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CHANGES IN CLIMATE ADAPTATION OF IMPORTED ABERDEEN-ANGUS CATTLE BREEDS

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Abstract
In our experiment, we studied the climate changes in the imported Aberdeen-Angus cattle breed and studied the protective reactions of the cattle to the effects of climatic conditions.

Keywords: body temperature, heat exchange, breathing depth, pulmonary ventilation, cattle, sweating intensity

Introduction

Cattle breeding is considered the main branch of animal husbandry and plays an important role in maintaining food security for the population of the countries of the world. This can be justified by the following indicators. More than 83 percent of the milk consumed by the world's population is cow's milk. Beef makes up more than 20 percent of the total meat production in the world meat structure, and it ranks third after pork and poultry. For comparison, this situation is close to 99 and 70 percent in Uzbekistan.

That is why great attention is being paid to the development of this industry in our republic. It is known that in order to increase the meat productivity of existing cattle breeds, bred animals are imported from abroad, and as a result of using their gene pool, the breeding and productivity characteristics of many cattle breeds are improved. One of these breeds is the Holstein breed, which is unique to the world gene pool. In addition to being involved in breeding, this breed is also bred in pure form on many farms.In general, it should be noted that imported breeding cattle have high heat resistance. This can be explained by the presence of such important features as a wide skin surface, a relatively short and at the same time smooth wool coat and high activity of sweat glands. However, a good level of heat resistance can be achieved only if the heat exchange of cattle is properly regulated, reducing the rate of oxidation of nutrients during the hot time of the day. To confirm this hypothesis, we measured the physiological parameters of cattle during eight hours of storage under direct sunlight. The results are

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presented in Table 1.High ambient temperature of different levels affects all physiological processes of cattle.

As can be seen from the data in Table 6, the depth of breathing of cattle changes with the increase of ambient temperature.Breathing becomes less shallow, probably due to reduced body moisture loss. Thus, Aberdeen-Angus heifers in group I showed the greatest decrease in respiratory depth, which was 8.2 ml / kg at an ambient temperature of 36.9 degrees Celsius.In the cool morning of the day, breathing depth of heifers of group I was significantly lower than that of heifers of group II and III (P>0.95).

Table 1 Changes in physiological parameters of Aberdeen-Angus heifers after 8 hours of direct sunlight in the open field (n = 10)

Indicators	Groups	Times of Day	
		06:00	14:00
Air temperature	-	20.5	36.9
Body temperature	I	38.32±0.32	39.47+0.17
	II	37.64±0.22	39.44+0.28
	III	37,98+0,34	39,62+0,16
Breathing depth, ml/kg	I	9,52±0,26	8,19+0,15
	II	9,93+0,17	8,41+0,19
	III	10,0+0,22	8,40+0,20
Pulmonary ventilation, l/kg*h	I	16,08+0,44	21,23+0,58
	II	16,66+0,42	21,56+0,59
	III	14,44+0,85	21.9+0,62
Oxygen consumption, ml/(kg*h)	I	475,44+13,87	346,89+11,65
	II	473,01+15,60	350,09+15,11
	III	465,34+16,43	343,94+11,90
Heat production, ml/(kg*h)	I	2282,15+66,60	1665,11+55,94
	II	2270,39+74,92	1680,47+72,55
	III	2233,67+78,91	1650,95+57,13
Sweat intensity mg*s/cm2	I	10,11+0,31	28,50+1,98
	II	10,86+0,46	26,25+1,15
	III	11,31+0,95	26,81+1,35

From the data in the table, we can see that the depth of breathing in heifers of group I was much lower than that of heifers of group II - III.

No significant difference in breathing depth parameter could be detected between other groups.At this stage, we came to the interim conclusion that group I cattle have a more perfect thermoregulatory system that does not lead to hyperventilation of the lungs. This was confirmed in a prospective study of the value of pulmonary ventilation.The value of lung ventilation in the morning hours in heifers of

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group I (16.08 l/(kg*h)). It is 16.66 l/(kg*hour) of heifers of the II group. It is significantly higher than that of cows of group III, 14.44 l/(kg*h). The difference with groups I and II is not so great. However, with the increase of ambient temperature, the pulmonary ventilation value of cows in group I (21.23 l/(kg*h)) and group II (21.56 l/(kg*h)) significantly increased (P>0.95). decreases. This means that cattle of group I have high adaptability, which allows them to more easily tolerate high ambient temperatures without significantly reducing the depth of respiration and increasing pulmonary ventilation.

The highest oxygen consumption in the morning was recorded in cows of group I - 475.44 ml/(kg*h), which was significantly (P>0.95) higher than cows of other groups. With increasing air temperature, oxygen consumption decreased in all groups, but the lowest values were recorded in groups III and I. The difference between them was not statistically significant. The same indicator was observed in the process of heat production. The lowest heat production was observed in group III cattle, which was 1650.95 cal / kg * h at an external temperature of 36.9 degrees.

However, with the increase of external temperature, the most significant decrease in heat production by 58,271 cal/kg*h was observed only in group III cattle, which is significantly (P>0.95) higher than that of cattle in other groups.Thus, according to the indicator under consideration, group I cattle took the leading place among other cattle and showed the most perfect ability of the organism to adapt to high ambient temperature.

Changes in breathing depth, lung ventilation and oxygen consumption values, and thus a decrease in metabolic rate in the cattle body, are important responses to high ambient temperatures.

However, the most important adaptation is the increase in the intensity of sweating with the increase in air temperature. In addition, there is a very close relationship between this indicator and the heat resistance index, so that, other things being equal, cattle with a higher sweating intensity also have a greater heat resistance index.

In the experiment, it was found that the lowest rate of sweating intensity was 10.11 mg*h/cm2 in the cool hours of the morning in cattle of group I (P>0.95).

The highest intensity of sweating with an increase in external temperature was recorded in cattle of group III of 26.81 mg*s/cm.

This allows us to say that the cattle of group I have the clearest adaptive reaction to high temperature, which is expressed by a significant increase in the intensity of sweating, so the daughters of bulls (I).

group) can be considered superior according to the considered parameter of heifers of other groups.Distribution of cattle groups according to this parameter is shown in Figure 1

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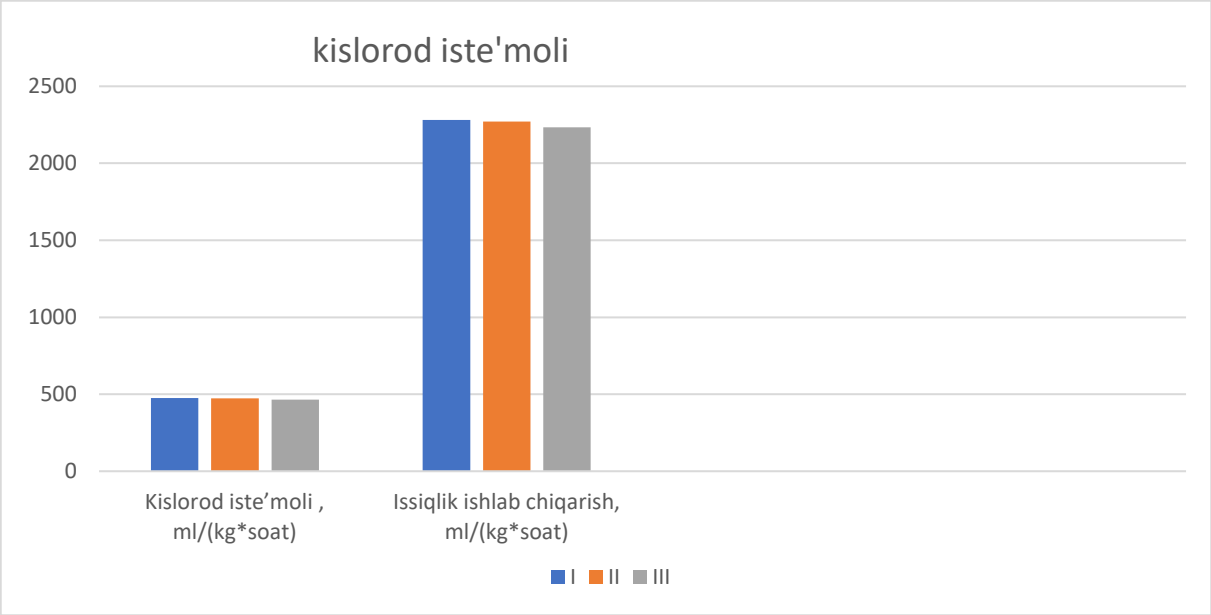

Average adaptation coefficient indicators were distributed as follows.
According to the significant (P>0.95) correlation coefficient, cattle of group I were superior to cattle of group II by 2.95 points. At the same time, cattle of group III were significantly (P>0.95) superior to heifers of group II. Thus, according to the results of the research, cattle of group I had the highest ability to adapt to the increased environmental temperature. These groups of cattle have a more developed system of thermoregulation, which allows to adapt to the hot weather typical of the summer months in our republic and to use resources more rationally.

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