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THE COMPARATIVE ESTIMATION OF BLOOD HEMATOLOGICAL PARAMETERS FOR HOLSTEIN, SWISS AND SIMMENTAL COWS IMPORTED FROM GERMANY AND AUSTRIA TO ARMENIA

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The aim of this assessment was to detect the deviations from standards of the hematological parameters for Swiss, Simmental and Holstein cows, imported from Germany and Austria to Armenia. The results of our research showed that blood hematological parameters in all tree breeds of cows was in reference ranges, which justifies normal adaptation process.

Blood – erythrocytes – hemoglobin – leucocytes – new climate conditions

Ուսումնասիրության նպատակն է եղել Ավստրիայից և Գերմանիայից Հայաստանի Հանրապետություն ներկրված հոլշտին, շվից և սիմենթալ ցեղերի կովերի հեմատոլոգիական ցուցանիշների համեմատական ուսումնահիրությունը՝ բնակլիմայական նոր պայմաններում: Հետազոտության համար ձևավորված 3 փորձնական խմբերի կովերը ընտրվել են համանման մեթոդով: Հետազոտության արդյունքները եղել են հետևյալը. բոլոր երեք ցեղերի մոտ հեմատոլոգիական ցուցանիշները գտնվել են նորմայի սահմաններում, որը փաստում է ներկրված կենդանիների հարմարվողականության նորմալ ընթացքը:

Արյուն – էրիթրոցիտ – հեմոգլոբին – լեյկոցիտ – կլիմայական նոր պայմաններ

Изучались изменения гематологических показателей коров голштинской, симментальской и швицкой пород в новых климатических условиях, завезенных из Австрии и Германии в Армению.

Для исследования трех опытных групп коровы голштинской, симментальской и швицкой пород были выбраны аналогичным методом. Результаты исследований были следующие: гематологические показатели у всех трех пород были в пределах нормы, что свидетельствует о нормальной адаптации данных пород к местным климатическим условиям.

Кровь – эритроциты – лейкоциты – гемоглобин – климатические новые условия

The present study aim's at investigating various hematological values of Holstein, Swiss and Simmental cows breed, which are imported from Germany and Austria to Armenia.

Some essential blood parameters can be indicators of the physiological, nutritional, metabolic, clinical and adaptation status of farm animals. Blood has a very important role for life nutritional processes and gives opportunity to estimate animals adaptation process in a new climate conditions.

At the same time laboratory testing is an important tool that helps practitioners monitor the changes of cows' health both: individual and herd levels.

The knowledge of hematological values is useful in diagnosing various pathological and metabolic disorders.

In clinical diagnostics, information about changes of white blood cell count is very important. White cells are the basic cells of the immune system, which determines normal body function. If erythrocytes and leucocytes are high in blood, this is an evidence for good adaptation abilities of animals [2]. For observing animals adaptation process many scientists have investigated animal blood hematological parameters [3-5, 7].

The norms of blood hematological parameters are: Hemoglobin (HGB) 90-150 g/l, erythrocytes (RBC) 5-10 x 10^{12}/L, leucocytes (WBC) 4-12 x 10^{9}/l [4], mean corpuscular volume (MCV) 40-60 fl, mean corpuscular hemoglobin (MCH)11–17 pg., mean corpuscular hemoglobin concentration (MCHC) 30-36 g/l [6]. Blood hematological parameters of cows depends on many factors and can be differ depends on breed, sex, age, feeding and keeping conditions and animal's physiological situation.

Materials and methods. The study was carried out in third lactation ages at Holstein, Simmental and Swiss cows imported from Europe (Austria and Germany) to the "Agroholding Armenia" LLC in Spitak, Armenia. This animals was imported within "Cattle breeding development program in Republic of Armenia in 2007-2015". Estimated animals were kept in a free stall barn under the same keeping and feeding conditions in whole estimated periods. The animals are chosen using analog method.

Blood samples were taken from jugular vein in vacuum tubes, the heads number of estimated animals was fifteen. Cows blood hematological parameters were analyzed with "ABX Pentra 60" devices in "HELLIOS" medicine center and we determined the following parameters: Hemoglobin (HGB) g/l, erythrocytes or red blood cell (RBC), leucocytes or white blood cell (WBC) 109/l, mean corpuscular volume (MCV) fl, mean corpuscular hemoglobin (MCH) pg., mean corpuscular hemoglobin concentration (MCHC) g/l .

Results and Discussion. The results of our research are presented in the tab. 1. It is clear from table one that erythrocytes (RBC) count in Holstein and Simmental cows is 7,2 x 10^{12}/l. By comparing this parameter with that of Holstein and Simmental with Swiss cows, the result is as follows: red blood cells count in Holstein and Simmental cows' blood samples exceeds the Swiss cows' by 0.9 x 10^{12}/l or by 14.3 %: There were significant differences (P>0,98) between the results of RBC in Holstein and Simmental cows. The next parameter that has estimated is hemoglobin, which is the highest in Simmental cows (89.0 g/l), which exceeds Simmental's hemoglobin count by 7.8 g/l and by 12.3 g/l Holstein's hemoglobin count. If compare Holstein and Swiss cows' hemoglobin count, we will see that Swiss cows exceed Holstein cows' by 4.5 g/l (5.5 %).

As for MCHC, the highest content of MCHC is observed in Swiss cows blood making up 24,6 g/l, which exceeds Holstein's by 0.8 g/l (3.25 %) and Simmental's by 0.3 g/l (1,2 %). MCH parameter is relatively higher in Swiss cows by 17 % or by 2.2 pg. than Holstein MCH parameter and by 4.6 % or by 0.6 pg than Simmental's MCH parameter. In this parameters no significant differences are observed.

What about white blood cells or leucocytes, it needs to mention that Holstein cows are leader comparing with coeval Swiss and Simmental cows. As it is mentioned the Holstein WBC count is the highest and exceeds the Swiss cows by 31.5 % or by 3.4 x 10^{9}/l and and by 15.7 % or by 1.7 x 10^{9} from Simmental. In this parameter there is no significant differences observed. According to the results of our research the highest level of hematocrit has been in Simmental cows' blood (36.5 %), which is by 3.5 higher than Swiss and by 4.3 higher than Holstein's. In this parameter medium level belongs Swiss cows (33 %), which is only by 0,8 more than Simmental cows' blood hematocrit. In this parameter there is no significant differences observed.

Table 1. Hematological parameters in third lactation Holstein, Swiss and Simmental cows

Hematological parameters	Biological parameters	Holstein	Swiss	Simmental
Red blood cell (RBC), 10^{12}/l	Lim	6,9-7,3	5,87-6,53	6,28-8,22
	M±m	7,2±0,1	6,3±0,2	7,23±0,56
	Cv %	2,9	5,3	13,42
	σ	0,2	0,3	0,97
Hemoglobin (HGB), g/l	Lim	67-89	70-92	78,0-102,0
	M±m	76,7±6,5	81,2±5,4	89±7
	Cv %	14,7	13,4	13,6
	σ	11,2	10,9	12,1
Mean corpuscular hemoglobin concentration, (MCHC),g/l	Lim	23,5-24,1	23,8-25,3	23,7,1-24,9
	M±m	23,8±0,2	24,6±0,3	24,3±0,3
	Cv %	1,3	2,8	2,5
	σ	0,3	0,7	0,6
White blood cell (WBC), 10^9/l	Lim	5,8-18,8	4,8-9,8	9,1
	M±m	10,8±4,0	7,4±1,1	9,1±0,4
	Cv %	64,4	28,0	8,6
	σ	7,0	2,1	0,8
Hematocrit (Hct), %	Lim	27,8-37,5	29,4-36,9	32-42,8
	M±m	32,2±2,8	33,0±2,1	36,5±3,2
	Cv %	15,2	12,5	15,3
	σ	4,9	4,1	5,6
Mean corpuscular volume (MCV), fl	Lim	38-54	38-54	48-52
	M±m	45±4,7	52,5±3,2	50,3±1,2
	Cv %	18,2	12,3	4,1
	σ	8,2	6,4	2,1
Mean corpuscular hemoglobin (MCH), pg	Lim	9,2-12,9	10,7-14,6	12,1-12,5
	M±m	10,7±1,1	12,9±0,9	12,3±0,11
	Cv %	18,0	13,4	1,6
	σ	1,9	1,7	0,2

According to the results of our research the highest level of hematocrit has been in Simmental cows' blood (36.5 %), which is by 3.5 higher than Swiss and by 4.3 higher than Holstein's. In this parameter medium level belongs Swiss cows (33 %), which is only by 0,8 more than Simmental cows' blood hematocrit. In this parameter there is no significant differences observed.

Comparing analysis of three breeds of Holstein, Swiss and Simmental cows' blood parameters show that MCV is higher in Swiss cows, followed by Simmental and then Holstein cows.

The results of our research that are carried out in "Agroholding Armenia" LLC, show Holstein and Simmental cows have higher RBC count in blood than in Swiss cows. The hemoglobin count comparatively is higher in Swiss cows' blood and WBC is higher cows'. Higher hematocrit parameters are observed in Swiss cows' blood. MCH and MCHC parameters are higher in Swiss cows.

According to the results of our study we can say that hematological parameters in Holstein, Swiss and Simmental cows are within norm limits, which justifies that three breeds of cows demonstrate sufficient adaptation in new climate and keeping conditions.

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