studied: body temperature, heart rate, and respiratory rate. The physiological condition of foals was evaluated by studying clinical indicators.

In determining the horse's physiological state, fitness, and reaction to any given load (exercise, training, etc.), the influence of hematological and biochemical data, dynamics of growth and development, etc., is reflected in clinical indicators (body temperature, heart rate, respiration rate).

Normal body temperature (37.5 - 38.5ºC), heart rate (24-42 beats per minute), and breathing rate (24-42 beats per minute) indicate that the horse is healthy. If the body temperature rises or falls from the normal level, it indicates that the horse is tired, the body is suffering from a disease or some other condition, and it is necessary to pay attention.

The clinical parameters of the foals in the experimental groups are given by seasons (Table 3).

Table 3.

Clinical parameters of cows in experimental groups

Indicators	**Groups**					
	I		II		III	
	X±Sx	Cv,%	X±Sx	Cv,%	X±Sx	Cv,%
At 9 months in Winter (January)						
Body temperature, ºC	37,5±0,09	0,47	37,8±0,10	0,62	38,1±0,11	0,60
Heart rate, 1 minute/beat	28,2±1,28	4,20	32,5±1,36	4,41	37,1±0,80	2,55
The number of breathing, 1 minute/time	9,2±0,56	4,34	12,3±0,81	6,52	14,2±0,57	4,46
At 12 months in Spring (April)						
Body temperature, ºC	38,1±0,10	0,51	38,3±0,09	0,56	38,5±0,11	0,61

Heart rate, 1 minute/beat	31,4±1,45	4,35	35,6±1,35	4,33	40,8±1,01	2,46
The number of breathing, 1 minute/time	11,3±0,89	6,91	15,6±0,66	5,04	16,9±0,57	4,12
At 15 months in Summer (July)						
Body temperature, ºC	38,4±0,11	0,56	38,5±0,10	0,47	38,9±0,9	0,53
Heart rate, 1 minute/beat	36,3±1,32	4,90	41,3±1,49	4,21	42,2±1,25	3,14
The number of breathing, 1 minute/time	13,9±0,88	6,84	16,7±0,55	3,85	18,8±0,71	3,15
At 18 months in Fall (October)						
Body temperature, ºC	37,7±0,08	0,50	38,0±0,10	0,48	38,7±0,09	0,51
Heart rate, 1 minute/beat	29,9±1,39	4,58	34,8±1,57	4,96	39,6±0,87	2,57
The number of breathing, 1 minute/time	12,3±0,75	5,42	15,6±0,51	3,86	16,0±0,41	3,15

Table 3 shows that the body temperature of the mares in the experimental groups was at a normal level, but in the hybrid offspring of the Karabayir mares in the III group, obtained from crossing with the Friesian horse, the body temperature was 0.4 ºC in the summer than in the winter, and the heart rate was in 1 minute 0.2 times, the number of breathing in 1 minute was 2.8 times higher, but these crossbred foals were well adapted to our warm climate due to the fact that they were kept in "stable-pasture" conditions.

Conclusion

Thus, these data show that in the summer season, the clinical indicators in all groups of foals were higher than in the winter, spring, and autumn seasons, which indicates that the metabolic processes in the foals' organism were slightly higher due to the influence of hot air temperature in the summer season.

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