Meat productivity of bull-calves of the red steppe breed with various methods of keeping

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Meat productivity of bull-calves of the red steppe breed with various methods of keeping

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Abstract. The article discusses the issues of creating an efficiently developing industry of beef cattle breeding. Technical re-equipment and modernization of meat farms, cluster farms and fattening enterprises capable of producing high-quality beef in the conditions of the Republic of Uzbekistan is described. The authors try to solve one of the tasks for increasing production and improving the quality of cattle meat and reducing production costs in the conditions of agricultural organizations that are engaged in beef cattle breeding.

1. Introduction

Currently, livestock products play a decisive role in ensuring the food security of the Republic. As part of the implementation of the import substitution program for meat resources in the domestic market, the industry was given the task of increasing the volume of beef production, which requires a set of measures aimed at modernizing the technology of growing, rearing and fattening beef cattle and developing the breeding base of the industry.

The main constraining factors for the sustainable development of domestic beef cattle breeding are the insufficient level of technical and technological equipment of the industry, the unstable level of the forage base, the unsatisfactory condition and use of natural forage lands, low livestock productivity and weak motivation of agricultural producers in animal fattening.

In addition, cattle breeding in most regions of the Republic of Uzbekistan is associated with milk production, and beef is traditionally considered a by-product, since so far beef production is provided mainly by dairy and combined breeds. In addition, in recent years, large-scale Holsteinization of dairy cattle in the Republic has led not only to an increase in milk productivity, but also to a decrease in meat productivity due to lower muscle mass. Holsteinized cattle [1, 2].

The increase in beef production should be based on the intensification of the industry with a differentiated technology approach depending on the genotype of animals, their biological characteristics and external environmental factors.

At the present stage of development of the livestock sector in the Republic, when the prevailing market relations require a detailed approach to the concepts of improving the industry, the problem of successful rearing of young cattle occupies an important place, since the further profitability of milk and beef production depends on this.

It is possible to achieve an increase in the productive qualities of dairy cattle both by selection and genetic methods, and by creating appropriate environmental conditions. Along with the expediency of breeding animals according to the main breeding traits, it is no less important to use different

technological methods of rearing and exploitation to increase the efficiency of rearing young stock and subsequent productivity.

In recent years, issues related to the effective rearing of young animals have been relevant in order to create highly productive herds of dairy cattle and obtain the maximum production of milk and beef.

Most dairy breeds of cattle are of great value in terms of their economic and biological properties and have high potential for increasing the production of milk and meat. This, above all, concerns the black-and-white breed, which has become widespread in our country. When raising calves, the method of keeping animals is of great importance. However, despite the fact that in recent years new approaches to raising calves have been developed, however, research on these issues, taking into account the genotype of bred cattle and the specific conditions of its maintenance, is not enough, which determines the relevance of the topic. In this regard, the search and implementation in agricultural enterprises of resource-saving methods of keeping young cattle, aimed at increasing growth, development, immunobiological characteristics of the body, meat productivity, is of great scientific and practical importance, determines the relevance of the topic.

However, in the first years of independence, the reduction in the number of cows in agricultural organizations created big problems in the formation of fattening livestock. Therefore, the most important means of increasing the number of young cattle for growing and fattening, reducing its cost is to increase the reproductive ability of animals and the safety of offspring, ensuring the output of at least 90 calves from 100 cows and heifers and high safety (not less than 96-98%) of the livestock .

According to a number of scientists, the accelerated development of specialized beef cattle breeding has no alternative and should be considered as a problem of national importance, the solution of which will allow, in the interests of the entire population, to meet the demand for beef and its products through domestic production in the future.

Cultivation and fattening of young cattle with high growth rate makes it possible to obtain more high quality meat products. even in the conditions of the economic crisis, an increasing number of citizens seek to consume domestic environmentally friendly "marble meat", and as the well-being of Russians grows, its consumption will increase even with an increase in the production of cheaper types of meat. At the same time, the high-quality beef market is extremely promising and socially significant and has the highest export potential, since beef is in great demand in the world.

The experience of many domestic advanced farms indicates that beef cattle breeding can successfully develop almost throughout the entire territory of the Russian Federation. Depending on the natural and climatic conditions and economic opportunities, the created beef cattle breeding technologies can have their own characteristics and be improved in the direction of increasing the productivity of livestock while reducing costs, feed and material resources per unit of production, which generally ensures high profitability of beef production.

The low efficiency of beef production is due to high-cost production technologies, insufficient intensity of rearing and fattening of young animals, incl . and meat breeds of cattle. When organizing the rearing and fattening of animals, it is necessary to take into account their breed, economic and biological characteristics, patterns of individual growth and development of the body, using which it is possible to control the growth, development and formation of meat productivity. Therefore, the cost savings of the created technologies in beef cattle breeding is achieved by the correct zoning of breeds, the skillful use of the biological resources of the animals themselves (endurance, good adaptability, high offspring safety, early maturity, high growth energy and payment for feed by products, etc.). this makes it possible to produce high-quality beef in hard-to-reach areas where the development of other livestock industries is limited by the availability of capital investments, energy and labor resources, or harsh climatic and fodder conditions [3, 4, 5, 6, 7, 8, 9].

2. Materials and methods

To conduct the experiment, according to the principle of analogues, 3 groups of bulls of the Red Steppe breed, 15 heads each, were formed according to the following scheme (table 1),

Table 1. Scheme of experience.

Group	Technology option		
	From birth to 2 months	From 2 to 12 months	From 12 to 18 months
Control	Closed premises, group keeping without leash	On sites with a shady canopy, group content without a leash	Fattening indoors, tethered
I - th experienced	In individual houses	On sites with a shady canopy, group content without a leash	Fattening on sites with a shady canopy, on a leash
II- th experienced	In buildings of lightweight construction in individual cages	In buildings of lightweight construction with group maintenance with walking	Fattening on sites with a shady canopy on a leash

Fatness was determined from each group by the degree of development of muscle and adipose tissue visually and by probing the animal.

Meat productivity, chemical composition and quality of meat of experimental bulls were studied according to the methodology of VNIMS (1984). Upon reaching the calves of 18 months of age, a control slaughter was carried out in a meat processing plant on three animals from each group "Cattle for slaughter, beef and veal in carcasses, half carcasses and quarters", when slaughtered, the pre-slaughter live weight was taken into account. Keeping livestock without food before slaughter for a specified time provides free watering to livestock, which is stopped three hours before slaughter.

Steam push mass, visceral fat mass, slaughter mass and slaughter yield. Morphological composition, deboning of the experimental groups of bulls was subjected on the third day after slaughter into five natural anatomical parts (cervical, shoulder, scapular , spinal, lumbar, and hip), which was carried out according to GOST according to sausage classification. As a result of deboning in the carcass, the absolute and relative content of muscle and fat ticking of bones and tendons was determined.

In order to analyze the chemical composition, samples of the longissimus dorsi muscle (between 9-11 ribs) and intermuscular fat, 200 g each, were taken, the fleshy part of the half carcass was passed through a top, and after thorough mixing, minced meat samples of 400 g were selected. In average meat samples minced meat and the longest back muscle, the concentration of moisture, dry matter, protein, fat and ash was determined according to the method of VNIIMS (1984). Along with this, the content of complete (by tryptophan) and inferior (by hydroxyproline) proteins was determined in the muscle tissue of bulls, the ratio of which was used to determine the protein quality index (PQI).

The digital material obtained in the studies was processed by the methods of variation statistics with the determination of the reliability of differences according to the algorithms proposed by N.A. Plokhinsky (1969).

3. Results and discussion

In our study, the diets of experimental bulls consisted of feed produced by the farm. The main diet for up to six months is milk 300 kg, reverse 450 kg, and then hay, alfalfa silage, corn alfalfa haylage, green alfalfa, green corn and mixed fodder. During the experiment, the feeding of young animals of all groups was the same.

In order to study the meat productivity of experimental bulls at the age of 18 months, a control slaughter was carried out at a meat processing plant. The fatness of all the studied groups of animals was recognized as the highest, and the resulting carcasses, in accordance with GOST 7595-79, were assigned to the first category.

The results of the control slaughter of podopiny bull-calves grown in various ways, the contents are presented in Table 2.

Table 2. Slaughter qualities of experimental animals.

Index	Group Control	I- experienced	II- experienced
Pre-slaughter live weight, kg	399.6 ± 4.12	429.3 ± 3.10	430.8 ± 3.44
Steam carcass weight, kg	208.19 ± 3.60	225.81 ± 3.68	227.9 ± 3.38
Steam carcass yield %	52.1	52.6	52.9
Mass of internal fat, kg	10.78±0.31	12.62±0.46	13.35±0.52
Yield of internal fat, %	2.7	2.94	3.1
Slaughter weight, kg	219	238.43	241.25
Slaughter yield, %	54.8	55.54	56

Table 2 shows that the results of the control slaughter indicate that different ways of keeping had a positive effect not only on the intensity of growth and development of the latter but also on the yield of slaughter products.

Tormented data indicate that in terms of pre-slaughter live weight, weight of a fresh carcass and internal fat at 18 months of age, a significant difference was revealed in animals. Animals of the II - experimental group, which were kept in light-weight buildings and on areas with shady canopies, had the largest weight of a paired carcass. They outperformed their peers in the control group by 19.71 kg or 9.46% (P >0.95) of the I -experimental group. Outperformed their peers in the control group 17.62 kg or 8.47% (P >0.95). The animals of the control group had the smallest mass of a paired carcass - 208.19 kg. There were no significant differences in the weight of the paired carcass between the I and II experimental groups (established). Regardless of the different conditions of detention, the slaughter yield in bulls of all groups was quite high (54.8, 55.54, 56%).

Thus, growing bulls of the red-steppe breed in light-weight buildings and in individual cages and in houses, then on open areas in the conditions of the Republic of Uzbekistan, is one of the reserves to increase beef production.

For a complete characterization of meat qualities, it is important to know not only the mass of the carcass and the slaughter yield, but also its components. This is due to the fact that a significant part of the carcass consists of inedible parts, which include bones, ligaments, cartilage and tendons.

In order to study the meat qualities of experimental bulls under various conditions of keeping, we carried out deboning of a half carcass, in which the mass of meat, bones and tendons was taken into account. This data is shown in Table 3.

Table 3. Morphological composition of semi-carcasses of experimental animals.

Index	Group Control	I- experienced	II- experienced
Weight of chilled carcass, kg	104.5 ± 3.24	112.6 ± 3.62	114.4±3.76
Weight of chilled carcass, %	100	100	100
Pulp weight, kg	78.48 ± 2.10	85.12 ± 2.26	86.94 ± 2.78
Pulp yield, %	75.10	75.60	76.00
Bone mass, kg	22.40 ± 3.36	24.30 ± 3.28	24.71 ± 3.42
Bone yield, %	21.46	21.58	21.62
Weight of tendons and ligaments, kg	3.60±0.11	3.18±0.13	2.75±0.12
Output of tendons and ligaments, %	2.44	2.82	2.40
meat index	3.65	3.96	4.02

It has been established that the mass of carcasses and the yield of slaughter products characterize the quantitative side of the products obtained. However, as the animals grow, the ratio in the composition of the edible part of the carcass is applied, that is, with an increase in live weight, the slaughter yield and carcass yield increase, which contributes to a greater percentage of the total amount of edible meat. At the same time, the proportion of muscle tissue is somewhat reduced, and fat, on the contrary, is increased. From this point of view, the industrial and nutritional value of the carcass depends not only on the total amount of muscle, fat and bone tissue, but also on their ratio. Therefore, in order to obtain an objective difference in the changes occurring in the carcasses of experimental animals, it is necessary to study its morphological composition, which to a greater extent characterizes their meat qualities.

It is known that for the consumer the greatest interest is the fleshy part of the carcass. This is primarily muscle and adipose tissue. At the same time, the presentation and taste of the product largely depend on the content of the latter and the place of its localization. The yield of pulp, bones and their ratio allowed us to identify the effectiveness of growing bulls for meat.

Red steppe breed with a different method of maintenance. The analysis of the table showed that the most valuable part of the carcass-pulp in bulls of the II - experimental group was 86.94 kg. They outperformed their peers in the control group by 8.46 kg or 10.7% (P >0.95). Between I and II of the experimental group, the most valuable part of the carcass in terms of pulp did not seem to have a significant difference. In the course of the study, no special distinguishing features were established, both in absolute and relative indicators of the content of bones in the carcasses of experimental animals, although there was some superiority in their relative mass in favor of their peers when kept in lightweight structures and on the site .

The results of the research showed that the meat index of the carcass reached the highest value in the bulls of the II -experimental group, on average 4.02 units; their advantage in terms of the studied indicator over the animals of the control group was 0.37 or 10.1%, respectively. Therefore, the bulls of the II -experimental group had higher quality indicators of the carcass than their peers.

The quality of the fleshy part of animal carcasses is largely determined by its varietal composition. In accordance with the requirements of GOST, according to the sausage classification, beef is divided into three grades: the highest - pure muscle tissue without visible remnants of other tissues and formations, grade I - the presence of no more than 6% of thin connective tissue formations, grade II - no more than 20% of thin connective tissue formations , the presence of small veins, tendons, films is allowed.

The varietal composition of the pulp largely determines its further use by meat processing enterprises, as well as the number and range of meat products produced (Table 4).

Table 4. Results of varietal development of half-carcasses of bulls (X ± Sx).

Index	Group Control	I- experienced	II- experienced
Carcass weight, kg	103.69 ± 1.27	113.21 ± 134	11.5 ± 1.56
Top quality meat			
kg	66 ± 2.10	73.54 ± 2.24	74.68 ± 2.56
%	63.65	64.96	65.80
First			
kg	31.11 ± 1.48	33.30±1.36	33.05 ± 1.64
%	30.01	29.41	29.17
Second			
kg	5.10±0.38	4.96±0.27	4.66 ± 0.18
%	4.92	4.38	4.11
Technical losses			
kg	1.48 ± 0.07	1.48±0.04	1.11±0.05
%	1.43	1.25	0.97

It can be seen from the table that the data obtained by us indicate that the half-carcasses of bull-calves kept in light-weight buildings in individual cages and in houses hitting the sites were characterized by the best varietal composition.

The largest amount of meat of the highest grade, both in absolute and relative terms, was obtained from animals of the I experimental group and then the II experimental group. So, according to its threshing amount, bulls of the II experimental group are 8.6 kg, I of the experimental group are 1.14 kg. In terms of relative quantity, this difference was 11.63 and 1.53% in favor of individuals of the second experimental group.

A similar picture was observed in terms of the absolute amount of pulp of the first grade in the carcass. The superiority of the animals of the II experimental group by their peers in the control group in the pulp of the first grade was 1.94 kg. There was no significant difference between the I and II experimental groups in terms of pulp content .

In terms of the amount of meat - pulp of the second grade in the carcasses of animals of the compared groups, no significant difference was found. There was a tendency to decrease its share in the carcasses of bulls of the II experimental group. According to the relative mass of the pulp of the first and second varieties, no significant difference was found.

4. Conclusions

In the conditions of Uzbekistan, for the sustainable development of domestic cattle breeding, a set of measures is required to improve the organizational and economic mechanism of management based on the introduction of modern resource-saving production technologies.

Thus, the bulls grown by the "Cold" methods in all age periods differed from their peers in higher growth energy. The results obtained allowed a significant advantage in terms of meat productivity of bulls. Their superiority over analogues grown and premises amounted to 31.2 kg before slaughter live weight, 19.3 kg of fresh carcass weight of 2.57 kg of internal fat and 22.25 kg of slaughter weight, which led to a higher slaughter yield.

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