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Some Physiological Indicators of Montbeliard Cows

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ABSTRACT

By studying the physiological indicators of cattle brought from temperate European climates, it is possible to draw conclusions about the characteristics of their adaptation to existing climatic conditions. The research was conducted at the Kungratboy Mehri farm in the Republic of Karakalpakstan. Two groups were formed: the first group included cows brought in the spring, and the second group included cows brought in the fall, each consisting of 5 heads. The conditions for keeping and feeding the cows were set identically. The morphological composition of the blood of cows, clinical indicators (respiration rate, body temperature and heart rate) and heat tolerance index were studied and analyzed by season. The studies showed small differences in the morphological composition of the blood, clinical indicators and heat tolerance index of cows imported in different seasons.

KEYWORDS: Europe, breed, Montbeliard, Republic of Karakalpakstan, adaptive features, constitution, productivity, erythrocyte, leukocyte, hemoglobin, heat tolerance index, respiration, heart rate, body temperature, stress, etc.

Introduction.

There are several methods of combating the effects of heat stress. Measures to combat external factors include: building shelters, fans, water sprinklers, installing shower facilities, etc. Installing fans inside them gives good results. When choosing fans, the size of the barn and the number of animals kept are taken into account, and fans of the appropriate type and power are purchased. It would be even better if water spray (mist) fans were installed, because the fan, together with the wind, sprays water in the form of mist or fine particles, as a result of which the air in the barn is moderately humid and cools quickly. Such small particles do not fall to the floor, but evaporate in the air and prevent the floor from becoming damp [1].

Cross ventilation is the most suitable of these. These cooling panels are fixed to the inside of one of the barn walls. For larger barns, the opposite wall is ideal. Management plays an important role in eliminating heat stress. This includes ensuring that cows do not stay in the milking parlor for too long and that there is sufficient shade in the pasture or feeding area. Cows should not be driven anywhere in the heat unless necessary. Watering is a key factor. Clean, fresh water should always be available, especially after milking. Watering troughs should be cleaned regularly. The length of the watering trough is 2 meters per 20 heads. Care should be taken to ensure that the coarse feed is of good quality. Feeding should be carried out at least twice a day and 80% of the feed should be given during the cool part of the day. Heat stress accelerates the excretion of sweat from the body, and disturbances in the metabolism of salts are observed in the body. To prevent this, it is necessary to add trace elements to the diet and increase the amount of mineral elements by 10%. Heat stress has a strong effect on cows in their first calving, causing ketosis and fatty dystrophy in the liver. Adding the amino acid choline to the diet has a positive effect on fat excretion. Choline is provided in a form that does not break down in the rumen and is protected [2].

Studying and analyzing the adaptive characteristics of imported cattle from foreign countries plays an important role in fully realizing the genetic potential of animals in terms of productivity. Because, regardless of the type and breed, the faster and better an animal adapts to new natural climate and environmental conditions, the higher its productivity, the better its quality, and the conditions for realizing its potential in productivity are created. Scientists have noted that there is a positive correlation between the ability of breeds to adapt to new climatic conditions and their health and milk productivity [3]. The adaptation characteristics of animals are affected by stress factors, namely, the conditions of their feeding and keeping, as well as the temperature of the existing climate, which reduce their consumption of nutrients, reduce productivity by up to 40%, and the live weight of cows by 10-15%. This creates a problem of adapting imported animals to new ecological, climatic and economic conditions. The reason for this is a different feeding technology, air temperature, humidity, barometric pressure and other factors, in general, the animal is forced to absorb these conditions [4].

Research objective. To study and analyze the morphological composition, clinical indicators and heat tolerance indices of Montbeliard cows brought in different seasons.

Research and methods. The research was conducted at the “Kungratboy Mehri” farm in the Kegeili district of the Republic of Karakalpakstan. For the experiment, 2 groups were formed, 5 cows each were placed in group I, which were brought to the farm in spring, and 5 cows were brought to the farm in group II, which were brought in autumn. The feeding and housing conditions of the cows were the same.

In order to study the adaptation characteristics of cows, the hemoglobin content was determined using a Sali hemometer (GS-2), the number of erythrocytes and leukocytes was determined using a microscope in a Goryaeva chamber; the heat tolerance index was determined using the method of Yu.O. Raushenbach (1975); clinical indicators (respiration rate, pulse rate, body temperature) were determined using the generally accepted method. The study was conducted in the morning, afternoon and evening every quarter (temperature - rectally using a thermometer, pulse rate - on the caudal artery, respiration rate - with a phonendoscope and visually by observing the movement of the abdominal wall).

Result and discussion. Blood, as a liquid tissue, is the main component of the internal environment of the body. It reaches all tissues and cells in the body, supplies them with the necessary nutrients and oxygen, and removes unnecessary products of vital activity from them. Taking into account the above points, we tried to study the morphological composition of cow blood in our experiments.

Table 1. Morphological composition of bovine blood

№	Composition	Standard	Groups, (n=5)			
			I		II	
			$\overline{X} \pm S\overline{x}$	Sv, %	$\overline{X} \pm S\overline{x}$	Sv, %
1	Erythrocytes, 10^{12}/l	5-7,5	7,01+0,10	3,24	7,08+0,09	2,87
2	Leukocytes 10^{9}/л	6-12	8,39+0,06	1,62	8,46+0,09	2,40
3	Hemoglobin, г/л	99-129	114,2+1,50	2,93	117,2+1,07	2,04

As can be seen from the data in Table 1, the amount of erythrocytes in the blood of both groups of cows in the experiment was within the normal range, and in the cows of the experimental (II-group) group it was 0.07 (1012/l) higher than in the cows of the control group. The amount of hemoglobin in the blood plays an important role in vitality, delivering oxygen to the tissues and cells of the body. It was also observed that the hemoglobin concentration in the cows of the experimental group was 117.2 g/l higher, or 3 g/l higher than in the cows of the control group. The amount of leukocytes indicates the strength of the protective processes in the body. The average leukocyte count was 8.46 in cows of group II and 8.39 in cows of group I, and was 0.07 (109/l) higher in cows of the experimental group, but the blood composition of cows of both groups was within the normal range. Thus, the morphological composition of the blood of Montbeliard cows imported at different times of the year was within the normal range, which indicates that they are well adapted to the existing conditions. The amount of erythrocytes, leukocytes and hemoglobin in the morphological composition of the blood of cows of group II of the experiment was higher than that of cows of group I of the control group by: 0.07 (1012/l); 0.07 (109/l) and 3 g/l, respectively. This indicates that the immune system of cows imported in the autumn season has adapted by the summer season.

In our experiment, we studied the effect of clinical indicators of Montbeliard cows presented in different seasons to further analyze the adaptation characteristics.

Table 2. Clinical indicators of cows

Indicators	Groups (n=5)			
	I (control)		II (experience)	
	$\overline{X} \pm S\overline{x}$	Sv, %	$\overline{X} \pm S\overline{x}$	Sv, %
Winter (February)				
Body temperature, ^{0}C	38,2+0,15	0,86	38,1+0,08	0,48
Respirations/minute	20,8+0,37	4,86	20,2+0,37	4,98
Heart rate beats/minute	72,2+0,66	2,05	71,4+0,68	2,12
Spring (April)				
Body temperature, ^{0}C	38,3+0,17	1,02	38,2+0,10	0,57
Respirations/minute	25,2+0,51	6,20	24,4+0,86	10,57
Heart rate beats/minute	72,4+0,93	2,86	71,8+0,86	2,68
Summer (July)				
Body temperature, ^{0}C	39,2+0,11	0,64	39,1+0,12	0,71
Respirations/minute	27,8+0,86	8,66	27,2+0,37	3,84
Heart rate beats/minute	75,6+0,93	2,74	74,2+0,97	2,92
Autumn (October)				
Body temperature, ^{0}C	38,8+0,14	0,80	38,4+0,15	0,89
Respirations/minute	22,8+0,37	4,45	22,6+0,51	6,13
Heart rate beats/minute	72,8+0,37	1,15	72,2+0,37	1,16

As can be seen from the data in Table 2, certain differences were observed in the clinical indicators of cows by season. In winter, the body temperature of cows in group I was 38.2 ° C, with a small

difference of 0.1 ° C from that of cows in group II, 0.1 ° C in spring, 0.1 ° C in summer, and 0.4 ° C in autumn. The body temperature of cows in both groups was higher in summer, showing 39.2 and 39.1 ° C. As for the heart rate, in winter, spring, summer, and autumn, the cows in the experimental group had lower values of 0.8; 0.6; 1.4 and 0.6 beats/minute, respectively. In terms of respiratory rate, cows in experimental group II showed 0.6; 0.8; 0.6 and 0.2 times/minute less than cows in control group I in winter, spring, summer and autumn, respectively. The fact that body temperature, heart rate and respiratory rate were higher in both groups in summer can be explained as being related to heat stress. However, the body temperature, heart rate and respiratory rate indicators in both groups did not exceed the normal level. This is due to the fact that Montbeliard cows are adapting to the existing climatic conditions. As is known, when animals are brought from a certain environmental condition to a new one, determining the heat tolerance index plays an important role in assessing the degree of their adaptation to the new climatic conditions.

The climatic conditions in Karakalpakstan are characterized by sharply fluctuating temperatures, which has a significant impact on the metabolism of cattle. The difference in air temperature and relative humidity in different seasons of the year affects the metabolism of animals, and thus their health and productivity. Taking into account the above points, we studied the heat tolerance of cows in our experiments.

Table 3. Cows' heat tolerance index (n-5)

Groups	X±Sx	Cv,%	Limit
I	86,08+1,46	6,87	77,9-88,6
II	87,01+1,81	5,12	

As can be seen from the data in Table 3, the heat tolerance index indicators of imported Montbeliard cows in different seasons of the year give average numerical data.

If the heat index is expressed as a single number, then the fact that the indicators obtained from the cows approach this number proves their heat tolerance. In the first control group, this indicator was 82.08, and in the second experimental group, it was 84.01. If we compare it with the limit indicator, these indicators can be interpreted as being within the norm. Cows in the second group outperformed those in the first group by 1.93 units in this indicator. Thus, it can be concluded that Montbeliard cattle imported in the winter season have higher adaptive characteristics than cattle imported in the spring season. However, the heat tolerance index of cows in both groups was at the level of zootechnical standards, indicating that the Montbeliard cattle are well adapted to the climatic conditions of Karakalpakstan.

Conclusion.

The morphological composition of the blood of imported Montbeliard cows at different seasons of the year was at the level of standards, which indicates that they are well adapted to the existing conditions. The amount of erythrocytes, leukocytes and hemoglobin in the morphological composition of the blood of cows in the experimental group II was higher than that of cows in the control group I by: 0.07 (1012/l); 0.07 (109/l) and 3 g/l, respectively. This indicates that the immune system of cows imported in the autumn season has adapted by the summer season. The clinical indicators of cows in both groups, namely body temperature, heart rate, and respiratory rate, were higher in the summer, which can be explained by the effect of heat stress on these cows. However, the indicators of body temperature, heart rate, and respiratory rate in both groups were within the normal range. The heat tolerance index of cows in both groups was within the zootechnical standard, which indicates that the Montbeliard breed of cattle is adapting well to the climatic conditions of Karakalpakstan.

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