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ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
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ВЕСТНИК

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

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NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources CitationIndex, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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MEAT PRODUCTIVITY OF BULL CALVES OF DIFFERENT DIRECTIONS OF PRODUCTIVITY USING FEEDING COMBINED WITH FINAL FATTENING

Abstract. A scale-up in beef production from the livestock of different origins can be realized only with the use of intensive production technologies, in which the main goal should be the maximum implementation of productivity with the lowest cost of labor and facilities. In some regions characterized by the presence of large pasture areas, it is important to maintain feeding during the pasture period, when beef production occurs without serious material and labor investments. The purpose of the research was a comparative assessment of the meat productivity of the Red steppe, Brown Swiss and Aberdeen-Angus bull calves when feeding in combination with final fattening in the conditions of Hammer agricultural company of the Karachay-Cherkess Republic. For the experiment, three groups of 8-month-old bull calves were formed with 15 animals each: Red steppe (I group), Brown Swiss (II group) and Aberdeen Angus (III group). The experimental groups of calves were reared for 160 days, feeding - for 142 days and final fattening - for 60 days. At the end of the rearing, 3 animals from each group, after feeding - 5 animals each and after the final fattening - 7 animals each were slaughtered. In all production cycles, bull calves of the Aberdeen-Angus breed differed in maximum values of average daily gain in live weight, which ensured them over the entire experiment period the dominancy over peers of Brown Swiss breed by 53 g (P>0.999), of Red steppe - by 91 g (P>0.999) at the lowest cost of feed per 1 kg of live weight gain (an average of 0.32-0.64 energy feed units and 0.03-0.06 kg of digestible protein). Comparison of the slaughter qualities of young stock of different origin in different production cycles indicates a significant superiority of the Aberdeen-Angus bull calves, although significant differences in slaughter yield occurred only after the final fattening (by 1.5-2.8%, P>0.95- 0.999). The obtained values for flesh and bones content in the carcass of experimental young animals provided the best ratio among bulls of the Aberdeen-Angus breed, whose coefficient full meatiness was higher by 0.18-0.33 units by the end of the growing period, and by 0.24-0.43 units after the feeding, and after final fattening - by 0.18-0.34 units. (concerning the bull-calves of the Red steppe breed P>0.95).

Key words: breed, Aberdeen-Angus, Red steppe, Brown Swiss, growth, meat productivity, feed-conversion efficiency, slaughter qualities, the morphological composition of carcasses.

Introduction. In the production of livestock products, the choice of a particular technology should be accompanied not only by ensuring high productivity indicators, but also by the highest return of investment in the industry [1]. The increase in cattle meat productivity in the vast majority of beef cattle breeding regions is achieved by keeping animals on pasture. However, the dominant part of our country's natural pastures needs a radical and (or) surface improvement. [2].

An increase in the volume of produced beef can be achieved by increasing labor productivity and reducing the cost of feed per unit of live weight gain, which is only possible using intensive technologies of growing and fattening young cattle in different directions of productivity [3]. As usual, large agricultural holdings specialize in such approaches [4,5], while the prevailing part of agricultural

enterprises due to imperfect production and economic relations is characterized by unprofitability in beef production.

Unfortunately, despite the measures taken to stabilize and further increase this type of raw meat, the situation for beef production remains difficult, and therefore it is necessary to use all available resources - the use of the gene pool of meat, dairy and combined breeds in the rearing and feeding of purebred and cross-bred young animals using intensive technologies of growing and fattening, application of supplementary feeding, etc. [6,7,8].

In this direction, there is a whole series of publications by scholars and practical workers specializing in beef production. When assessing the formation of meat productivity, the main indicators are carcass weight, morphological composition, and slaughter yield. These traits are driven by a complex of morphological characteristics of the organism, which depend on heredity and environmental factors [9,10].

In the studies of D.A. Baimukanov, V.N. Pristupa, Yu.A. Kolosov, et al., it was found that the higher the live weight of cows, the better the growth rate is manifested in their offspring. With the intensive level of feeding on heavy cows, the offspring is 10-20 kg heavier than peers obtained from lightweight cows and, when grown further, the former show a higher rate of live weight gain and form an enlarged body type. Among such animals, individuals that meet the requirements of the standard of the enlarged type are more common, and with individual homogeneous selection, they give highly productive offspring. [9].

In the opinion of V.N. Lukyanov, I.P. Prokhorov [10], the intensive rearing and fattening of Simmental bulls and Hereford crosses up to 15 months of age, and Charolais crossbreeds up to 18 months of age provided heavy carcasses with the required meat quality, relatively low cost of 1 kg of gain and significant net income when selling them for meat. The most profitable was the intensive rearing and fattening of Charolais crossbreed since they inherited from the father breed the ability to prolong and intensive growth without excessive fat deposition and better feed-conversion efficiency by gaining.

Depending on the fatness of the calves when they enter the pastures for five to six months of the grazing season, they can increase live weight by 120-140 kg [11]. Moreover, young Aberdeen-Angus calves respond well to immunostimulation with biological products of a new generation of domestic (Russian) production, due to this, adaptogenesis and quality of produced beef are increased [12,13].

When using a pasture conveyor from annual forage crops and conducting ration grazing during the drying-out period of the grass stand, it is possible to significantly reduce the time to achieve the required live weight with relatively low labor and material costs.

The experience of foreign countries shows that the technology of beef production, which consists of two cycles (the 1st cycle - the operation “cow-calf”, the 2nd cycle - the growing and fattening of calves after weaning from 6-8 to 18 months of age) has its features - the maximum duration of use and maintenance of cows with offspring and replacements, the use of seasonal tour calving, the maintenance of adult cattle in winter in lightweight premises, the intensive rearing and fattening of young stock in specialized feeding yards [14].

In agricultural enterprises specializing in breeding beef cattle, it is recommended that growing and fattening should be carried out with the division of the production cycle into three periods in a single production cycle and, depending on the feeding capacity (specific weight of concentrates in diets), to establish the age of young animals to be sold at 14–18-months of age upon reaching the live weight of 420-440 kg [15]. The specified technology ensures good use of feed and obtaining full-fledged carcasses with high technical and economic indicators of production.

The aim of the research was to give a comparative assessment of the meat productivity of the Red steppe, Brown Swiss and Aberdeen-Angus breed calves when feeding in combination with final fattening in the conditions of Hammer agricultural company of the Karachay-Cherkess Republic.

Object, material and research methods. For the experiment, three groups of 8-month-old bull calves were formed with 15 animals each: Red steppe (I group), Brown Swiss (II group) and Aberdeen Angus (III group). The live weight of the bulls of the Red steppe breed when setting them up for growing amounted to an average of 175 kg, of Brown Swiss - 177 kg, and Aberdeen-Angus - 183 kg.

The experimental groups of calves were reared for 160 days, the feeding was conducted for 142 days and final fattening for 60 days. The total duration of the experiment was 362 days. At the end of the

growing, 3 animals from each group, after feeding - 5 animals each and after the final fattening - 7 animals each were slaughtered.

The feeding of the experimental livestock on high mountain pastures was carried out from the first decade of May till October 1, 2019.

Weighing of animals was performed in the following technological periods: when setting up for rearing, before being sent to pasture (at the end of rearing), after feeding and final feeding.

During the research period, an average of 28 centners of energy feed units and 2.4 centners of digestible protein were used for each animal. During the feeding season, the consumption of pasture grass was determined by the method of recounting taking into consideration the average daily gain in live weight.

The absolute, average daily and relative gains in live weight were calculated according to the formulas common in zootechnics.

As a result of control slaughter, pre-slaughter live weight, carcass and fat mass and yield, and slaughter yield have been studied. Evaluation of these indicators was carried out according to the methods of the Federal Science Center for Animal Husbandry and Federal Science Center for Nutrition System at a meat processing plant in Cherkessk.

The morphological composition of the carcasses of bull calves was analyzed by the mass of pulp, bones, cartilage, and cords. The full meatiness coefficient was calculated by the ratio of the meat part to the bone mass.

Digital research material has been processed using BIOMETR.EXE software. From statistical indicators, the arithmetic mean and the arithmetic mean error were taken into account. The reliability of intergroup differences in the studied indicators was estimated by the Student table at three levels of probability ($P>0.95$; $P>0.99$ and $P>0.999$).

Research results and discussion. Values of the live weight of the experimental groups of bulls in separate technological periods of growing, feeding, and fattening are shown in table 1.

Table 1 – Change in live weight of bull calves of different breeds during the production cycle

Breed	Production cycle			
	Before growing	After growing	By the end of a feeding	After the final fattening
Red steppe	175.0±1.14**	290.0±1.67***	403.6±1.83***	464.8±3.02***
Brown Swiss	177.3±1.36*	296.7±1.52***	414.0±1.81***	481.4±2.83***
Aberdeen-Angus	183.2±1.98	310.8±2.70	433.6±3.65	506.2±4.81

When forming groups of bull calves, no significant differences in live weight were found between individuals of the Red steppe and Brown Swiss breeds, although the representatives of both breeds were inferior to the Aberdeen Angus calves by an average of 5.9-8.2 kg ($P>0.95$-0.99). As a result of 160 days of rearing, the live weight of bull calves of the Red steppe breed increased by 115 kg, Brown Swiss breed - by 119.4 kg and Aberdeen-Angus breed - by 127.6 kg, by the end of growing this ensured the superiority of meat breeds over peers of other breeds in an average of 14.1-20.8 kg ($P>0.999$). The feeding provided the animals a weight of 400 kg or more and, as expected, the bulls of the Aberdeen-Angus breed were characterized by the highest values - 433.6 kg, with the smallest values - the peers of the Red steppe breed - 403.6 kg, while the individuals of the combined direction of productivity were defined by intermediate values. During the final fattening, the representatives of the Aberdeen Angus and Brown Swiss breeds were more sensitive to the improved feeding conditions, which outperformed the Red steppe peers by an average of 41.4 and 16.6 kg, respectively ($P>0.999$ and $P>0.99$).

The values of the absolute gain in live weight in all groups of calves during the growing and feeding periods were almost at the same level with some superiority obtained during the period of grazing animals (table 2).

Table 2 – Absolute and average daily gain in live weight
of bull calves during periods of growing, feeding and final fattening, $X \pm m_x$

Breed	Продолжительность производственного цикла (сут.)			
	Growing (160 days)	Feeding (142 days)	Final fattening (60 days)	For the whole production cycle (362 days)
The absolute gain in live weight, kg				
Red steppe	115.0±0.50***	113.6±1.25***	59.5±1.65***	289.2±2.29***
Brown Swiss	119.4±0.97***	117.3±1.17***	67.5±0.59*	303.2±1.41***
Aberdeen-Angus	127.6±1.74	124.3±1.05	71.4±1.25	322.2±2.66
An average daily gain in live weight, g				
Red steppe	719±3.15***	798±8.63***	992±27.60***	799±7.81***
Brown Swiss	746±6.09***	823±8.22***	1126±9.88*	837±3.85***
Aberdeen-Angus	797±10.91	875±7.36	1191±20.90	890±7.38

It should be noted that the absolute gain in live weight of bull calves during the feeding period was higher than during rearing since the duration of the pasture period is 18 days shorter. This trend was confirmed by the values of the average daily live weight gain obtained in the compared technological periods. Regardless of the production cycle — growing and feeding — the highest values of the average daily gain in live weight were for the young stock of the Aberdeen-Angus breed, whose superiority over animals of other groups varied between 51-78g (P> 0.999) and 52-77g (P> 0.999), respectively. During the final fattening, the superiority of Aberdeen-Angus calves over other breeds increased compared to previous periods and reached 65-199 g (P>0.95-0.999). Throughout the experiment, the superiority in an average daily gain in live weight of bull calves of the Aberdeen-Angus breed over the peers of the Brown Swiss breed was 53 g (P>0.999), of the Red steppe - 91 g (P>0.999).

The highest relative growth rate in all technological periods of the experiment was demonstrated by the bulls of the Aberdeen-Angus breed, it provided them with an advantage in this indicator over the entire period of research. Regardless of the breed, the maximum growth energy was manifested during the growing period, which decreased slightly in feeding and reached minimum values in the final feeding, which is consistent with the specific pattern consisting of a gradual decrease in the relative growth rate with age.

During the experiment, lasting 362 days, the experimental groups of calves consumed different amounts of nutrients, they received unequal absolute growths, which contributed to differences in feed-conversion efficiency by a gain in live weight (table 3).

Table 3 – Feed-conversion efficiency by the gain in live weight
of bull calves during the experiment (on average per animal)

Indicator	Breed		
	Red steppe	Brown Swiss	Aberdeen-Angus
The absolute gain in live weight, kg	289.2	303.2	322.2
Consumed: EFU, kg Digestible protein, kg	2712 236	2748 241	2816 245
Expended per unit of gain in live weight: EFU, kg Digestible protein, kg	9.38 0.82	9.06 0.79	8.74 0.76

As a result of the highest feed consumption, the maximum gains were obtained from the Aberdeen-Angus bulls, while peers of the Red steppe breed were characterized by the lowest feed consumption with minimal absolute gain in live weight among the analyzed groups of animals. According to the specified indicators, the young animals of the Brown Swiss breed occupied an intermediate position between the extreme values of traits. These trends provided the superiority to meat bull calves, in which the cost per 1 kg of live weight gain was 0.32-0.64 energy feed units and 0.03-0.06 kg of digestible protein lower than in peers of other breeds.

During the analyzed age periods of slaughter, young Aberdeen-Angus calves differed in maximum pre-slaughter live weight, which in this indicator, after growing, exceeded peers of other groups by

13.6-19.8 kg, after feeding - by 18.8-28.6 kg (P>0.95-0.99) and after the final fattening - by 24.0-39.7 kg (P>0.999). At the end of all production cycles, large carcass weight was for animals of the Aberdeen-Angus breed: after growing by 11.5-16.9 kg, after feeding by 15.4-25.7 kg (P>0.95-0.99) and after the final fattening - by 21.1-36.6 kg (P>0.99-0.999). The age-related increase in the differences in carcass weight between the experimental groups of bull calves is quite natural (table 4).

It should be pointed out that the greatest localization of internal fat was noted in carcasses obtained from the Red steppe bull calves, the smallest one - in the Aberdeen-Angus breed. These differences between the compared groups of bull calves at the end of the growing reached 1.1 kg, after the feeding - 1.0 kg and after fattening - 0.5 kg, although they are not reliable. With age, regardless of the origin of the calves, as expected, the mass of internal fat increases.

As a result, the slaughter yield of the Aberdeen-Angus bulls in all production cycles was higher than in young animals of the combined and dairy directions of productivity. The differences in this indicator between the compared groups of calves were 1.3 and 2.1% at the end of growing, respectively, after the feeding - 1.1 and 2.2% (P>0.95), after the fattening - 1.5 (P>0, 95) and 2.8% (P>0.999). Along with interbreeding differences, a regular age-related increase in slaughter yield was observed in all groups of bulls. So, during the slaughter of bulls after feeding in comparison with that after growing, the values of the analyzed indicator increased, depending on the breed, by 1.3-1.6 abs. percent, and after the final fattening - by 3.9-4.6 abs. percent, and by a large amount in individuals of the Brown Swiss and Aberdeen-Angus breeds.

Table 4 – the results of the control slaughter of the experimental groups of calves, $X \pm m_x$

Indicator	Breed		
	Red steppe	Brown Swiss	Aberdeen-Angus
After growing (n=3)			
Pre-slaughter live weight, kg	286.2±4.84	292.4±2.68	306.0±9.56
carcass weight, kg	143.7±4.84	149.1±4.32	160.6±5.46
Carcass yield, %	50.2±0.90	51.0±1.04	52.5±0.41
Fat mass, kg	6.3±0.32	5.5±0.46	5.2±0.57
Fat yield, %	2.2±0.08	1.9±0.14	1.7±0.14
Weight of carcass and fat, kg	150.0±5.16	154.6±4.75	165.8±6.04
Slaughter yield, %	52.1±0.63	52.9±1.17	54.2±0.50
After feeding (n=5)			
Pre-slaughter live weight, kg	398.0±2.64**	407.8±3.47*	426.6±6.70
carcass weight, kg	203.0±2.83**	213.3±3.24*	228.7±5.06
Carcass yield, %	51.0±0.63	52.3±0.39	53.6±0.37
Fat mass, kg	9.5±0.44	9.0±0.53	8.5±0.33
Fat yield, %	2.4±0.11	2.2±0.11	2.0±0.04
Weight of carcass and fat, kg	212.5±3.16**	222.3±3.70	237.2±5.39
Slaughter yield, %	53.4±0.66*	54.5±0.49	55.6±0.41
After fattening (n=7)			
Pre-slaughter live weight, kg	456.1±2.76***	471.8±2.66***	495.8±4.63
carcass weight, kg	243.5±2.69***	259.0±3.20**	280.1±3.76
Carcass yield, %	53.4±0.32	54.9±0.39	56.5±0.30
Fat mass, kg	11.9±0.36	11.3±0.35	11.4±0.30
Fat yield, %	2.6±0.06	2.4±0.05	2.3±0.04
Weight of carcass and fat, kg	255.4±3.05***	270.3±3.55**	291.5±4.06
Slaughter yield, %	56.0±0.37***	57.3±0.43*	58.8±0.34

The morphological composition of carcasses of different breeds turned out to be different both in connection with the origin and in different production cycles of beef production (table 5).

Table 5 – The morphological composition of carcasses of bull calves of different breeds after growing, feeding and fattening, $X \pm m_x$

Indicator	Breed		
	Red steppe	Brown Swiss	Aberdeen-Angus
After growing			
weight of chilled carcass, kg	143.7±4.84	149.1±4.32	160.6±5.46
pulp mass, kg %	110.6±4.5 77.0±0.6	115.4±4.4 77.4±2.1	125.7±6.3 78.2±1.99
bones mass, kg %	29.6±0.14 20.6±0.60	30.0±2.4 20.1±1.60	31.0±2.6 19.3±0.99
mass of cords and cartilage, kg %	3.5±0.2 2.4±0.04	3.7±1.3 2.5±0.79	3.9±0.5 2.4±0.25
coefficient of full meatiness, units	3.74±0.13	3.89±0.43	4.07±0.14
After feeding			
weight of chilled carcass, kg	203.0±2.83**	213.3±3.25*	228.7±5.06
pulp mass, kg %	157.5±1.72*** 77.6±0.50	167.6±2.14** 78.6±0.30	181.6±2.40 79.4±0.70
bones mass, kg %	40.0±2.07 19.6±0.75	40.5±2.10 19.0±0.75	41.6±2.40 18.2±0.67
mass of cords and cartilage, kg %	5.5±1.04 2.7±0.53	5.2±1.00 2.4±0.49	5.5±0.44 2.4±0.16
coefficient of full meatiness, units	3.97±0.18	4.16±0.18	4.40±0.20
After fattening			
weight of chilled carcass, kg	243.5±2.69***	259.0±3.20**	280.1±3.76
pulp mass, kg %	190.2±2.90*** 78.1±0.38	203.8±2.72*** 78.7±0.27	222.7±3.16 79.5±0.31
bones mass, kg %	46.7±0.51** 19.2±0.40	47.9±0.87 18.5±0.32	50.4±1.00 18.0±0.33
mass of cords and cartilage, kg %	6.6±0.27 2.7±0.09	7.3±0.29 2.8±0.08	7.0±0.32 2.5±0.08
coefficient of full meatiness, units	4.08±0.10*	4.24±0.09	4.42±0.10

The highest pulp content was in the Aberdeen-Angus bulls: at the end of growing 10.3-15.1 kg, feeding - 14.0-24.1 kg (P>0.99-0.999) and final fattening - 18 9-32.5 kg (P>0.999).

No significant interbreed differences were registered in the bones mass as well as in cartilage and tendons, only after fattening the Aberdeen Angus significantly exceeded the calves of the Red steppe breed in bone content (by 3.7 kg, P>0.99). The relative yield of these parts of the carcass was lower in meat calves, and the maximum - in peers of dairy and combined directions of productivity.

The obtained values for the content of pulp and bones in the carcass of experimental young animals provided the best ratio among bulls of the Aberdeen-Angus breed, the coefficient of the full meatiness of which was higher in all production cycles than in individuals of other breeds. So, by the end of the growing period, these differences were 0.18-0.33 units, after the feeding - 0.24-0.43 units, and after the final fattening - 0.18-0.34 units. (in relation to the bull-calves of the Red steppe breed P>0.95). With age, the level of the coefficient of full meatiness for all groups of calves increased and reached the maximum for slaughter after the final fattening.

Conclusion. As a result of the young stock formation of the Red steppe, Brown Swiss and Aberdeen-Angus breeds at the age of 8 months with the aim of further rearing, feeding and final fattening, the livestock with high slaughter qualities was obtained. The greatest impact from different production cycles was received as a result of the slaughter of young animals after the final fattening. Other conditions being equal, the biggest pulp yield and the best coefficients of the full meatiness of carcasses were shown by the bulls of the Aberdeen-Angus breed, especially after a two-month final fattening. The smallest expenditure of nutrients per unit of gain in live weight during the experiment is characterized by young meat production trends. Obvious is the fact of the essence of all production cycles - growing, feeding and fattening, after which the young stock reaches a mass of 450-500 kg.

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ҚОРЫТЫНДЫ БОРДАҚЫЛАУ МЕН ЖАЙЫЛЫММЕН ҮЙЛЕСКЕН ТҮРЛІ БАҒЫТТАҒЫ БҰҚАЛАРДЫҢ ЕТ ӨНІМДІЛІГІ

Аннотация. *Зерттеу мақсаты* – қырдың қызыл, қоңыр швиц және абердин – ангусс тұқымдары бұқаларының ет өнімділігіне салыстырмалы бағалау беру. Қорытынды бордақылау Карачай-Черкес Республикасының «Хаммер» агрофирмасы жағдайында өткізілді.

Жас бұқалардың топтарын қалыптастыруда тірі салмағы бойынша қырдың қызыл және қоңыр швиц тұқымының арасында айтарлықтай айырмашылық болған жоқ, алайда қос топта абердин – ангус тұқымына орташа алғанда 5,9-8,2 кг орын берді (P>0,95-0,99). 160 тәуліктік өсім нәтижесінде қырдың қызыл тұқымы – 115 кг, қоңыр швиц – 119,4 кг және абердин – ангус – 127,6 кг еселенді, өсімнің соңында екі құрдастарынан да орташа есеппен алғанда 14,1-20,8 кг (P>0,999) басым болды. Жайылым жануарлардың 400 кг және одан да жоғары салмақ қосуын қамтамасыз етті, жоғары салмаққа абердин – ангус тұқымы – 433,6 кг ие болды, төменге қырдың қызыл тұқымы - 403,6 кг иеленді. Қорытынды бордақылау нәтижесінде абердин – ангус және қоңыр швиц тұқымдары басымдыққа ие болды, тірі массасы бойынша 41,4 және16,6 кг сәйкесінше (P>0,999 және P>0,99).

Барлық топ бұқаларында тірі массаның абсолютті өсім мәні өсіру және жайылым барысында бір деңгейде болды. Атап өтетін жағдай тірі масса бойынша абсолютті өсім жайылым кезеңінде басым болды. Екі кезеңдеде орташа тәуліктік өсім бойынша абердин – ангус тұқымдары басымдыққа ие болды 51-78 (P>0,999) және 52-77 (P>0,999). Қорытынды бордақылау кезінде абердин – ангус тұқымының басқа тұқымдардан басымдылығы ұлғайды және 65-199 г (P>0,95-0,999) жетті. Қоңыр швиц тұқымынан орташа өсім бойынша 53 г (P>0,999) және қырдың қызыл 91 г (P>0,999) басымдылыққа ие болды.

Тәжірбие барысында, 362 тәулік ұзақтығында жас бұқалар тобында түрлі мөлшерде азықтар қолданылды. Олардан түрлі өсім алынды. Максималды азық қолдану нәтижесінде жоғары өсімге абердин – ангус тұқымы ие болды. Қызыл қыр тұқымы аз өсім берді. Қоңыр швиц тұқымы аталған көрсеткіште аралық мәнге ие болды. Көрсетілген тенденциялар етті бағыттағы жас бұқалардың артықшылығын айқындады, тірі салмақтың 1 кг өсіміне 0,32-0,64 энергетикалық азықтық бірлік және 0,03-0,06 кг қорытылатын протеин шығымы басқа тұқымдармен қарағанда төмен.

Бір жасқа дейінгі бұқалардың ұшаларының морфологиялық құрамы шығу тегіне байланысты түрлі болды. Таза ет шығымының көп мөлшері абердин – ангус тұқымына тән болды: жетілдіру соңында - 10,3-15,1 кг, жайылымда - 14,0-24,1 кг (P>0,99-0,999) және қорытынды бордақылауда - 18,9-32,5 кг (P>0,999). Сүйектер сонымен қатар шеміршек пен сіңір массасы бойынша айтарлықтай тұқымаралық айырмашылықтар байқалған жоқ, тек бордақылаудан кейін абердин – ангус тұқымдары қызыл қыр тұқымынан сүйектер мөлшері бойынша басым болды (3,7 кг, P>0,99).

Бұлшықеттің және сүйектердің мөлшері бойынша алынған мәлметтер тәжірбиелік жануарларда абердин – ангус тұқымы қалған екі тұқымнан басым болды. Осылайша, жетілдіруде бұл айырмашылықтар 0,18-0,33 бірлік, жайылымда - 0,24-0,43бірлік және қорытынды бордақылау - 0,18-0,34 бірлік (қырдың қызыл тұқымына байланысты P>0,95). Қорытынды бордақылаудан кейін жас қосқан сайын еттілік коэффициенті ұлғайды және максимальды көрсеткішке жетті.

Түйін сөздер: тұқым, абердин – ангус, қыр қызылы, қоңыр щвиц, өсу, ет өнімділігі, азық төлемі, сойыс сапасы, еттің морфологиялық құрамы.

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МЯСНАЯ ПРОДУКТИВНОСТЬ БЫЧКОВ РАЗНОГО НАПРАВЛЕНИЯ ПРОДУКТИВНОСТИ ПРИ НАГУЛЕ В СОЧЕТАНИИ С ЗАКЛЮЧИТЕЛЬНЫМ ОТКОРМОМ

Аннотация. *Цель исследований* – дать сравнительную оценку мясной продуктивности бычков красной степной, бурой швицкой и абердин-ангусской пород при нагуле в сочетании с заключительным откормом в условиях агрофирмы «Хаммер» Карачаево-Черкесской Республики.

При формировании групп бычков не обнаружено достоверных различий по живой массе между особями красной степной и бурой швицкой пород, хотя представители обеих пород уступали абердин-ангусам в среднем на 5,9-8,2 кг (P>0,95-0,99). В результате 160-суточного доращивания живая масса бычков красной степной породы увеличилась на 115 кг, бурой швицкой – на 119,4 кг и абердин-ангусской – на 127,6 кг, что обеспечило к концу доращивания превосходство особям мясной породы над сверстниками других пород в среднем на 14,1-20,8 кг (P>0,999). Проведенный нагул обеспечил достижение животными массы 400 кг и более, причем, как и ожидалось, наибольшими значениями характеризовались бычки абердин-ангусской породы – 433,6 кг, наименьшими – сверстники красной степной породы – 403,6 кг, тогда как особи комбинированного направления продуктивности характеризовались промежуточными значениями. В период заключительного откорма отзывчивее на улучшенные условия кормления оказались представители абердин-ангусской и бурой швицкой пород, которые превзошли по живой массе сверстников красной степной породы в среднем на 41,4 и 16,6 кг соответственно (P>0,999 и P>0,99).

Значения абсолютных приростов живой массы у всех групп бычков в периоды доращивания и нагула были, практически, на одном уровне с некоторым превосходством, полученным в период пастбищного содержания животных. При этом следует отметить, что абсолютные приросты живой массы бычков в период нагула оказались выше, чем при доращивании, так как продолжительность пастбищного периода на 18 суток короче. Эту тенденцию подтвердили значения среднесуточных приростов живой массы, полученные в сравниваемые технологические периоды. Независимо от производственного цикла – доращивание и нагул – наибольшими значениями среднесуточного прироста живой массы характеризовался молодняк абердин-ангусской породы, чье превосходство над животными других групп варьировало в пределах 51-78 (P>0,999) и 52-77 (P>0,999) г соответственно. В период заключительного откорма превосходство абердин-ангусов над бычками других пород увеличилось относительно предыдущих периодов и достигло 65-199 г (P>0,95-0,999). За весь период опыта превосходство по среднесуточному приросту живой массы бычков абердин-ангусской породы над особями бурой швицкой породы составило 53 г (P>0,999), красной степной – 91 г (P>0,999).

За период опыта, продолжительностью 362 суток, подопытные группы бычков потребили разное количество питательных веществ, от них получены неодинаковые абсолютные приросты, что способствовало различиям в оплате корма приростом живой массы. В результате наибольшего потребления кормов максимальные приросты были получены от бычков абердин-ангусской породы, тогда как сверстники красной степной породы характеризовались наименьшим расходом кормов при минимальном абсолютном приросте живой массы среди анализируемых групп животных. Молодняк бурой швицкой породы по указанным показателям занимал промежуточное положение между крайними значениями признаков. Указанные тенденции обеспечили превосходство бычкам мясной породы, у которых затраты на 1 кг прироста живой массы оказались на 0,32-0,64 энергетических кормовых единиц и 0,03-0,06 кг переваримого протеина ниже, нежели у особей других пород.

Морфологический состав туш бычков разных пород оказался различным как в связи с происхождением, так и в разные производственные циклы производства говядины. Наибольшее содержание мякоти было свойственно бычкам абердин-ангусской породы: по окончании доращивания на 10,3-15,1 кг, нагула – на 14,0-24,1 кг (P>0,99-0,999) и заключительного откорма – на 18,9-32,5 кг (P>0,999). По массе костей, а также хрящей и сухожилий существенных межпородных различий не обнаружено, лишь после откорма абердин-ангусы достоверно превзошли бычков красной степной породы по содержанию костей (на 3,7 кг, P>0,99). Относительный выход этих частей туши был ниже у бычков мясной породы, а максимальный – у сверстников молочного и комбинированного направлений продуктивности.

Полученные значения по содержанию мякоти и костей в туше подопытного молодняка обеспечили наилучшее их соотношение у бычков абердин-ангусской породы, коэффициент полномясности которых во все производственные циклы был выше, нежели у особей других пород. Так, к концу периода доращивания эти различия составили 0,18-0,33 ед., нагула – 0,24-0,43 ед. и заключительного откорма – 0,18-0,34 ед. (по отношению к бычкам красной степной породы P>0,95). С возрастом уровень коэффициента полномясности у всех групп бычков увеличивался и достигал максимальных значений к убою после заключительного откорма.

Ключевые слова: порода, абердин-ангусская, красная степная, бурая швицкая, рост, мясная продуктивность, оплата корма, убойные качества, морфологический состав туш.

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