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Adaptation Features of Montbéliarde Breed Cows to Hot Climates

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A B S T R A C T
It is practically important to study the adaptation of cattle imported from the temperate climate of Europe to new hot climate conditions. The aim of the study is to study the adaptation characteristics of imported Montbéliarde breed cattle to hot climate conditions. Research was conducted at the "Kungirotboy Mehri" farm in the Republic of Karakalpakstan. In it, two groups were formed: group I included mature cows brought in the spring, and group II included 5 cows brought in the autumn. The conditions for keeping and feeding the cows were determined to be the same.One of the signs showing the adaptation characteristics of cows to the existing climatic conditions is the formation of their wool cover, on the basis of which it is possible to draw conclusions about the health, constitution and productivity of cows. The adaptation characteristics of cows are observed in the winter season (February), when the wool cover is well developed, and in the summer (July), when the cows have shed and a new wool cover is formed. The wool cover of cows in both groups was well formed, with an increase in the amount of down fibers in their wool composition in winter and an increase in awn fibers in summer, indicating their good adaptation to the existing conditions.

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Introduction

In recent years, the temperature has been very hot throughout the world and including Uzbekistan. This has a direct negative impact not only on people, but also on the health and productivity of animals [5;6].

Experts warn that heat stress and dehydration negatively affect the health and productivity of cows, which in turn reduces the economic efficiency of the farm.

When these indicators exceed the amount of temperature and relative humidity that is acceptable to the animal (comfort), they cause heat stress or thermostress in their body [3;4].

The optimal temperature for cattle depends on their age, physiological state, live weight and productivity indicators.

The optimal temperature for adult cattle is from 0˚C to +18˚C, and for calves it is from +12˚C to +25˚C. An increase in temperature primarily affects their health and productivity. When the temperature is above +35˚C, milk productivity decreases by 33%, and when it exceeds 40˚C, it decreases by 50%.

After an animal has been exposed to heat stress, it is very difficult to return to its previous productivity regime; low productivity can last for one or two months. The stronger the stress, the lower the productivity will be.

During the period of thermostress in the body, changes in their overall and nutritional processes affect them. Negative situations are observed in metabolism, as a result of which thermogenesis decreases; in simple terms, the internal heat production process is disrupted and negative situations occur. First, the cows' appetite decreases. The animal's feed and digestion requirements are called an exothermic process, which occurs with the release of heat. This process is especially strong in the fermentation of fiber in the large rumen. Cows reduce their consumption of roughage in order to reduce thermogenesis. There is information that when the temperature in the external environment exceeds +30˚C, the consumption of vaccines decreases by 5%, and the consumption of alfalfa hay decreases by 22%. This is especially noticeable in productive cows, and their productivity decreases by up to 30% [1;2].

The study of physiological processes of adaptation of cultural breeds to the natural and climatic conditions of Central Asia, reducing the negative impact of high air temperature and solar radiation of the external environment on the animal body, has always been of great importance. Assessing the heat resistance of animals when breeding in hot climatic conditions or in a rapidly changing environment is an important adaptation indicator, and the adaptation characteristics of cattle can be assessed to a certain extent based on their interior indicators [7;8;9;10].

Research Objective: To study the composition of the wool cover of Montbéliarde breed cows in winter and summer and to draw conclusions about their adaptation characteristics.

Research Tasks: To compare and study the structural components of the wool cover of Montbéliarde breed cows brought in different seasons.

Research Object and Methods Used: The research was conducted at the "Kungirotboy Mehri" farm in Kegeyli district of the Republic of Karakalpakstan. For the experiment, II groups were formed, and 5 cows each were assigned to group I, which were brought to the farm in the spring, and group II, which were brought in the autumn. The cows were fed and kept under the same conditions.

In order to study the adaptation characteristics of cows, the morphological composition of the wool cover was studied in winter and summer. In the winter season (February), the wool cover is well developed during this period, and in the summer (July), the cows have shed and a new wool cover has been formed. During these periods, the weight of wool per 1 cm square of skin cover was determined. The composition of the wool cover and the length of the wool fiber were determined by the VASKHNIL (1985) method. To determine the density of the wool cover, the number of wool fibers per 1 cm square was determined. Samples of wool fibers were taken from the shoulder, back and thigh areas, weighing up to 3 grams, washed in warm soapy-soda water and dried in a drying oven at 105 degrees Celsius to a final weight. The weight was measured on an analytical balance with an accuracy of 0.001 g. These fibers were visually separated with tweezers into down, transitional and awn fibers. The length of the awn fibers was measured with a ruler with an accuracy of 1 mm.

Research Results and Analysis. The wool cover of cattle performs a protective function and changes in terms of morphological composition depending on the seasons. The results obtained in the research confirm this.

Table 1. Characteristics of wool fibers on 1 cm2 of skin of Montbéliarde breed cows (X±Sx), n-5

Indicators	Time of year	Groups	
		I	II
Weight, mg	Winter	82,3±0,81	83,5±0,72
	Summer	19,0±0,30	18,5±0,22
Awn fiber length, mm	Winter	32,2±1,31	32,4±1,30
	Summer	11,9±0,39	11,7±0,40
Density, units	Winter	1430,0±19,3	1438,0±19,1
	Summer	740,0±15,9	739,0±16,0

As can be seen from the table data, when we pay attention to the wool fibers on the skin of cows in both groups, we witness that the wool fibers are heavy, long and dense in winter on 1 cm2. When we assessed the condition of the wool fibers, it was found that in the summer, compared to the winter, the weight of the wool fibers, the length of the awn fibers and the density in 1 cm2 of the cows were respectively: 63.3 mg less, 20.3 mm shorter and 690 fibers less in group I. In group II, these indicators were respectively: 65 mg; 20.7 mm and 693 units. In winter, the weight of wool fibers on 1 cm2 of skin in group II cows was respectively 1.2 mg (1.46%) heavier and the density was 8 units or 0.6% more than in group I cows. The adaptation of cattle to climatic conditions can also be known by the change in the composition of fibers in their wool cover by seasons. The changes in the amount of wool fibers on the skin of cows by seasons are given in the following table.

Table 2. Changes in the composition of wool on the skin of cows by seasons, %

Wool fibers	Groups	
	Group I	Group II
	Winter season	
Awn	21,9	21,0
Down	54,8	55,6
Transitional	23,3	23,4
Summer season		
Awn	52,6	54,2
Down	16,2	15,3
Transitional	31,2	30,5

The data in Table 2 show that in winter the amount of down and transitional fibers predominated. In the composition of wool fibers of cows in group II, the number of awn fibers in winter was 0.9% less, and transitional fibers were 0.1% less. However, the amount of down fibers was 1.2% higher.

When the composition of the wool cover was determined in the summer, a larger difference was observed in the amount of awn fibers. The amount of awn fibers was 1.6% more than in cows in group I, while the amount of down and transitional fibers was 0.9 and 0.7% higher in cows in group I, respectively.

Therefore, there are certain changes in the wool cover of cows depending on the season. In summer, wool fibers are shorter, less numerous, and contain more awn fibers.

Nevertheless, there was no significant difference between the amount of wool fibers between the groups. This indicates that the cows have adapted to the existing climatic conditions.

Conclusion.

When we assessed the condition of the wool fibers, it was found that in the summer, compared to the winter, the weight of the wool fibers, the length of the awn fibers and the density in 1 cm2 of the cows were respectively: 63.3 mg less, 20.3 mm shorter and 690 fibers less in group I. In group II, these indicators were respectively: 65 mg; 20.7 mm and 693 units. In winter, the weight of wool fibers on 1 cm2 of skin in group II cows was respectively 1.2 mg (1.46%) heavier and the density was 8 units or 0.6% more than in group I cows.

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