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MORPHOLOGICAL INDICATORS OF PRIMARY COWS OF DIFFERENT GENOTYPES

ANNOTATION

The article presents the results of studies of morphological parameters of blood, mineral and protein composition in the blood serum of first-calf cows. The effect of the genotype on both the number of red blood cells and the hemoglobin content in the blood has been established.

The effect of the genotype on both the number of red blood cells and the hemoglobin content in the blood has been established. At the same time, the first-calf cows of the black-and-white breed of group I differed by the minimum value of the analyzed indicators. So they lost to the Holstein crickets of the German selection of group II in terms of the number of red blood cells in the blood in winter by 0.33*1012/l (4.73% P<0.01), in summer – by 0.45*1012/l (6.24%, P<0.01), the hemoglobin content, respectively, by 2.47 g/l (2.13%, p<0.05) and 2.95 g/l (2.52%, p<0.05), holsteins of the Dutch selection of group II – by 0.46*1012/l (6.60%, p<0.01) and 0.68*1012/l (9.43%, p<0.01), 3.42 g/l (2.95%, P<0.01) and 3.25 g/l (2.78%, P<0.01), by crossbreeds of group IV– 0,18*1012/ l (2.58%, P < 0.05) and 0.09 * 1012/l (1.25%, P > 0.05), 1.40 g/l (1.21%, P < 0.05) and 1.92 g/l (1.64%, P < 0.05), by crossbreeds of group V – 0.24*1012/l (3.44%, P<0.05) and 0.32*1012/l (4.44%, P<0.05), 2.16 g/l (1.86%, P<0.01) and 2.40 g/l (2.05%, P<0.05).

The minimum value of the analyzed indicators was distinguished by the first-calf cows of the black-and-white breed. They were inferior to the Holstein peers of the German selection in terms of the number of red blood cells in the blood in winter by 0.33 · 10^{12}/l, in summer – by 0.45 · 10^{12}/l; according to the hemoglobin content – by 2.47 g/l and 2.95 g/l, respectively, Dutch holsteins – by 0.46 ·10^{12}/l and 0.68 · 10^{12}/l, 3.42 g/l and 3.25 g/l, crossbreeds ½ holsteins of German selection × ½ black-and-white – 0,18· 10^{12}/ l and 0.09 · 10^{12}/l, 1.40 g/l and 1.92 g/l, crossbreeds ½ holstein Dutch selection × ½ black and mottled – 0,24 · 10^{12}/ l and 0.32 · 10^{12}/l, 2.16 g/l and 2.40 g/l. The effect of the genotype on the albumin content in the blood serum of first-calf cows has been established. At the same time, their maximum level was distinguished by animals of the Holstein breed of foreign selection of groups II and III, the purebred first–born cows of the black–and-white breed of group I, crossbreeds of groups IV and V were characterized by intermediate inheritance of the trait. Suffice it to note that the first-born cows of the black-and-white breed of group I were inferior to their peers of groups II, III, IV and V in terms of serum albumin concentration in winter, respectively, by 1.26 g/l (3.12%, P<0.01), 1.63 g/l (4.04%, P<0.01), 0.64 g/l (1.58%, P<0.05), 1.40 g/l (3.47%, P<0.05), in the summer season – by 1.00 g/l (2.38%, P<0.05), 1.25 g/l (2.98%, P<0.05), 0.15 g/l (0.36%, P>0.05), 0.90 g/l (2.14%, P<0.05).

Key words: *black-and-white breed, holsteins of German and Dutch breeding, morphological composition of blood, erythrocytes, leukocytes, vitamin A, dairy cattle breeding*

Introduction. Blood performs diverse functions and provides the necessary conditions for the vital activity of all body tissues. In turn, the composition of blood largely depends on the state of the body as a whole, as well as its individual organs and tissues. In case of violation of their functions, the

development of local or general pathological processes, not only the biochemical, but also the morphological composition of the blood changes. It is known that one of the most important interior signs, largely characterizing the physiological state of animals, the direction and level of metabolic processes, are hematological indicators. At the same time, it should be borne in mind that blood, with its certain constancy of composition, is a fairly labile medium. It changes under the influence of various factors, the most important of which are environmental conditions [1-10]. According to the biochemical parameters of the blood, it is possible to judge the intensity of metabolic processes, therefore, the level of dairy productivity of animals. Since blood enzymes, their activity, the level of metabolism, as well as biochemical adaptation are encoded in animal genes, it can be assumed that the biochemical composition of their blood is to some extent related to their breeding and productive qualities [11-14].

The aim of the work was to determine the hematological parameters of the blood of first-calf cows of various genotypes.

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Providing the population with dairy cattle products of domestic production is one of the most important tasks of the agro-industrial complex. A significant increase in the milk productivity of animals causes a tense function of all organs and systems of the body, which often leads to a decrease in its resistance to adverse environmental conditions, the occurrence of infectious diseases and a decrease in productivity. According to a number of scientists and practitioners, the main direction of genetic improvement of livestock in the coming century will be its selection not only for high productivity, but also for resistance to diseases. When conducting breeding activities in a number of large farms engaged in breeding farm animals, much attention is paid to increasing the productivity of animals, studying their immune status. The state of individual organs and tissues, as well as the natural resistance of the body, significantly depends on the composition of the blood. Thus, the study of blood composition provides information about the physiological state of the body, productive and adaptive qualities of animals

According to the biochemical parameters of the blood, it is possible to judge the intensity of metabolic processes, and, consequently, the level of dairy productivity of animals. Since blood enzymes, their activity, the level of metabolism, as well as biochemical adaptation are encoded in the heredity of animals, in their genes, it can be assumed that the biochemical composition of blood in cows is to some extent related to their breeding and productive qualities. One of the decisive factors in increasing dairy productivity and the natural defenses of the cows' body is the creation of optimal conditions for keeping and feeding, ensuring a normal physiological state and satisfying biological needs for basic nutrients. The study of the factors of natural resistance of cattle of different genotypes in specific ecological, climatic and technological conditions is relevant, has great scientific and practical interest, which served as the basis for these studies.

The content of erythrocytes, hemoglobin and other hematological parameters in the blood varies depending on age, gender, feeding level, content, productivity and season of the year. Hematological indicators are interrelated with the productivity of animals. In this regard, biochemical blood indicators are increasingly used for the early assessment of economically useful signs of animals. Thus, the content of serum blood proteins is studied when studying the growth and development of young animals of the biological basis of productivity and genetic characteristics of animals [15-20].

Material and methods. For research in the conditions of the farm, five groups of animals with 12 heads each were formed from among the first-born cows on the principle of groups-analogues, taking into account the origin, live weight, physiological state: I – black-and–white (purebred); II – holsteins of German breeding (purebred); III - holsteins of Dutch breeding (purebred); IV – ½ holstein of German selection × ½ black-mottled; V – ½ holstein of Dutch selection × ½ black-mottled. Control of the physiological state of the organism of first-calf cows was carried out by taking blood from 3 animals from each group according to the seasons of the year. At the same time, the hemoglobin content, the number of leukocytes, the number of erythrocytes, the content of calcium, phosphorus, vitamin A were determined according to generally accepted methods.

Results and discussion. The ability of an organism to maintain a certain level of stability, that is, to be adapted to the action of factors that are diverse in nature, including those of an extreme nature, is determined, among other things, by the nonspecific resistance of the organism. Adaptation is

the adaptation of an animal's metabolism to the new conditions of its life. The adaptability of living beings to new conditions is very great. One of the ways to identify the boundaries of life is the study of metabolism, which determine the body's resistance to unusual environmental factors and the ability of animals to adapt to them. It was found that the morphological and biochemical composition of the blood of first-calf cows of all groups was within the physiological norm with an increase in the number of red blood cells, blood saturation with hemoglobin, total protein and protein fractions in the summer period of the year. The change is confirmed by the results of monitoring the morphological composition of the blood of the first-calf cows of the experimental groups according to the seasons of the year (Table 1). At the same time, an increase in the concentration of erythrocytes and hemoglobin in the blood in summer compared with winter in first-calf cows of all genotypes was noted. Thus, in purebred animals of the black-and-white breed I gr. the increase in the content of erythrocytes in the blood in summer compared to the winter season of the year was 0.24 • 1012 / l (3.44%), hemoglobin – 1.10 g / l (0.95%). The increase in the value of the studied indicators was 0.36*1012/l (1.93%) and 1.58 g/l (1.36%), respectively, in Holstein cows of the German selection of the II gr., holsteins of the Dutch selection of the III group – 0,46*10 12/ l (6.19%) and 0.93 g/l (0.78%, crossbreeds of group IV – 0,15*1012/ l (2.10%) and 1.62 g/l (1.38%), crossbreeds of group V – 0,32*10 12/ l (4.44%) and 1.34 g/l (1.14%).

The effect of the genotype on both the number of red blood cells and the hemoglobin content in the blood has been established. At the same time, the first-calf cows of the black-and-white breed of group I differed by the minimum value of the analyzed indicators. So they lost to the Holstein crickets of the German selection of group II in terms of the number of red blood cells in the blood in winter by 0.33*1012/l (4.73% P<0.01), in summer – by 0.45*1012/l (6.24%, P<0.01), the hemoglobin content, respectively, by 2.47 g/l (2.13%, p<0.05) and 2.95 g/l (2.52%, p<0.05), holsteins of the Dutch selection of group II – by 0.46*1012/l (6.60%, p<0.01) and 0.68*1012/l (9.43%, p<0.01), 3.42 g/l (2.95%, P<0.01) and 3.25 g/l (2.78%, P<0.01), by crossbreeds of group IV– 0,18*1012/ l (2.58%, P < 0.05) and 0.09 * 1012/l (1.25%, P > 0.05), 1.40 g/l (1.21%, P < 0.05) and 1.92 g/l (1.64%, P < 0.05), by crossbreeds of group V – 0.24*1012/l (3.44%, P<0.05) and 0.32*1012/l (4.44%, P<0.05), 2.16 g/l (1.86%, P<0.01) and 2.40 g/l (2.05%, P<0.05).

Table 1 – Morphological indicators of blood of first-calf cows of experimental groups

Group	Indicator					
	red blood cells, 10^{12}/ l		hemoglobin, g/l		white blood cells, 10^{9}/l	
	X±Sx	Cv, %	X±Sx	Cv, %	X±Sx	Cv, %
	Winter					
I	6,97±0,31	3,22	115,88±2,28	3,04	6,77±0,43	3,51
II	7,30±0,39	4,11	118,35±2,82	3,16	6,75±0,50	3,69
III	7,43±0,40	3,81	119,30±3,24	4,12	6,74±0,66	4,12
IV	7,15±0,43	4,24	117,28±3,91	3,63	6,72±0,55	4,04
V	7,21±0,50	4,33	118,04±3,43	4,11	6,73±0,59	3,93
	Summer					
I	7,21±0,43	3,81	116,98±2,33	3,42	5,98±0,42	3,99
II	7,66±0,51	4,50	119,93±3,42	4,31	5,92±0,38	2,39
III	7,89±0,50	4,33	120,23±2,83	3,52	5,96±0,40	3,14
IV	7,30±0,66	3,92	118,90±3,63	4,12	5,95±0,55	3,94
V	7,53±0,64	3,82	119,38±3,94	4,03	5,94±0,48	2,43

The maximum concentration of erythrocytes and hemoglobin in the blood was distinguished by the holsteins of foreign selection of groups III and II, the crossbreeds approached them according to these indicators, which indicates the manifestation of the effect of crossing on these signs. When analyzing the seasonal dynamics of the quality of leukocytes in the blood, their decrease in the summer season of the year was noted in first-heifer cows of all genotypes without significant intergroup differences. This is quite understandable: in winter, exposure to adverse environmental factors leads to a strain on the body's defenses, which contributes to an increase in the number of white blood cells. In summer, environmental conditions are favorable and the concentration of white blood cells decreases. At the same time, all fluctuations in the number of leukocytes in the blood of first-calf cows did not go beyond the reference values.

Thus, in animals of the black-and-white breed of group I, the total protein content in blood serum increased by 1.02 g/l (1.31%), first–calf cows of the Holstein breed of the German selection of group II - by 1.14 g/l (1.44%), holsteins of the Dutch selection of group III by 1.16 g/l (1.45%), crossbreeds of group IV – by 1.07 g/l (1.37%), crossbreeds of group V – by 1.02 g/l (1.29%).

Thus, the concentration of total protein in the blood serum of first-calf cows of the black-and-white breed of group I in the summer period increased to a lesser extent than in animals of other genotypes. At the same time, they were inferior to holsteins of the German selection of group II in terms of the analyzed indicator in winter by 1.19 g/l (1.53%), P<0.01), in summer – by 1.31 g/l (1.66%, P<0.01), holsteins of the Dutch selection of group II, respectively, by 2.16 g/l (2.77%, P<0.01) and 2.30 g/l (2.92%, P<0.01), crossbreeds of group IV – 0.35 g/l (0.45%, P<0.05) and 0.40 g/l (0.51%, P<0.05), crossbreeds of group V – 1.22 g/ll (1.57%, P<0.05) and 1.23 g/l (1.56%, P<0.05).

The manifestation of the effect of crossing by the concentration of total protein in blood serum in crossbreeds of groups IV and V was established. As a result, animals of these genotypes, inferior to holsteins of foreign breeding of groups II and III in terms of its level, surpassed purebred first-born cows of the black-and-white breed of group I both in winter and in the summer season of the year (Table 2).

The main proteins of the blood serum are albumins. They take part in metabolic processes with proteins of body tissues and in fact are their structural elements. The analysis of the obtained experimental materials indicates that the seasonal dynamics of albumin concentration in the blood serum of first-calf cows is similar to the concentration of total protein.

Table 2 – Protein composition of blood serum of first-calf cows of experimental groups, g/l

Group	Indicator					
	total protein		albumins		globulins	
	X±Sx	Cv, %	X±Sx	Cv, %	X±Sx	Cv, %
	Winter					
I	77,88±0,64	1,14	40,38±0,98	1,88	37,08±0,89	1,90
II	79,07±0,60	1,23	41,64±1,12	2,04	37,43±0,74	1,84
III	80,04±0,74	2,04	42,01±1,38	2,14	38,03±0,94	1,73
IV	78,23±0,81	2,13	41,02±1,34	2,24	37,21±0,82	2,01
V	79,10±0,88	2,33	41,78±1,25	2,19	37,32±1,04	2,14
	Summer					
I	78,90±0,78	1,93	41,99±1,38	1,97	36,91±0,94	2,10
II	80,21±0,89	2,77	42,99±1,94	2,10	37,22±1,03	2,16
III	81,20±0,80	1,88	43,24±2,10	2,71	37,96±1,12	2,15
IV	79,30±0,98	2,82	42,24±2,09	2,33	37,16±1,18	1,99
V	80,13±0,95	2,71	42,79±2,31	2,93	37,23±1,21	2,04

Thus, in animals of the black-and-white breed of group I, the level of albumins in the blood serum in the summer period increased by 1.61 g/l (3.99%) compared to the winter seasons of the year, first–calf cows of the Holstein breed of the German selection of group II - by 1.35 g/l (3.24%), holsteins of the Dutch selection of group III – by 1.23 g/l (2.93%), crossbreeds of group IV – by 1.12 g/l (2.73%), crossbreeds of group V – by 1.11 g/l (2.66%).

The effect of the genotype on the albumin content in the blood serum of first-calf cows has been established. At the same time, their maximum level was distinguished by animals of the Holstein breed of foreign selection of groups II and III, the purebred first–born cows of the black–and-white breed of group I, crossbreeds of groups IV and V were characterized by intermediate inheritance of the trait.

Suffice it to note that the first-born cows of the black-and-white breed of group I were inferior to their peers of groups II, III, IV and V in terms of serum albumin concentration in winter, respectively, by 1.26 g/l (3.12%, P<0.01), 1.63 g/l (4.04%, P<0.01), 0.64 g/l (1.58%, P<0.05), 1.40 g/l (3.47%, P<0.05), in the summer season – by 1.00 g/l (2.38%, P<0.05), 1.25 g/l (2.98%, P<0.05), 0.15 g/l (0.36%, P>0.05), 0.90 g/l (2.14%, P<0.05).

It is known that the key role in protein metabolism in the animal body is played by the transamination enzymes aspartate aminotransferase (AST) and alanine aminotransferase (ALT). They are involved in the synthesis and destruction of individual amino acids by the reversible transfer of the amine group of amino acids to ketoacids. In addition, being oxidized in the Krebs cycle, they serve as a source of energy in the body.

The influence of the season of the year on the activity of transaminases with an increase in their level in the summer period compared with the winter season of the year was. Thus, in the first-calf cows of the black-and-white breed of group I, the increase in AST activity was 1.76 units/l (2.74%), ALT activity was 1.10 units/l (2.84%), in animals of the Holstein breed of German selection of group II, respectively, 2.07 units/l (3.10%) and 2.39 units/l (5.97%), holsteins of the Dutch selection of group II – 2.11 units/l (3.11%) and 3.05 units/l (7.39%), crossbreeds of group IV – 2.65 units/l (4.06%) and 1.60 units/l (4.01%), crossbreeds of group V – 2.67 units/l (4.03%) and 2.15 units/l (5.33%). The established dynamics of transaminase activity indicates the influence of paratypical factors on the oxidative processes of the Krebs cycle and, consequently, on the synthesis of amino acids, which are intermediate products of this cycle.

The influence of the genotype of first-calf cows on these signs has been established, as evidenced by intergroup differences in the activity of aminotransferases.

At the same time, the first-calf cows of the black-and-white breed of group I differed by the minimum value of the analyzed indicators. So they were inferior to the Holstein peers of the German selection of group II in terms of AST activity in winter by 2.71 units/l (4.23%, P<0.01), in the summer season by 3.02 units/l (4.58%, P<0.01), by the Holstein breed animals of the Dutch selection of group III, respectively, by 3.66 units/ll (5.71%, P<0.01) and 4.01 units/l (6.09%, P<0.001), crossbreeds of group IV – by 1.11 units/l (1.73%, P<0.05) and 2.00 units/l (3.04%, P<0.05), crossbreeds of group V – by 2.13 units/l (3.32%, P<0.01) and 3.04 units/l (4.61%, P<0.01).

Similar intergroup differences were observed in ALT activity. Suffice it to note that the first-calf cows of groups II, III, IV and V outperformed their peers of the black-and-white breed of group I in ALT activity in winter, respectively, by 1.16 units/l (2.98%, P<0.05), 2.40 units/l (6.18%, P<0.01), 1.02 units/ll (2.63%, P<0.05), 1.48 units/l (3.81%, P<0.05), and in the summer season – by 2.45 units/l (6.13%, P<0,01), 4,35% (10,88%, P<0.001), 1.52 units/l (3.80%, P<0.05) and 2.53 units/l (6.33%, P<0.01).

It was found that the maximum activity of transamination enzymes was distinguished by the first-calf cows of the Holstein breed of foreign selection of groups II and III, the crossbreeds of groups IV and V were characterized by intermediate inheritance of the analyzed trait, which is due to the influence of the crossing effect.

Analysis of the dynamics of the glycolytic enzyme lactate dehydrogenase (LDH) indicates an increase in its activity in first-calf cows of all genotypes in the summer compared with the winter season. In animals of the black-and-white breed of group I, this increase was 20.88 units/l (3.20%), holsteins of the German selection of group II – 22.99 units/l (3.34%), holsteins of the Dutch selection of group III – 35.21 units/l (5.04%), crossbreeds of group IV – 28.93 units/l (4.31%), crossbreeds of group V – 31.68 units/ l (4.66%).

The minimum level of LDH enzyme in the blood serum of first-calf cows of the black-and-white breed of group I has been established. So in winter, they were inferior to their peers of groups II, III, IV and V in terms of the analyzed indicator, respectively - by 36.82 units/l (5.65%, P<0.01), 47.29 units/l (7.26%, P<0,01), 19,78% (3,04%), 28,91 units/l (4.44%, P<0.05), and in the summer season – by 38.93 units/l (5.79%, P<0.01), 61.62 units/l (9.16%, P<0.001), 27.83 units/l (4.14%, P<0.05), 31.68 units/l (4.71%, P<0.01).

It is characteristic that the highest activity of LDH was distinguished by the first-born cows of foreign breeding of groups II and III, the crossbreeds were somewhat inferior to them with superiority over the black-and-white peers of group I. In general, the activity indicators of the analyzed enzymes were within the physiological norm.

According to the biochemical parameters of the blood, it is possible to judge the intensity of metabolic processes, and, consequently, the level of dairy productivity of animals. Since blood enzymes, their activity, the level of metabolism, as well as biochemical adaptation are encoded in the heredity of animals, in their genes, it can be assumed that the biochemical composition of blood in cows is to some extent related to their breeding and productive qualities. One of the decisive factors in increasing dairy productivity and the natural defenses of the cows' body is the creation of optimal conditions for keeping and feeding, ensuring a normal physiological state and satisfying biological needs for basic nutrients. The study of the factors of natural resistance of cattle of different genotypes in specific ecological, climatic and technological conditions is relevant, has great scientific and practical interest, which served as the basis for these studies.

Conclusion. Hematological parameters of first-calf cows of all genotypes were within the physiological norm. Metabolic processes took place more intensively in the body of Holstein cows and their hybrids with black-and-white cattle, which is confirmed by a higher concentration of erythrocytes and hemoglobin in the blood, total protein in the blood serum. Studies have established that, regardless of breeding, Holstein cows have a high genetic potential for milk productivity and in all lactation they show it well under specific conditions. According to the biochemical parameters of the blood, it is possible to judge the intensity of metabolic processes, and, consequently, the level of dairy productivity of animals. Since blood enzymes, their activity, the level of metabolism, as well as biochemical adaptation are encoded in the heredity of animals, in their genes, it can be assumed that the biochemical composition of blood in cows is to some extent related to their breeding and productive qualities. One of the decisive factors in increasing dairy productivity and the natural defenses of the cows' body is the creation of optimal conditions for keeping and feeding, ensuring a normal physiological state and satisfying biological needs for basic nutrients. The study of the factors of natural resistance of cattle of different genotypes in specific ecological, climatic and technological conditions is relevant, has great scientific and practical interest, which served as the basis for these studies.

REFERENCES

1 Salikhov, A.A. The influence of various factors on the quality of beef in different ecological and technological conditions [Text] / A.A. Salikhov, V.I. Kosilov, E.N. Lyndina - Orenburg. - 2008. - 368 p .

2 Tyulebaev, S.D. The use of single-nucleotide polymorphism in creating a crossline of meat simmentals [Text] / S.D. Tyulebaev, M.D. Kadysheva, V.M. Gabidulin et al. // IOP Conference Series: Earth and Environmental Science. The proceedings of the conference AgroCON-2019. - 2019. - p. 012188.

3 Kosilov, V.I., Hematological indicators of heifers of various genotypes in the Southern Urals [Text] / V.I. Kosilov, S.I. Mironenko, O.A. Zhukova // Bulletin of beef cattle breeding. - 2009. - Vol. 1. - No. 62. - pp. 150-158.

4 Mironova, I.V. Regularity of the use of energy rations by black-and-white cows when introducing a probiotic supplement "Vetosporin-active" into the diet [Text] / I.V. Mironova, V.I. Kosilov, A.A. Nigmatyanov et al. // Actual directions of agricultural development production in modern trends of agrarian science: collection of scientific works. -Uralsk 2014. - pp. 259-265.

5 Buravov, A. The potential of meat productivity of Simmental cattle bred in the Southern Urals [Text] / A. Buravov, A. Salikhov, V. Kosilov et al. // Dairy and meat cattle breeding. -2011. - No. 1. - pp. 18-19.

6 Litovchenko, V.G. The influence of the probiotic feed additive biodarin on the growth and development of heifers of the Simmental breed [Text] / V.G. Litovchenko, S.S. Zhaimysheva, V.I. Kosilov et al. // Agroindustrial Complex of Russia. - 2017. Vol. 24. - No. 2. - pp. 391-396.

7 Morozova, L. Improving the physiological and biochemical status of high-yielding cows through complete feeding [Text] /L. Morozova, I. Mikolaychik, M. Rebezov, et. al. // International Journal of Pharmaceutical Research. - 2020; 12 (Suppl.ry 1): - p. 2181-2190.

8 Komarova, N.K. New technological methods of increasing dairy productivity of cows based on laser radiation [Text] / N.K. Komarova, V.I. Kosilov, E.Y. Isaikina et al.// - M., - 2015. - 192 p.

9 Nikonova, E.A., Exterior features of young black-and-white breed and its crossbreeds with holsteins / E.A. Nikonova, S.I.Mironenko, T.S.Kubatbekov // Izvestiya Orenburg State Agrarian University. - 2021. - № 3 (89). - P. 272 – 277.

10 Kharlamov, A.V. Hematological indicators of red steppe bulls when feeding mixed feeds of various compositions [Text] / A.V. Kharlamov, A.M. Miroshnikov, S.A. Kovalev // Bulletin of meat cattle breeding. -2010. - Vol. 1. - No. 63. -pp. 128 – 133.

11 Kosilov, V., Productive qualities of bulls of black-and-white and Simmental breeds and their two- and three-breed crossbreeds [Text] / V.I. Kosilov, S.Mironenko, E.Nikonova // Dairy and meat cattle breeding. -2012. - No. 7.- pp. 8-11.

12 Zyryanova, I.A. Efficiency of cattle crossing as a factor of increasing meat productivity [Text] / I.A. Zyryanova, E.A. Nikonova, R.G.Kalyakina // Sustainable development of territories: theory and practice: mater. IX All-Russian Scientific and Practical conf. Sibai. - 2018. - pp. 56-58.

13 Skvortsov, E.A. Determination of the applicability of robotics in animal husbandry[Text] /, O.A. Bykova, V.S. Mymrin et. al. The Turkish Online Journal of Design Art and Communication. - 2018; 8(S-MRCHSPCL): -P.291-299.

14 Kubatbekov, T.S. The genotypic peculiarities of the consumption and the use of nutrients and energy from the fodder by the purebred and crossbred heifers [Text] / T.S. Kubatbekov, V.I. Kosilov, A.P. Kaledin et al. Journal of Biochemical Technology. - 2020; 11(4): - pp. 36-41.

15 Weight growth of Kalmyk bulls of different linear affiliation in the conditions of Primorsky Krai [Text] / V.V. Tolochka, D.Ts. Garmaev, V.I. Kosilov, etc. // Agrarian Bulletin of Primorye. 2019. No. 3 (15). -pp. 25 -27.

16 Kosilov, V. I. Amino acid composition of milk protein of first-calf cows [Text] / V. I. Kosilov, Yu. A. Yuldashbayev, B. T. Kadralieva // Bulletin of KrasGAU. – 2022. – № 11(188). – Pp. 151-157.

17 Kosilov, V. I. Comparative characteristics of the development features of muscle and bone tissue in young Black and white cattle and their crossbreeds [Text] / V. I. Kosilov, T. S. Kubatbekov, Yu. A. Yuldashbaev [et al.] // International Journal of Ecosystems and Ecology Science. – 2022. – Vol. 12, No. 4. – P. 505-510.

18 Bykova, O. A. A Study on Milk Productivity of Black-and-white Cows Considering Genotypes of DNA Markers CSN2, LGB, CRH, STAT1, TFAM1, and TFAM2 [Text] / O.A. Bykova, O. S. Chechenikhina, A. V. Stepanov [et al.] // International Transaction Journal of Engineering, Management and Applied Sciences and Technologies. – 2022. – Vol. 13, No. 3. – P. 133.

19 Nikonova, E. A. Protein composition, activity of serum aminotransferases and indicators of natural resistance of heifers of different genotypes [Text] / E. A. Nikonova, I. V. Mironova, T. N. Kokov [et al.] // Izvestiya Orenburg State Agrarian University. – 2022. – № 3(95). – Pp. 307-311.

20 Kadralieva, B. T. Indicators of the development of the hair cover of first-calf cows of different genotypes by seasons [Text] / B. T. Kadralieva, V. I. Kosilov, I. A. Babicheva [et al.] // Izvestiya Orenburg State Agrarian University. – 2023. – № 2(100). – Pp. 244-249.

ТҮЙІН

Мақалада сиырлардың қан сарысуындағы қанның, минералды және ақуыз құрамының морфологиялық көрсеткіштерін зерттеу нәтижелері келтірілген. Генотиптің эритроциттер санына да, қандағы гемоглобин құрамына да әсері анықталды. Талданатын көрсеткіштердің минималды мөлшері қара түсті тұқымды сиырлармен ерекшеленді. Олар қыста қандағы эритроциттер саны бойынша неміс селекциясының голштин құрдастарынан $0,33 \cdot 10^{12}$/л, жазда $0,45 \cdot 10^{12}$/л төмен болды; гемоглобиннің құрамы бойынша – тиісінше 2,47 г/л және 2,95 г/л,

голландиялық селекцияның гольштиндері – 0,46 ·10^{12}/л және 0,68 · 10^{12}/л, 3,42 г/л және 3,25 г/л, ½ гольштин неміс селекциясының будандары × ½ қара-түсті– 0,18· 10^{12}/л және 0,09 · 10^{12}/л, 1,40 г/л және 1,92 г/л, ½ голландиялық селекцияның гольштині × ½ қара түсті– 0,24 · 1012/л және 0,32 · 10^{12}/л, 2,16 г/л және 2,40 г/л. Генотиптің эритроциттер санына да, қандағы гемоглобин құрамына да әсері анықталды. Сонымен қатар, I топтағы қара және түрлі-түсті тұқымның сиырлары талданған көрсеткіштердің минималды мәнімен ерекшеленді. Осылайша, олар қыс мезгілінде қандағы эритроциттер саны бойынша II топтағы гольштин қыста 0,33*1012/л (4,73%, P<0,01), жазда – 0,45*1012/л (6,24%, P<0,01), гемоглобин мөлшері тиісінше 2,47 г/л (2,13%, p<0,05) және 2,95 г/л (2,52%, p<0,05), II топтағы голланд селекциясының гольштиндері-0,46*1012/л (6,60%, p<0,01) және 0,68*1012/л (9,43%, p<0,01), 3,42 г/л (2,95%, P<0,01) және IV топтағы будандарда 3,25 г/л (2,78%, P<0,01) – 0,18*1012/л (2,58%, P < 0,05) және 0,09 * 1012/л (1,25%, P > 0,05), 1,40 г / л(1,21%, P < 0,05) және 1,92 г/л (1,64%, P < 0,05), V топтағы будандарда-0,24*1012 / л (3,44%, P<0,05) және 0,32*1012/л (4,44%, P<0,05), 2,16 г/л (1,86%, P<0,01) және 2,40 г/л (2,05%, P<0,05). Сиырлардың қан сарысуындағы альбуминдердің құрамына генотиптің әсері анықталды. Сонымен қатар, олардың максималды деңгейі II және III топтардың шетелдік селекциясының гольштин тұқымының ерекшеленді, ең азы – I топтағы қара түсті тұқымның таза тұқымды сиырлары, IV және V топтардың будандары белгінің аралық тұқым қуалауымен сипатталды. Генотиптің тұңғыш сиыр қан сарысуындағы альбумин құрамына әсері анықталды. I топтағы қара түсті тұқымның сиырлары қыста сарысулық альбумин концентрациясы бойынша II, III, IV және V топтардағы құрдастарынан тиісінше 1,26 г/л (3,12%, P<0,01), 1,63 г/л (4,04%, P<0,01), 0,64 г/л (1,58%, P<0,05), 1,40 г/л (3,47%, P<0,05), жазғы маусымда-1,00 г/л (2,38%, P<0,05), 1,25 г/л (2,98%, P<0,05), 0,15 г/л (0,36% , P>0,05), 0,90 г/л (2,14%, P<0,05).

РЕЗЮМЕ

В статье представлены результаты исследований морфологических показателей крови, минерального и белкового состава сыворотки крови коров-первотелок. Установлено влияние генотипа как на количество эритроцитов, так и на содержание гемоглобина в крови. Минимальным значением анализируемых показателей отличались коровы-первотелки черно-пестрой породы. Они уступали голштинским сверстникам немецкой селекции по количеству эритроцитов в крови зимой на 0,33•1012/л, летом – на 0,45•1012/л; по содержанию гемоглобина – на 2,47 г/л и 2,95 г/л соответственно, голландские голштинцы – на 0,46•1012/л и 0,68•1012/л, 3,42 г/л и 3,25 г/л, помеси ½ голштинцев немецкой селекции × ½ черно-белых - на 0,18• 1012/л и 0,09 • 1012/л, 1,40 г/л и 1,92 г/л, помеси ½ голштинской голландской селекции × ½ черной и пестрой – 0,24 • 1012/ л и 0,32 • 1012/л, 2,16 г/л и 2,40 г/л. Установлено влияние генотипа как на количество эритроцитов, так и содержание гемоглобина в крови. При этом минимальной величиной анализируемых показателей отличались коровы-первотелки черно-пестрой породы I группы. Так они уступали голштинским сверстницам немецкой селекции II группы по количеству эритроцитов в крови в зимний период на 0,33*1012/л (4,73% P<0,01), летом – на 0,45*1012/л (6,24%, P<0,01), содержанию гемоглобина соответственно на 2,47 г/л (2,13%, P<0,05) и 2,95 г/л (2,52% P<0,05), голштинам голландской селекции II группы– на 0,46*1012/л (6,60%, P<0,01) и 0,68*1012/л (9,43%, P<0,01), 3,42 г/л (2,95%, P<0,01) и 3,25 г/л (2,78%, P<0,01), помесям IV группы – 0,18*1012/л (2,58%, P<0,05) и 0,09*10 12/л (1,25%, P>0,05), 1,40 г/л (1,21%, P<0,05) и 1,92 г/л (1,64%, P<0,05), помесям V группы – 0,24*10 12/л (3,44%, P<0,05) и 0,32*10 12/л (4,44%, P<0,05), 2,16 г/л (1,86%, P<0,01) и 2,40 г/л (2,05%, P<0,05).

Установлено влияние генотипа на содержание альбумина в сыворотке крови коров-первотелок. При этом их максимальным уровнем отличались животные голштинской породы зарубежной селекции II и III групп, чистокровные коровы–первенцы черно–пестрой породы I группы, помеси IV и V групп характеризовались промежуточным наследованием признака. Достаточно отметить, что коровы-первенцы черно-пестрой породы I группы уступали своим сверстницам II, III, IV и V групп по концентрации сывороточного альбумина зимой соответственно на 1,26 г/л (3,12%, P<0,01), 1,63 г/л (4,04%, P<0,01), 0,64 г/л (1,58%, P<0,05), 1,40 г/л (3,47%, P<0,05), в летний сезон – на 1,00 г/л (2,38%, P<0,05), 1,25 г/л (2,98%, P<0,05), 0,15 г/л (0,36%, P>0,05), 0,90 г/л (2,14%, P<0,05).