Some biological characteristics of Simmental bulls of different production types

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Abstract. The article presents data on growth, clinical and blood morphological indicators of Simmental bulls of different production types, as well as heat resistance index. The live weight of intensively bred bulls was 480-520 kg at 18 months, and the live weight of meat-milk type bulls was 29.5 kg (5.8%) more than their peers of milk-meat type. Also, bulls of this type had higher growth rates in all breeding periods. Clinical, hematological and heat resistance indicators of Simmental breed bulls are at the standard level, which indicates that they are well adapted to local climate conditions. Key words: Simmental breed, production types, live weight, growth, development, respiratory movements, pulse, body movement, erythrocytes, leukocytes, hemoglobin, heat resistance index.

1 Introduction

The Simmental breed is one of the oldest breeds in the world, and it is considered a breed in the multi-product direction. The Simmental breed was formed as a result of folk selection through selection and selection over a long period of time. In most countries, the Simmental breed is used for meat production by crossing it with beef and dairy cattle. These countries include: USA, Canada, Great Britain, Denmark, Sweden, Brazil and others. At this point, the effective use of Simmental cattle in providing quality beef to the population is an urgent issue [1-9].

A large number of Simmental cattle have been brought to the territory of the Republic of Uzbekistan from developed foreign countries in recent years, and these activities are still ongoing. Simmental breed in the breed: milk; There are types of production such as milk-meat and meat-milk. In this breed, milk-meat and meat-milk types are important in meat production [3]. The purpose of research is comparative study and assessment of growth, clinical, hematolytic and heat tolerance indicators of Simmental bulls of different production types in the sharply changing climate of Uzbekistan.

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2 Materials and methods

In order to fulfill the tasks arising from these goals, two groups of Simmental bulls bred in the "Sardoba Railway Agro-Industrial Complex" farm in Mirzaabad district of the Syrdarya region were formed in the style of pair-analogues. Bulls of milk-meat type (10 heads) were included in the first group, and bulls of meat-milk type (10 heads) were included in the second group. Both groups of bulls were raised intensively under the same feeding and housing conditions.

Live weight growth indicators were determined monthly by weighing and evaluated according to the methodology generally accepted in zootechnics.

- clinical parameters (respiration rate, pulse rate, body temperature) were determined in 5 bulls in each group in the generally accepted method - winter (January), spring (May), summer (August), autumn (October). The study was determined in the morning, noon and evening in each quarter (temperature-rectally using a thermometer, pulse in the artery of the base of the tail, the number of respirations using a phonendoscope and visually observing the movement of the abdominal wall); - the morphological composition of blood was determined in 5 bulls in each group, then hemoglobin was counted on the Sali hemometer device (GS-2), the number of erythrocytes and leukocytes was counted on the Goryayeva grid; - The heat resistance index of bulls was determined using the following formula [4]

$$IChI = 2 \times (0.6 \, xt \, 2 - 10dt + 26)$$

Here: IChI - heat endurance index ;

t 2 – body temperature determined of the day the air temperature ;

dt- in the morning and daytime the body temperature between difference.

3 The results and discussion

The results of the study of the dynamics of live weight of bulls in the experiment showed that although there was no significant difference in live weight between the production types of newborn calves, it was evident that these differences became larger during the breeding periods. It's done.

Table 1. Dynamics of live weight of experimental bulls over time, kg

Age, month	Groups by types of production			
	I (dairy and meat)		II (meat-milk)	
	X± Sx	CV , %	X± Sx	CV , %
At birth	32.0±0.58	6.29	32.5±0.58	6.22
3	109.0±0.60	1.92	118.4±0.65	1.89
6	190.3±0.72	1.31	203.5±0.83	1.41
9	252.9±2.68	3.67	268.3±2.83*	3.66
12	326.5±3.23	3.43	345.8±4.04*	4.05
15	401.3±3.02	2.61	425.3±3.11*	2.53
18	479.4±2.07	1.49	508.9±2.87*	1.96

* $P \leq 0.05$

Live weight of meat-milk type calves at birth was only 0.5 kg (1.5%) higher than milk-meat type calves, and this difference was 9.4 kg (7.9%) at 3 months of age. did In the following growth periods (at 6, 9, 12, 15 and 18 months) the advantage in live weight was 13.2 kg (6.5%); 15.4 kg (5.7%); 19.3 kg (5.6%); It was noted that 24.0 kg (5.6%) and 29.5 kg (5.8%) were in bulls of the meat-milk type. (P<0.05)

The fact that the bulls in the experimental groups experienced different absolute growth rates was confirmed by their daily growth rates. It was shown that the daily growth index of the meat-milk type bulls was relatively high, and it had a positive effect on the live weight at the end of the growing and fattening period. 2 , calves of the II group (meat-milk type) during the milk period, compared to their peers of the I group (milk-meat) calves at 0-3 and 0-6 months, respectively 98.8 g (11, 5%, P≤0.001) and 70.6 g (8%, P≤0.001) were shown to achieve higher daily growth. This trend is in the later periods of growth 6-9; 9-12; 12-15; was maintained at 15-18 months, and the intergroup difference was 24.5 g (3.5%, P≤0.05), 43.4 g (5.3%, P≤0.05), 55.6 g, respectively (6.7%, P≤0.01) and 61.1 g (7%, P≤0.001). It was found that during the growing and fattening period of bulls, meat-milk type was superior to milk-meat type bulls in terms of daily weight gain.

Based on the data of the daily growth indicators of the calves, it should be noted that the calves recorded the highest result (954.4 and 855.6 g) in both groups at the end of the milking period. This situation is explained by the fact that the calves were fed and maintained at a standard level during the milk period. Such a high daily growth rate was not observed during the following periods, which can be explained by the fact that young cattle have reached sexual and physical maturity and certain physiological changes have occurred in their body. In this case, hormonal changes occur in the body of calves during sexual maturation, and during physical maturation, the rate of fat accumulation in the body increases, and the level of growth of muscle and bone tissue, on the contrary, decreases.

Clinical indicators can be used in practice, to evaluate the levels of animal keeping, feeding, and farm use.

Table 2. During the periods of bulls in the experiment daily growth indicators, g

Age, month	I (dairy and meat)		II (meat-milk)	
	X ± Sx	Cv,%	X ± Sx	Cv,%
0-3	855.6 ± 5.64	2.28	954.4 ± 8.70 ***	3.16
3-6	903.7 ± 10.71	4.11	945.5 ± 14.63 **	5.36
0-6	879.4 ± 5.69	2.24	950.0 ± 6.74 ***	2.46
6-9	695.5 ± 32.78	16.33	720.4 ± 32.83 *	15.81
9-12	817.7 ± 19.76	8.20	861.1 ± 20.44 *	8.22
0-12	818.0 ± 8.24	3.54	870.2 ± 10.69 **	4.31
12-15	827.7 ± 19.29	8.03	883.3 ± 23.15 *	9.09
15-18	867.7 ± 27.78	11.09	928.8 ± 19.02 *	7.09
0-18	828.5 ± 3.80	1.59	882.2 ± 4.85 ***	1.91

* P ≤0.05, ** P ≤0.01 , *** P ≤0.001

Clinical indicators of bulls are affected by age, time of day, feeding level, environmental conditions, etc.

Cattle kept in high temperature conditions have a thin skin layer, and wool fibers are shiny and smooth. This determines their ability to avoid direct sunlight. Heat is released through

the skin, and this property remains up to +35 0 C, and when the temperature rises further, the process of heat release begins to take place through breathing. The rate of breathing increases dramatically, appetite worsens, food intake and energy formation decrease.

In our experiments, we studied the clinical indicators of bulls by seasons and age and determined the following information.

Analyzing Table 4.1.1 of the results of the study of the clinical indicators of the meat-milk type bulls in the experiment, it was found that the clinical indicators of the cattle in the experimental groups were at the level of physiological norm requirements. It can be said that the changes in clinical indicators with increasing age in them were completely regular. When analyzing the clinical indicators in the cross-section of the seasons, it was observed that the body temperature of the bulls in both groups of the experiment was 0.2-0.4 °C higher than the indicators of other seasons.

3 that the parameters of respiration, heart rate and body temperature of bulls changed in different seasons.

The number of breaths in autumn was 33-35 breaths per minute, and in winter, spring and summer respectively; 30-32; It was 26-28 and 28-30. This condition is related to the age and body size of the bulls. It is explained by the fact that it is 2 times higher in groups in the summer season than in the spring season, and the temperature in the outdoor environment rises.

When we analyzed the number of pulses, we observed that the number of pulses decreased as the age of bulls increased. When we observed the change in body temperature, we got the opposite data. Depending on the age of the bulls, the body temperature gradually increased. The body temperature was the highest in 18-month-old bulls, showing 39.0 0 C in dairy-meat bulls of group I, and 38.5 0 C in group II. However, all clinical parameters were normal in both groups.

Table 3. Clinical indicators of bulls in experimental groups, (X±Sx), (n=5)

Indicators	**Groups (n=5)**	
	I	II
In the fall (9 months)		
Body temperature is ^{0}C	38.1 ±0.07	38.0±0.03
Heartbeat (in 1 minute)	85.8±1.16	82.5±0.78
Breathing (in 1 minute)	35.0±0.64	33.0±0.43
In winter (12 months)		
Body temperature is ^{0}C	38.3±0.04	38.1±0.03
Heartbeat (in 1 minute)	80.0±1.11	77.5±0.81
Breathing (in 1 minute)	31.8±0.68	30.0±0.56
In the spring (15 months old)		
Body temperature is ^{0}C	38.4±0.07	38.2±0.04
Heartbeat (in 1 minute)	74.0±0.71	72.0±1.01
Breathing (in 1 minute)	28.0±0.56	26.5±0.40
In the summer (18 months)		
Body temperature is ^{0}C	39.0±0.10	38.5±0.04
Heartbeat (in 1 minute)	68.0±0.78	66.0±0.02
Breathing (in 1 minute)	30.0±0.61	28.0±0.40

Blood is very important in the body. Reflecting the changes in the internal environment, it indicates the vitality of growth in periods. The composition of blood depends on the physiological state of the body and changes under the influence of several factors. When the temperature in the external environment is high, the amount of calcium, sodium phosphorus, and glucose in the blood decreases [5,8]

A living organism is interconnected with the external environment, it is quick to respond to various influences, and this is reflected in the composition of the blood.

When studying the morphological and biochemical parameters of the blood of local Aberdeen-Angus and three cross-breed local x Aberdeen-Angus x Santa Gertrude bulls in Uzbekistan, significant differences were observed in the blood of bulls kept in pastures by season and breed. In spring and winter, the amount of erythrocytes and hemoglobin in blood was low in bulls of all groups. In summer, on the contrary, the blood values increased and reached the highest point in autumn. The content of erythrocytes and hemoglobin in the blood of bulls of the III generation was slightly higher, which indicated that the oxidation-disintegration process in their body was accelerated. This has a positive effect on the growth and development of bulls, and ensures the acceleration of absolute and daily growth [1]

Many researchers have proven that total protein, erythrocyte, hemoglobin are organically related to the type and productivity of animals [2, 7,10]

In our experiments, we studied the morphological composition of blood of bulls by age and seasons, summarized the obtained data and presented it in the following table.

depending on the age ; It should be 5-13 thousand mm 3 and 9-14 g%. It was found that these indicators did not significantly deviate from the standard level in the age section of the bulls. At 18 months of age, it was observed that the amount of erythrocyte, leukocyte and hemoglobin in the experimental and control group bulls was at the standard level, but it was found that the amount of erythrocyte, leukocyte and hemoglobin was higher in summer compared to other seasons.

Table 4. Morphological indicators of the blood of bulls in the experiment, X±Sx,(n=5)

Indicators	**Group I**		**Group II**	
	X±Sx	Cv, %	X±Sx	Cv, %
In the spring				
Erythrocytes	7.08 ± 0.06	1.89	7.21 ± 0.05	1.67
Leukocytes	9.71 ± 0.05	1.15 _	9.92 ± 0.05	1.14
Hemoglobin	10.84 ± 0.08	1.62	11.10 ± 0.09	1.81
In the summer				
Erythrocytes	7.88 ± 0.04	1.09	8.01 ± 0.05	1.31
Leukocytes	9.80 ± 0.07	1.52	10.1 ± 0.06	1.27
Hemoglobin	11 .01 ± 0.10	1.95	11.30 ± 0.10	2.04
In the fall				
Erythrocytes	7.75 ± 0.05	1.39	7.89 ± 0.06	1.78
Leukocytes	9.59 ± 0.07	1.62	9.89 ± 0.05	1.20
Hemoglobin	10.76 ± 0.10	2.09	11.05 ± 0.08	1.63
In winter				
Erythrocytes	7.46 ± 0.05	1.51	7.86 ± 0.05	1.30
Leukocytes	9.18 ± 0.04	1.01	9.65 ± 0.06	1.28
Hemoglobin	10.58 ± 0.07	1.43	10.95 ± 0.06	1.25

During the evolution of animals, a mechanism of adaptation to sudden temperature changes in the external environment has been formed. This allows the body to maintain a normal internal environment when the temperature changes in different directions. If a moderate temperature is created in keeping young cattle, they show good growth and fattening properties. When the temperature in the external environment is high, breathing and heart rate accelerate, body and skin temperature rises, oxygen intake, sweat and heat release from the body increase. In the summer, bulls consume 7-20% less feed, and growth is reduced by 15-25%.

The temperature in the external environment should be from +4 0 C to +18 0 C. When the temperature drops below the norm, metabolism in the body increases, energy consumption for heat production and, accordingly, food consumption increases. It should be remembered that cattle are more resistant to a decrease in temperature than an increase in temperature. That is, high temperature has a more negative effect on their body.

Local cattle are resistant to temperatures above or below normal. When the temperature drops 10 0 C below normal, feed cost is 1.5 oz. increases by one. If combined with wind chill, this figure is 2.0 oz. is equal to unity.

It should be noted that if the moisture content increases at low temperatures, this condition has a very negative effect on cattle. Growth slows down by 25-30%, feed cost per 1 kg of growth increases by 20-30%.

As the heat load decreases, growth in bulls increases, but cannot repeat the previous state. Therefore, in meat production, it is advisable to take a calf in early autumn and fatten it for meat at 18 months. Because the fattening period of bulls is at the end of winter and the beginning of spring. During these periods, the air temperature in our country will not be high. Keeping calves in pastures until 2 months of age strengthens the body's defenses. With age, natural resistance is strengthened due to cellular and humoral factors. Growth (daily), live weight gain increases, incidence of diseases decreases.

Therefore , it is important to study the resistance index of bulls to heat load or pressure. Therefore, in our research, we tried to determine the degree of adaptation of bulls to hot climate conditions. It is rated in the heat resistance index. We determined the heat tolerance index of bulls and presented the obtained data in table 5 below.

As can be seen from the data of Table 5, the index of heat resistance in bulls belonging to different production types was within the norm. However, bulls belonging to the meat-milk production type of group II showed superiority over their counterparts of group I in terms of heat index. This determined the heat resistance feature of meat-milk type bulls and ensured the high adaptability to climatic conditions.

In both groups, the heat resistance property was normal, which created the basis for revealing the productivity of their genetic potential.

It can be seen from the data of Table 5 that according to the index of heat resistance, bulls of meat-milk type of group II are 0.3 at 3, 6, 9, 12, 15 and 18 months from their counterparts of group I. 2.3; 0.12; 0.1; showed that 0.6 and 2.3 units are higher.

Table 5. Experimental bulls , (n=5)

Age, month	**I**	**II**
	Milk and meat	Meat and milk
3	92.0	92,3
6	90.4	92.7
9	94.08	94.2
12	94.2	94.3
15	91.6	92.2
18	88.7	91.0

4 Conclusion

Simmental bulls of the meat-milk type bred under the same feeding and maintenance conditions have a reliable advantage over their peers of the milk-meat type in terms of growth rate. The presence of clinical, hematological and heat tolerance indicators of both types of bulls at the level of physiological norms indicates that Simmental cattle are well adapted to the climatic conditions of Uzbekistan.

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