

Dynamics Of Hematological Parameters Of Orenburg Goats Bred In Uzbekistan By Different Sexes And Ages

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Abstract. *The work researched that this article is the first study of the dynamics of hematological indicators of different sexes and ages of white Orenburg goats brought to our country from abroad. For the first time, the studies used goats from goats that gave birth. In the experiment, three groups were formed, and male goats (he-goat) were included in the first group, female goats (doe) were included in the second group, and barren goats (wether) were included in the third group. A vasectomy was performed in one-month-old male goats using an open blood method. In goats of different sexes, hematological parameters changed dramatically from birth to one month of age, and this was especially evident in erythrocyte, hemoglobin, and hematocrit parameters. According to sexual dimorphism, the indicators of erythrocyte, hemoglobin, hematocrit were relatively high in goats, while the leukocyte index was higher in male and female goats. However, in adult goats, it was found that the hematological parameters were at the level of physiological norm, and no negative effects of vasectomy were observed.*

Key words: *postembryonic period, Orenburg goat breed, erythrocyte, hemoglobin, hematocrit, erythrocyte index.*

INTRODUCTION

Today, goats are valuable and necessary animals in agriculture. Currently, there are many breeds and groups of goats in many parts of the world. They are diverse in terms of size and live weight, direction of productivity, characteristics of skin and wool, constitutional and exterior, distribution area. The diversity of goat breeds requires them to be grouped into one or another group according to their zoological and economic characteristics. According to their zoological characteristics, goats can be divided into three main groups: Western European - breeds of milk, tweed and wool, European and Asian goats - coarse-wool breeds and goats of mixed productivity, Indo-African breeds of milk and goats of mixed productivity [11,12].

Due to their biological characteristics, goats are ideal animals for breeding due to their ability to survive in harsh conditions and high productivity [9].

It is known that the period of personal development of an organism (ontogeny) is divided into two big periods. The first period of ontogenesis is the embryonic period. During the embryonic period, the growth and formation of the body is very fast, and the developing fetus is very sensitive to various changes. But during this period, it is very difficult to control the fetus in a certain direction. Because this process is carried out by the mother's body. The mother's organism protects the embryo from the influence of the external environment [2].

After the end of the embryonic period in the organism, the second period of ontogenesis - the postembryonic period - begins. In this case, the young organism born will be exposed to new environmental conditions and will have to adapt to these environmental conditions and develop. During this period, the organism of a young animal is affected by external environmental factors, including care, feeding, light, humidity, air temperature, air pressure and other factors. The animal organism reacts to the continuous influence of these factors through unconditional and conditioned reflexes formed on their basis. At the same time, blood has an important biological importance for the normal functioning of processes in the body [5].

Hematological, biochemical and mineral indicators of the composition of the blood of animals differ by breed, sex, physiological state, and determination of these indicators provides valuable information about

health. Although there is a lot of information about normal blood parameters for livestock species, there is variation between animal breeds due to various environmental factors and different husbandry methods. [4,8].

Hematological indicators are widely used to determine the physiological adaptation to a new environment and systemic interrelationships [7].

Hematological tests serve as an important tool for assessing the physiological and health status of farm animals. Hematological tests in farm animals are widely discussed as an integral part of the clinical examination, often pointing to a clear differential diagnosis or allowing a prognosis [3,6].

Today, Orenburg and Angar goat breeds are being brought from abroad in order to develop goat breeding in the fluff area and to establish the cultivation of soft wool in our country. However, there are almost no studies on the growth, development and productivity of fluff goats imported from abroad under new environmental conditions. Therefore, it is important to determine how sexual dimorphism and related live weight change in different age periods in imported Orenburg goats, how goats grow and adapt to new environmental conditions, allows for initial thinking.

Based on this, determining the number of shaped elements of blood is of great practical importance. If we know the indicators of blood in the body, we can think about the changes in the physiological state of animals in the new environmental conditions. That is why it is important to know the dynamics of hematological parameters during the period of post-embryonic lactation and physiological maturity of goats born from imported Orenburg goats.

MATERIALS AND METHODS

The researches were carried out on Orenburg goats of the fluff line bred at Nurota Karakul Breeding LLC in the village of Temirkovuk, Nurota District, Navoi Region. For the first time, goats taken from goats that gave birth were used. In the experiment, three groups were formed, and male goats (he-goat) were included in the first group, female goats (doe) were included in the second group, and barren goats (wether) were included in the third group. A vasectomy was performed in one-month-old male goats using an open blood method. 20 goats were selected for each group. Blood samples from the goats were taken from the neck of the goats in a vacuum blood collector using a syringe before feeding in the morning. Hematological indicators of blood were determined using the "BK-6190" automatic hematological analyzer. With the help of this device, indicators such as WBC - leukocytes, RBC - erythrocytes, HGB - hemoglobin, HCT - hematocrit were determined [1]. The following erythrocyte parameters were determined during the experiment: erythrocyte concentration (RBS), hemoglobin content (HGB), hematocrit (HCT), mean hemoglobin content in erythrocyte (MCH), erythrocyte volume (MCV), hemoglobin concentration in erythrocyte (MCHC). During the experiment, the following erythrocyte parameters: average erythrocyte volume (MCV), average hemoglobin content in erythrocyte (MCH), average hemoglobin concentration in erythrocyte content (MCHC) were calculated using appropriate formulas.

The received numerical data were processed in a mathematical-statistical manner: the arithmetic mean value - \bar{X} , the error of the arithmetic mean value - S_x , the coefficient of variation - $C_v\%$, the reliability criterion of the difference between groups - P were calculated using the appropriate formulas using the Microsoft Office Excel 2007 computer program [10].

RESULT AND DISCUSSION

During the research, hematological parameters were determined in Orenburg goats of different sexes and ages. Numerical data obtained on the dynamics of the morphological composition of blood in Orenburg goats of different sexes and ages in the experiment are presented in Table 1 below.

The analysis of the data in this table shows that the average arithmetic value of erythrocytes on the first day of life of goats in male goats is $11.52 \pm 0.24 \times 10^{12}/l$, and the average value in female goats is $11.35 \pm 0.25 \times 10^{12}/l$. Sexual dimorphism was $0.17 \times 10^{12}/l$ or 1.50%, but there was no significant difference ($P > 0.05$).

It was observed that the amount of erythrocytes decreased relatively in both groups at the age of one month. The average arithmetic value of erythrocytes in male goats at this age was $10.21 \pm 0.33 \times 10^{12}/l$. At this age, it was found that the amount of erythrocytes decreased by $1.31 \times 10^{12}/l$ ($P < 0.01$), or by 11.37%, compared to the time of birth. In female goats, the average arithmetic value of erythrocytes was $9.64 \pm 0.29 \times 10^{12}/l$, and compared to the time of birth, its amount decreased by $1.71 \times 10^{12}/l$ ($P < 0.01$), or 15.07%. At the age of one month, the difference in sexual dimorphism was $0.57 \times 10^{12}/l$ or 5.91%, but there was no significant difference ($P > 0.05$). The amount of erythrocytes was $10.07 \times 10^{12}/l$ in the group of sedated goats formed at the age of one month, and it did not differ from male and female goats.

During the experiments, the indicators of erythrocytes determined for sexual dimorphism in Orenburg goats at the age of 4 months at weaning were $15.13 \times 10^{12}/l$; It was $14.92 \times 10^{12}/l$ and $14.75 \times 10^{12}/l$. It can be seen that, even at this age, the amount of erythrocytes of male goats was higher than that of females and goats by $0.21 \times 10^{12}/l$ or 1.41% and $0.38 \times 10^{12}/l$ or 2.78%, respectively, but there was no reliable difference between them ($P > 0.05$). However, it was found that the quantity of erythrocytes per volume unit in all groups was reliably increased compared to the age of one month. In particular, the amount of erythrocytes increased by $4.92 \times 10^{12}/l$ ($P < 0.001$) or 48.18% in male goats, $5.28 \times 10^{12}/l$ ($P < 0.001$) or 54.77% in female goats, and $4.68 \times 10^{12}/l$ ($P < 0.001$) or It was found that it increased by 46.47%.

The amount of erythrocytes at the age of eight months of goats is 16.21; It was 15.65 and $15.87 \times 10^{12}/l$. At this age, the amount of erythrocytes increased by $1.08 \times 10^{12}/l$ ($P < 0.05$), or 7.14%, $0.73 \times 10^{12}/l$ ($P > 0.05$), or 4.89%, $1.12 \times 10^{12}/l$ ($P < 0.05$), or 7.59%, respectively. At the age of eight months, male goats were superior to female goats and goats by 0.56 and $0.34 \times 10^{12}/l$ units, respectively, but there was no significant difference between them ($P > 0.05$). At the age of 12 months, the amount of erythrocytes in goats according to sexual dimorphism is $15.75 \times 10^{12}/l$; $15.13 \times 10^{12}/l$ in the female goat group; it was $15.33 \times 10^{12}/l$ units in the sarcoid group. Among the groups, a relatively high rate was recorded in the he-goat group, but the difference did not have a reliable value. Also, at this age, the amount of erythrocytes was 0.45, respectively, in groups compared to the age of eight months; 0.52 and $0.54 \times 10^{12}/l$ units were observed to decrease, but no significant difference was found between them ($P > 0.05$). In physiologically mature goats, the erythrocyte index was $16.06 \times 10^{12}/l$ in the he-goat group, $15.52 \times 10^{12}/l$ in the doe group, and $15.93 \times 10^{12}/l$ in the wether group. Even at this age, a relatively high rate was observed in the he-goat group, and the difference did not have a reliable value. 0.30 of the goats' erythrocytes at 12 months of age in groups, respectively; 0.39 and $0.60 \times 10^{12}/L$ units were found to increase, but this difference was also not statistically significant.

Table 1. Morphological composition of blood of Orenburg goats of different ages and sexes, n-10

Age, month	Sex					
	♂		♀		wether	
	$\bar{X} \pm S_x$	$C_v\%$	$\bar{X} \pm S_x$	$C_v\%$	$\bar{X} \pm S_x$	$C_v\%$
RBS, $\times 10^{12}/l$						
0	11,52±0,24	6,70	11,35±0,25	7,04	-	-
1	10,21±0,33	10,36	9,64±0,29	9,65	10,07±0,31	9,85
4	15,13±0,29	6,03	14,92±0,36	7,55	14,75±0,32	6,86
8	16,21±0,27	5,25	15,65±0,30	6,08	15,87±0,32	6,44
12	15,76±0,25	5,07	15,13±0,27	5,69	15,33±0,29	6,03
18	16,06±0,31	6,17	15,52±0,26	5,27	15,93±0,30	5,86
WBC, $\times 10^9/l$						
0	8,24±0,21	8,16	8,84±0,21	7,60	-	-
1	8,78±0,23	8,23	9,20±0,24	8,13	8,86±0,25	8,97
4	9,46±0,24	7,98	9,86±0,22	7,16	9,98±0,24	7,47
8	8,98±0,24	8,36	9,24±0,24	8,09	9,14±0,23	7,86
12	9,82±0,23	7,53	10,62±0,26*	7,66	10,28±0,23	7,17
18	9,14±0,24	8,19	9,54±0,24	8,09	9,60±0,24	7,86

HGB, g%						
0	8,36±0,18	6,75	8,02±0,18	7,10	-	-
1	6,88±0,21	9,71	6,74±0,21	9,90	6,80±0,20	9,20
4	8,82±0,22	7,82	8,66±0,24	8,78	8,70±0,20	7,13
8	8,69±0,19	7,04	8,26±0,18	6,95	8,52±0,20	7,27
12	8,28±0,18	6,85	8,16±0,18	7,10	8,30±0,18	7,03
18	9,18±0,17	5,94	8,76±0,18	6,44	8,92±0,18	6,27
HCT, %						
0	27,58±0,56	6,37	27,32±0,49	5,72	-	-
1	24,12±0,20	2,56	22,88±0,18	2,18	23,95±0,17	2,29
4	28,32±0,30	3,34	28,22±0,32	3,59	28,03±0,30	3,41
8	28,60±0,21	2,30	28,32±0,22	2,43	28,75±0,19	2,11
12	28,01±0,15	1,64	27,70±0,17	1,91	28,13±0,17	1,96
18	28,80±0,27	2,96	28,62±0,22	2,49	28,71±0,18	2,03

In the researches, the dynamics of leukocytes, which are white blood cells, of experimental goats according to age periods were also determined. The dynamics of leukocyte quantity indicators per volume unit by age periods increased steadily. In particular, on the first day of the goats' life, the average arithmetic value of leukocytes in male goats was $8.24 \pm 0.21 \times 10^9/l$, and the average value in female goats was $8.84 \pm 0.21 \times 10^9/l$. The difference in sexual dimorphism was $0.60 \times 10^9/l$ or 7.28%, but the difference was not statistically significant ($P > 0.05$), although female goats predominated. It was noted that the number of leukocytes in the experimental goats increased relatively in both groups at the age of one month. At this age, the average arithmetic value of leukocytes in male goats was $8.78 \pm 0.23 \times 10^9/l$, and in female goats it was $9.20 \pm 0.24 \times 10^9/l$. The difference in sexual dimorphism was $0.42 \times 10^9/l$ or 7.28%, but the difference was not statistically significant ($P > 0.05$), although female goats predominated. Also, compared to the time of birth, the number of leukocytes increased by $0.54 \times 10^9/l$ ($P > 0.05$) or 6.55% and $0.36 \times 10^9/l$ ($P > 0.05$) or 4.07% by gender. The average amount of leukocytes in the group of 1-month-old goats was $8.86 \times 10^9/l$, and it did not differ from male and female goats. At the age of 4 months, leukocyte values in the male, female and male groups were $9.46 \times 10^9/l$; It corresponded to $9.86 \times 10^9/l$ and $9.98 \times 10^9/l$. At this age, the number of leukocytes in the group of female and infected goats was higher than that of male goats, correspondingly $0.40 \times 10^9/l$ ($P > 0.05$) or 4.23% and $0.52 \times 10^9/l$ or 5.50%, respectively, but the difference did not have a reliable value. At this age, it was shown that the quantity of leukocytes in a volume unit increased compared to the age of one month. In particular, the amount of leukocytes in male goats was $0.68 \times 10^9/l$ ($P > 0.05$) or 7.74%, in female goats it was $0.66 \times 10^9/l$ ($P > 0.05$) or 7.17%, and in the group of infected goats it was $1.12 \times 10^9/l$ ($P < 0.01$) or 12.64%. It was found that it increased. The average arithmetical value of leukocyte count of experimental goats at the age of eight months by groups is 8.98, respectively; It was 9.24 and $9.14 \times 10^9/l$. When comparing the number of leukocytes at this age compared to the age of four months, it was observed that it decreased by $0.48 \times 10^9/l$ ($P > 0.05$), or 5.07%, $0.62 \times 10^9/l$ ($P > 0.05$), or 6.29%, $0.84 \times 10^9/l$ ($P < 0.05$), or 8.42%, respectively. At eight months of age, the female goat group was superior to the he-goat and wether goat groups by 0.26 and $0.10 \times 10^9/l$ units, respectively, for sexual dimorphism, but it did not have a reliable value ($P > 0.05$). At the age of twelve months, leukocyte count of goats was $9.82 \times 10^9/l$, $10.62 \times 10^9/l$ in female goats, and $10.28 \times 10^9/l$ in goats. In terms of sexual dimorphism, female goats were superior to the he-goat group by $0.8 \times 10^9/l$ ($P < 0.05$) or 8.15%, and by $0.34 \times 10^9/l$ ($P > 0.05$) or 3.31% to the wether group. In addition, it was found that the amount of leukocytes increased by $0.84 \times 10^9/l$ ($P < 0.05$) or 9.35% in goats, by $1.38 \times 10^9/l$ ($P < 0.01$) or 14.94% in the female goat group, and by $1.14 \times 10^9/l$ ($P < 0.01$) or 12.47% in the goat group. When the goats in the experiment reached physiological age, the amount of leukocytes was $9.14 \times 10^9/l$, $9.54 \times 10^9/l$ and $9.60 \times 10^9/l$ in the taka, doe and wether groups, respectively. At this age, the number of leukocytes was higher in the doe and wether groups, but no reliable difference was found. Also, leukocyte count decreased by $0.68 \times 10^9/l$ ($P > 0.05$) or 6.67% in bucks, $1.08 \times 10^9/l$ ($P < 0.01$) or 10.16% in female goats, and $0.68 \times 10^9/l$ ($P > 0.05$) or 6.61% in female goats compared to twelve months of age was recorded.

During the experiments, the amount of hemoglobin (g%) in the erythrocyte was taken into account along with the shape elements of blood. Hemoglobin has a complex structure. It is composed of a protein - globin and a non-protein - heme (iron and protoporphyrin IX complex), which transports oxygen from the alveoli of the lungs to cells throughout the body and carbon dioxide in the body. is a chromoprotein that carries out transport from cells to lung alveoli. The amount of hemoglobin determined by the age of goats showed very variable dynamics. In particular, the average value of hemoglobin at the time of birth of goats was 8.36 g% in male goats, and 8.02 g% in female goats. The difference between sexual dimorphism was 0.34 g% or 4.24%, but there was no significant difference between male goats ($P>0.05$). It was found that the amount of hemoglobin decreased dramatically in both groups at the age of one month. The average arithmetic value of hemoglobin in male goats at this age was 6.88 g%. At this age, it was found that the amount of erythrocytes decreased by 1.48 g% ($P<0.01$) or 17.70% compared to the time of birth. In female goats, the average arithmetic value of hemoglobin was 6.74 g%, which showed that its amount decreased by 1.28 g% ($P<0.001$), or 15.96%, compared to the time of birth. There was no significant difference in sexual dimorphism at the age of one month ($P>0.05$). The amount of hemoglobin in the group of one-month-old goats was 6.80 g%, and this difference was not significantly different from that of male and female goats. It was found that the amount of hemoglobin in the blood of the goats in the experiment increased significantly at the age of 4 months. In particular, the amount of hemoglobin in the age groups of 4-month-old goats is 8.82; It corresponded to 8.66 and 8.70 g%. At this age, the amount of hemoglobin increased compared to one month of age. In particular, it was found that it increased by 1.94 g% ($P<0.001$) in male goats, by 1.92 g% ($P<0.001$) in female goats, and by 1.90 g% ($P<0.001$) in the group of pregnant goats. Hemoglobin content of the experimental goats at the age of eight months, the average arithmetic value of the groups is 8.69, respectively; It was 8.26 and 8.52 g%. The amount of hemoglobin at this age is 0.13, corresponding to the age of four months; It was found that it decreased by 0.4 and 0.18 g% ($P<0.05$). At the age of eight months, the buck group was superior to the female and wether goat groups by 0.43 and 0.17 g%, respectively, in terms of sexual dimorphism, but the difference between the groups was not statistically significant ($P>0.05$). Hemoglobin content of goats at the age of twelve months was 8.28 g% in bucks, 8.16 g% in female goats, and 8.30 g% in the group of goats. In terms of sexual dimorphism, the dominance of goats in the group of goats at this age was determined, but the difference did not have a reliable value. Also, compared to the age of eight months, the amount of hemoglobin was 0.41 according to the groups; Although 0.10 and 0.22 g% decreased by one unit, the difference between them did not have a reliable value. At the age of eighteen months, the hemoglobin of the goats in the experiment was 9.18 in the he-goat, doe and wether groups, respectively; It corresponded to 8.76 and 8.92 g%. At this age, the amount of hemoglobin was relatively high in the he-goat and wether groups, but there was no reliable difference. However, compared to the age of twelve months, it was found that the amount of hemoglobin increased by 0.9 g% ($P<0.01$) in the he-goat group, by 0.6 g% ($P<0.05$) in the doe group, and by 0.62 g% ($P<0.05$) in the wether group.

During the research, the percentage of hematocrit was calculated in the blood of experimental goats. As mentioned, blood consists of two parts according to its composition, which includes blood plasma and blood-forming elements. Hematocrit (Hematocrit, or HCT) represents the percentage of formed elements in the total blood volume. As mentioned above, the shaped elements include erythrocyte, leukocyte and platelet. As a rule, hematocrit represents the number of red blood cells in relation to blood plasma. Sometimes hematocrit is also expressed as the ratio of the total volume of all shaped elements (erythrocytes, leukocytes, platelets) to the total volume of blood. However, the difference is very small. Because 99% of the total volume of shaped elements corresponds to erythrocytes. If the hematocrit is expressed as a percentage of the total blood volume, the unit is expressed as a percentage (%), if it is expressed as a volume, the unit is displayed in the form of liters (l/l). Studying the hematocrit index allows evaluating erythrocytes according to the index value. The percentage of hematocrit in the lactating stage of the postembryonic period of the goats in the experiment was also determined. In particular, the percentage of hematocrit at the time of birth of goats was 27.58% in male goats, and 27.32 g% in female goats. In terms of sexual dimorphism, there was no significant difference ($P>0.05$), although male goats predominated with a difference of 0.26%. It was found that hematocrit percentage decreased sharply in

both groups at the age of one month. At this age, the percentage of hematocrit was 24.12% in male goats, and 22.88% in female goats. At the age of one month, male goats predominated with a difference of 1.24% ($P < 0.01$) in terms of sexual dimorphism. When hematocrit percentage was compared to the time of birth, it was found that its amount decreased by 3.46% and 4.44% ($P < 0.001$) in male and female goats, respectively. It was found that hematocrit percentage was 23.95% in the group of one-month-old pregnant goats, it was not significantly different from the group of male goats, but it was 1.07% ($P < 0.01$) higher than that of female goats. It was observed that the hematocrit percentage in the blood of goats increased significantly at the age of 4 months. In particular, the hematocrit percentage of goats at the age of 4 months is 28.32; It corresponded to 28.22 and 28.03%. There was no significant difference between the groups in terms of sexual dimorphism. At this age, hematocrit percentage increased by 4.20% ($P < 0.001$) in male goats, 5.34% ($P < 0.001$) in female goats, and 4.08% ($P < 0.001$) in the group of infected goats. At the age of 8 months, the percentage of hematocrit in the blood of goats is 28.60 according to groups; It corresponded to 28.32 and 28.75%. There was no significant difference between the groups in terms of sexual dimorphism ($P > 0.05$). Also, although the hematocrit percentage was slightly increased compared to four months of age, no significant differences between groups were found ($P > 0.05$). A slight decrease in the percentage of hematocrit was observed in goats when they reached the age of twelve months, and the arithmetic mean value was 28.01% in the group of bucks, 27.70% in the group of female goats, and 28.13 g% in the group of goats. In terms of sexual dimorphism, sardines were relatively dominant, but group differences did not have a reliable value. However, compared to eight months of age, hematocrit percentage decreased by 0.59% ($P < 0.05$) in bucks, 0.62% ($P < 0.05$) in female goats, and 0.62% ($P < 0.05$) in female goats. When the experimental goats reach physiological age, the percentage of hematocrit is 28.80 in the he-goat, doe and wether groups, respectively; It corresponded to 28.62 and 28.71%. Although the hematocrit percentage at this age was higher in the he-goat group, it did not differ according to religious dimorphism. Hematocrit percentage increased by 0.79% ($P < 0.05$) in bucks, 0.92% ($P < 0.01$) in female goats, and 0.58% ($P < 0.05$) in female goats compared to twelve months of age.

The digital data obtained during the research on the dynamics of the erythrocyte index in Orenburg goats of different sexes and ages are presented in Table 2 below. The analysis of the data in this table shows that on the first day of the life of goats, the average arithmetic value of erythrocyte volume (MCV) in male goats was 23.95 femtoliters, and in female goats it was 24.10 femtoliters on average. In terms of sexual dimorphism, there was no significant difference between female goats. It was observed that the MCV index of erythrocytes decreased relatively in both groups at the age of one month. The average arithmetic value of erythrocyte volume in male goats at this age was 23.95 femtoliters. At this age, it was found that the volume of erythrocytes decreased by 0.14 ($P > 0.05$), or by 0.58%, compared to the time of birth. In female goats, the average arithmetic value of erythrocyte volume was 24.06 femtoliters, and compared to the time of birth, it decreased by 0.04 ($P > 0.05$), or by 0.17%. Arithmetic average of erythrocyte volume in one-month-old goats was 23.97 femtoliters, which was 0.16 ft ($P > 0.05$) more than that of male goats, and 0.09 ($P > 0.05$) ft ($P > 0.05$) less than that of female goats. In terms of sexual dimorphism, even at this age, a reliable difference between gender groups was not detected. It was found that the MCV index of goats at the age of 4 months decreased significantly by group. In particular, at the age of 4 months, the MCV indicator for the groups is 18.75; was 19.03 and 19.07 fl. Among the groups in terms of sexual dimorphism, the wether group is relatively dominant, but there was no significant difference between them. At this age, MCV decreased by 5.06 ft ($P < 0.001$) in male goats, 5.03 ft ($P < 0.001$) in female goats, and 4.90 ft ($P < 0.001$) in pregnant goats compared to one month of age. It was found that the MCV indicator significantly decreased in groups at the age of 8 months. In particular, the MCV indicator for groups is 17.68; 18.15 and 18.18 corresponded to fl. Among the groups in terms of sexual dimorphism, although the wether group is relatively dominant, no significant difference was detected. Compared to four months of age, MCV at this age showed a decrease of 1.07 ft ($P < 0.001$) in bucks, 0.88 ft ($P > 0.05$) in female goats, and 0.89 ft ($P > 0.05$) in female goats. In the one-year period, the arithmetic average value of the MCV indicator was 17.81 ft in the he-goat group, 118.37 ft in the female goats, and 18.41 ft in the wether group. In terms of sexual dimorphism, the group of wether and doe was superior to the group of he-goats, but the difference did not have a reliable value. A similar trend was observed when the groups

were matched at eight months of age. This trend was observed even when experimental goats reached the age of eighteen months, and although the MCV index was slightly increased in the group of sardines and does, no reliable difference was detected.

Table 2. The erythrocyte index of the blood of Orenburg goats of different ages and sexes, n-10

Age, month	Sex					
	♂		♀		wether	
	$\bar{X} \pm S_x$	C, %	$\bar{X} \pm S_x$	C, %	$\bar{X} \pm S_x$	C, %
MCV, fl						
0	23,95±0,06	0,73	24,10±0,15	2,01	-	-
1	23,81±0,66	8,77	24,06±0,68	8,96	23,97±0,66	8,74
4	18,75±0,17	2,82	19,03±0,54	8,91	19,07±0,40	6,62
8	17,68±0,21	3,83	18,15±0,34	5,97	18,18±0,38	6,58
12	17,81±0,26	4,59	18,37±0,40	6,53	18,41±0,36	6,17
18	17,97±0,24	4,23	18,48±0,26	4,50	18,08±0,33	5,84
MCH, pg						
0	7,26±0,02	1,06	7,07±0,07	2,94	-	-
1	6,75±0,13	6,10	7,00±0,08	3,83	6,77±0,12	5,64
4	5,84±0,14	7,76	5,81±0,11	5,91	5,90±0,07	3,95
8	5,32±0,12	7,00	5,29±0,12	6,92	5,37±0,07	4,41
12	5,26±0,11	6,65	5,40±0,12	7,09	5,43±0,14	8,20
18	5,73±0,12	6,83	5,65±0,12	6,81	5,62±0,16	8,74
MCHC, g/dl						
0	30,31±0,13	1,40	29,35±0,35	3,81	-	-
1	28,51±0,77	8,57	29,28±0,84	9,04	28,39±0,77	8,62
4	31,15±0,74	7,52	30,72±0,91	9,36	31,05±0,69	7,02
8	30,40±0,73	7,58	29,19±0,73	7,91	29,65±0,73	7,78
12	29,57±0,66	7,06	29,46±0,65	7,02	29,51±0,67	7,17
18	31,89±0,63	6,21	30,64±0,73	7,51	31,09±0,71	7,18

The following results were found when the dynamics of the mean hemoglobin content (MCH) in the erythrocyte content of experimental goats was determined during lactation. In particular, the MCH indicator on the first day of the goats' life was 7.26 picograms on average in male goats, and 7.07 picograms in female goats. According to sexual dimorphism, male goats were superior in this indicator by 0.19 pg ($P < 0.05$), or by 2.69%. It was observed that the MCH indicator of erythrocytes decreased relatively in both groups at the age of one month. It was found that the arithmetic mean value of MCH in male goats at this age was 26.75 pg, compared to the time of birth, it was reduced by 0.51 pg ($P < 0.01$), or 7.02%. In female goats, the arithmetic average value of MCH corresponded to 7.00 pg, and compared to the time of birth, it was reduced by 0.07 ($P > 0.05$), or 0.99%. In one-month-old goats, the MCH index was 6.77 pg, which was 0.02 pg ($P > 0.05$) higher than that of male goats, while it was 0.23 ($P > 0.05$) pg ($P > 0.05$) lower than that of female goats. In terms of sexual dimorphism, no reliable differences between gender groups were found at this age. At the age of 4 months of the goats, it was observed that the MCH index significantly decreased again in the groups. In particular, at the age of 4 months of goats, the MCH index by groups is 5.84; It corresponded to 5.81 and 5.90 pg. Among the groups in terms of sexual dimorphism, although the wether group is relatively dominant, no reliable difference was detected. At this age, it was found that the MCH indicator decreased by 0.91 pg ($P < 0.001$) or 13.48% in male goats, by 1.19 pg ($P < 0.001$) or 17.00% in female goats, and by 0.87 pg ($P < 0.001$) or 12.85% in the group of infected goats. A slight decrease in the MCH indicator was also observed in experimental goats by the age of 8 months. In particular, the MCH indicator for groups is 5.32; 5.29 and 5.37 pg, compared to four months of age,

it was found that it decreased by 0.52 pg ($P < 0.05$) in bucks, by 0.52 pg ($P < 0.01$) in female goats, and by 0.53 pg ($P < 0.001$) in female goats. At the age of 12 months, the MCH index was higher in the wether group, but no difference in sexual dimorphism was observed. A similar situation was observed when compared to eight months of age. In the period of physiological adulthood, the MCH indicator slightly increased, but the differences by group and by period were almost not detected.

The mean hemoglobin concentration (MCHC) in the erythrocyte content of the experimental goats underwent specific dynamics during lactation. In particular, the MCHC index was 30.31 g/dl in male goats and 29.35 g/dl in female goats on the first day of life. According to sexual dimorphism, it was observed that male goats were superior in this indicator by 0.96 g/dl ($P < 0.05$), or by 3.27%.

MCHC indicator of erythrocytes was found to be significantly decreased in both groups at the age of one month. At this age, the arithmetic mean value of MCHC in male goats was 28.51 g/dL, which was 1.80 g/dL ($P < 0.05$) or 5.94% lower than at birth. In female goats, the mean arithmetic value of MCHC corresponded to 29.28 g/dl, and it was observed that it decreased by 0.07 ($P > 0.05$), or 0.24%, compared to the time of birth. In one-month-old goats, the MCHC index was 28.39 g/dl, which was 0.12 g/dl ($P > 0.05$) lower than that of male goats and 0.89 g/dl ($P > 0.05$) than that of female goats. In terms of sexual dimorphism, there was no reliable difference between gender groups at this age.

At the age of 4 months, the MCHC index of goats was significantly increased by group. In particular, at the age of 4 months of goats, the MCHC index by groups is 31.15; It was 30.72 and 31.05 g/dl. Among the groups in terms of sexual dimorphism, although the group of male goats is relatively dominant, no reliable difference was detected. At this age, the MCHC index increased by 2.64 g/dl ($P < 0.01$) or 9.26% in male goats, by 1.44 g/dl ($P > 0.05$) or 4.92% in female goats, and by 2.66 g/dl ($P < 0.05$) or 9.37% in the group of infected goats. In experimental goats, there was also a slight decrease in MCHC at 8 months of age. In particular, this indicator is 30, 40 in a suitable sequence by gender groups; It was 29.19 and 29.65 g/dL, compared to the age of four months, it was observed that it decreased by 0.75 g/dL ($P > 0.05$), in female goats by 1.53 g/dL ($P > 0.01$), and by 1.40 g/dL ($P > 0.05$) in the group of goats. A further decrease in the MCHC index was detected at twelve months of age, but no reliable change was detected either in terms of sexual dimorphism or age. However, a significant increase in this indicator was found at the age of physiological puberty. In particular, at this age, it was observed that the MCHC indicator increased by 2.32 g/dl ($P < 0.05$) in the he-goat group, by 1.18 g/dl ($P > 0.05$) in the does, and by 1.58 g/dl ($P > 0.05$) in the wether group. Even at this age, the differences between the groups in terms of sexual dimorphism have a reliable value, it didn't happen.

CONCLUSION

In the course of research, a sharp change in hematological indicators occurs in the post-embryonic stage of lactation of goats of the Orenburg breed. In particular, it was shown that the amount of erythrocytes at birth can be reduced by 11.37% ($P < 0.01$) in male goats, and by 15.07% ($P < 0.01$) in female goats, and the amount of hemoglobin can decrease by 17.70% ($P < 0.01$) and 15.96% ($P < 0.001$), respectively. MCV and MCH indicators of erythrocytes of different sexes decreased with age, while MCHC indicator increased on the contrary. It is known that bone formation in our young body develops with age after birth. In our opinion, this is why the number of erythrocytes increases. According to sexual dimorphism, the indicators of erythrocyte, hemoglobin, hematocrit were relatively high in goats, while the leukocyte index was higher in male and female goats. However, in adult goats, it was found that the hematological parameters were at the level of physiological norm, and no negative effects of vasectomy were observed.

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