

Compensation Ability of Bulls of Simmental Breed

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Abstract: The peculiarities of compensatory growth and the influence of intensive rearing on the meat productivity of lagging young Simmental breeds and the ways of rational use of genetic possibilities of the animals of the studied groups for increasing the production of high-quality beef and increasing the profitability of the branch have been revealed. It was established experimentally that increasing the level of nutritiousness of diets of experimental bulls allows increasing their live weight up to 523.4-473.9 kg with using 8.25-9.33 fodder units per 1 kg of growth. An increase in the level of feeding of experimental bulls by 10-25% improved the meat indicators. For example, bulls of Group II at the age of 18 months surpassed their peers by 2.7-47.4 kg on preslaughter weight, by 0.7-30.3 kg on carcass weight and by 2.4-8.3 kg on slaughter weight. The slaughter yield was 55.6% in the control group I; 55.8% in group II and 55.2% in group III. The study of the compensatory growth of steers has shown that steers of groups II and III yielded 16% and 35.3% of the live weight of the control group, respectively, when put to experiment. An increase in the nutritive value of the diet of bulls of group II by 10-15% made it possible to decrease the lag during the following breeding periods and by the age of 15 months to fully liquidate the lag and to yield by 1.2% (6.1 kg) at the end of the experiment. Group III bulls, despite increasing the intensity of feeding by 20-25%, were unable to completely cover the lag in live weight until the end of the experiment, but reduced it to 9.1% (43.4 kg). At the age of 18 months the yield of flesh in the carcasses of animals of all groups increased, namely in bulls of group I - 11.7%, in animals of group II - 13.1%, in group III - 13.5% compared to the age of 7 months. At that age, group II steers were 1.0 kg ahead of group I steers and 13.7 kg ahead of group III steers.

Key words: Simmental breed, growing, compensation, feeding, the weight, meat productivity, growing of the muscles.

Relevance: The main task of the agroindustrial complex of the country is to ensure further growth and greater sustainability of agricultural production, constantly improving the efficiency of livestock to better meet the needs of the population in food products.

The current level of cattle meat production in Uzbekistan does not yet fully meet the needs of the population of the country. At the same time, the potential of bred cattle is not used in a rational way. The average daily gain of young stock in many farms during the growing and fattening period does not exceed 350-400 grams, and the average daily weight when sold is no more than 330-350 kilos, which is half to two times less than when it reaches its slaughter state.

The problem of protein nutrition, especially protein of animal origin, has not yet been solved and is still relevant. Thus meat proteins have the special importance for human body, main source of which is beef, its specific weight in total balance of the country is 40-45%. All this, and also the growing unsatisfied demand and modern achievements of zootechnical science and best practices create the preconditions for the accelerated use of all the reserves to increase beef production.

Progressive technology of beef production is based on the principle of maximum use of biological possibilities of the animal. Consequently, there is a need to periodically study the productive qualities of cattle of different breeds, the most common in a particular natural and climatic zone, to establish their compliance with the main objectives of cattle breeding in those or other regions of the country. The main role in this is played by scientific research determining the biological laws of animal development, as well as the development of various ways to manage the vital processes of the organism.

Studying the formation of meatiness of various cattle breeds during their intensive breeding is both theoretically and practically important. Studies will provide evidence of the dynamics of growth of muscle, fat and bone tissues, which makes it possible to determine the optimal age for slaughtering steers.

Knowledge of the potential capabilities of young stock of different breeds and the features of their meat productivity formation allows young stock of one or another breed to be raised according to a given program.

Knowing the duration of rearing animals to standard conditions, it is possible to determine the cost of feed and differentiate the technology of rearing and fattening of young animals for each breed.

Knowing the impact of intensive rearing on growth, development and meat productivity of steers taking into account weight and age specifics and

Peculiarities of formation of meat productivity of steers of Simmental breed can control the development of the organism under the specified program, will give the opportunity not only to increase the productivity of animals, but also improve the nutritive value of beef, which determines the relevance of the theme of research.

The aim of the scientific research is to study the meat productivity, meat quality and degree of compensation ability of steers lagging in growth and development, under intensive technology of growing on meat.

In connection with this goal the following tasks were solved:

- To study the effect of the level of feeding on compensatory growth and development, meat productivity and meat quality, weight growth of muscularity of steers lagging in growth and development.

The objects of the research are steers of Simmental breed at the age of 7 months old and the growth, development, meat productivity, meat quality and formation of the meat productivity of the experimental steers have been studied.

The scientific significance of the work lies in the fact that methods have been developed to identify the genetic potential of meat productivity of stunted steers.

The practical significance of the results of research consists in the fact that the developed methods of growing stunted steers are important in intensifying beef production in the hot climate of Uzbekistan.

Material and methodology of research: The scientific-economic experience was conducted in the cattle-farm of Uzbek-British joint venture "INZIM-TEX" on stunted steers of Simmental breed from 7 to 18 months.

The tests were done with three groups of Simmental bulls, 11 bulls in each group, from 7 to 18 months of age. Group I (control) consisted of bulls with the average live weight 203 kg, Group II - experimental group - bulls with the live weight 170 kg, and Group III - bulls with the live weight 150 kg.

Steers were fed according to the standards of A.P. Kalashnikov (M, 2003), taking into account live weight and fodder conditions of the farm. Calves of experimental group I were fed by 10-15% more nutritious ration, and those of experimental group II by 20-25% more than the control group, using vitamin and mineral supplements in all groups.

The weight gain of steers was determined by weighing in the morning before feeding, at putting on the experiment and at the end of each month, determining the absolute, relative and average daily gain of live weight.

In order to establish the amount and payment for the feed eaten by growth, a ten-day record of the given feed and its residues by group and by weighing the feed on 2 contiguous days was carried out.

Meat productivity of the experimental animals was established according to the methodology of VIG and VNIIMSH by conducting a control slaughter of three animals from each group. The live weight (before and after starvation), carcass weight (steamed and chilled) and the weight of internal fat were taken into account.

The morphological composition and weight growth of the muscles were determined by deboning the half-carcasses according to the natural anatomical parts

Research results. The most important condition for intensive technology of growing and fattening of steers is feeding and housing.

During all the period of the experiment the animals were fed with their own fodder (excluding mixed fodder) and fed the same kind of food. As a result of differences in the eating habits, differences in feed and nutrient intake were observed. In our experiment the level of feeding and the nutritive value of the diets were made according to the feeding norms of A.P. Kalashnikov (2003), taking into account the live weight of the steers. Feeding level of steers of group II was increased by 10-15%, of group III by 20-25%, while that of group I (control) - according to the accepted norm with the use of vitamin-mineral supplements in all groups.

It should be noted that for the whole period of the experiment (Table 1), due to the high content of solids in the feed and good digestibility, the experimental animals of all groups were distinguished by a high payment for fodder growth. The biggest advantage was in steers of group II, which spent 8.25 k.e. per kg of growth respectively. This is less than in peers of groups I and III by 0.2 and 1.08 k.e. Consumption of digestible protein per 1 kg of growth by groups was 916, 894 and 1022 g, respectively.

During the period of growing, steers of groups I, II and III spent 7.35, 7.03 and 7.81 fodder units and 823, 787 and 891 g of digestible protein per 1 kg of growth respectively. Group II bulls had the best assimilation of nutrients in fodder.

During fattening period group I bulls consumed 1018,9 kg of fodder units, group II bulls spent 89,6 kg and group III bulls spent 178,5 kg more fodder units than group I.

The highest consumption of metabolizable energy of fodder was observed in bulls of group III, which amounted to 12573.0 MJ. By this indicator they surpassed their peers of groups I and II by 17.5 MJ and 7.5 MJ, respectively

During fattening period 11,44 c.e.f. were spent per 1 kg of live weight gain by bulls of group II, while their peers of groups I and III had 11,14-13,26 c.e.f.

Thus, the conditions created for intensive breeding of experimental steers to realize the genetic potential of meat productivity were satisfactory. At the same time, animals of different groups reacted differently to them, which affected the intensity of growth and meat productivity indicators.

Live weight is the main criterion for animal growth. Consequently, weight growth of young animals is an important indicator in the study of meat productivity, which largely depends on breed, feed level, age and other environmental factors, the study of which is given great attention in zootechnical science.

Knowing the live weight of an animal, we can, to a certain extent, identify its meat productivity, the need for nutrients, feed consumption per unit of weight gain, and consequently the compensatory ability, the efficiency of rearing and fattening.

As can be seen from Table 2, when producing steers of group I (control) surpassed the steers of group II in live weight by 32.4 kg ($P>0.999$). Increasing the nutritive value of group II steers by 10-15% reduced this lag at 9 months of age to 18.6 kg, at 12 months to 5.7 kg, and at 15 months of age they exceeded the control group by 0.8 kg and at 18 months of age by 6.1 kg ($P>0.99$).

Despite the 20-25% increase in the nutritive value of the diet, group III steers were inferior in their live weight to group I and II steers at all ages. Their live weights were 50.3 and 20.6 kg ($P>0.999$) lower when they were put on trial, 47.9 and 29.3 kg ($P>0.999$) at 9 months, 45 and 37.5 kg ($P>0.999$) at 12 months, 42.2 and 43 kg ($P>0.999$) at 15 months, 43.4 and 49.5 kg ($P>0.999$) at 18 months.

The difference in live weight between group II and I steers is highly reliable ($P>0.999$), and between II and III within $P>0.95$. This means that group II and III steers gave higher live weight at all ages compared to group I steers.

Under intensive feeding, it was possible to obtain sufficiently high absolute and average daily gains in live weight. Group II steers outperformed their peers of groups I and III in terms of the indicator under study at certain ages.

Table 1.

Ratio	Consumption of fodder by periods of growing								
	period of the growing			period fatten			the whole period		
	I	II	III	I	II	III	I	II	III
Cereals-grass hay	869,3	873,1	865,0	257,6	296,0	303,6	1126,8	1149,1	1168,6
Cereal-legume haylage	1069,5	1250,7	1135,1	908,0	922,0	938,4	1977,5	2170,7	2073,5
Maize silage	2465,9	2128,9	2059,7	184,0	399,0	450,8	2649,9	2496,9	2510,5
Combined feed	913,0	913,0	913,0	552,0	552,0	552,0	1465,0	1465,0	1465,0
Salt	125,6	125,6	125,6	50,6	50,6	50,6	176,2	176,2	176,2
Premix	105,5	105,5	105,5	60,7	60,7	60,7	166,2	166,2	166,2
Wheat straw				276,0	368,0	349,6	276,0	368,0	349,6
Bard wheat				1380,0	1380,0	1380,0	1380,0	1380,0	1380,0
The feed contains									
exchange energy, MJ	17173,8	18749,85	19155,15	10698,45	11639,25	12572,7	27872,3	30389,1	31727,9
Dry matter, kg	1962,7	2232,1	2243,9	1222,7	1385,6	1460,8	3185,4	3617,7	3704,7
Fodder Unit, kg	1635,6	1785,7	1824,3	1018,9	1108,5	1197,4	2654,5	2894,2	3021,7
Crude protein, kg	230,6	251,8	281,4	131,7	143,2	154,7	362,3	395,0	436,1

Digestible protein, kg	183,0	199,8	208,2	104,5	113,7	122,8	287,6	313,5	331,0
Crude fibre, kg	589	584,5	564,7	339	391,9	400,1	928,0	976,4	964,8
Sugar, kg	68,9	71,7	68,1	33,9	36,2	37,9	102,8	107,9	106,0
Starch, kg	41,2	40,4	38,5	13,9	15,7	16,9	55,1	56,1	55,4
Crude fat, kg	100,7	100,8	97,8	59	62,7	64,1	159,7	163,5	161,9
Calcium, kg	14,1	14,3	13,8	7,2	7,9	8,1	21,3	22,2	21,9
Phosphorus, kg	11,8	11,9	11,7	7,5	7,8	7,8	19,3	19,7	19,5
Carotene, g	91,6	88,5	84,6	29,1	33,8	36,4	120,7	122,3	121,0
Vitamin D, thousand IU	53,4	54,3	76,8	21,5	23,2	24,7	74,9	77,5	101,5
Increase in live weight	222,4	253,9	233,6	91,5	96,9	90,3	313,9	350,8	323,9
Consumption of feed units per 1 kg live weight gain	7,35	7,03	7,81	11,14	11,44	13,26	8,46	8,25	9,33
Consumption of digestible protein per 1 kg live weight gain	823	787	891	1142	1173	1360	916	894	1022

At the age of 7 to 15 months (growing period) they surpassed their peers of groups I and III in absolute weight gain by 31,5 and 20,3 kg ($P>0,999$), and average daily gain by 115 and 74 g, and in fattening period (16-18 months) by 5,4-6,6 kg and 59-73 g. Therefore, bulls of group II were superior to their peers of other groups under investigation. The superiority was particularly noticeable in the final stage of fattening ($P>0,999$).

Increasing the nutritional value of the diets increased the relative growth rate of the experimental steers. For the whole period of growth, group II steers outran group I by 14.4%, while group III steers outran group I and II by 16.5% and 2.1%, respectively. During growing period the share was 70.8% in group I, 85.7% in group II and 87.5% in group III during fattening period - 19.3%; 20.4%; 21.1%, respectively.

Table 2 Dynamics of live weight of experimental steers, kg ($X + S x$)

Age, month	Group		
	I	II	III
At setting for experiment	203,0+7,5	170,6+8,8	150,0+7,2
9	266,6+9,9	248,0+10,4	218,7+8,4
12	340,7+9,3	335,0+10,6	297,5+9,9
15	425,7+11,1	426,5+10,9	383,5+10,5
18	517,3+11,2	523,4+11,8	473,9+9,9

The compensatory capacity of growth and development of the organism is greatly influenced by the duration of negative factors: maintenance, feeding, degree of morbidity, production stresses, etc.

In our researches groups of animals were formed of the same age, i.e. 7 months, but with different live weights (Fig.1). Group I control bulls weighed 203 kg (100%), Group II experimental bulls weighed 170.6 kg (84.0%) and Group III experimental bulls weighed 150 kg (73.8%). The analysis of the Figure shows that when put on experiment the experimental bulls of groups II and III were inferior in live weight to the control group by 16% and 35.3% respectively. An increase in the nutritive value of the diet of steers of group II by 10-15% enabled bulls of group II to shorten the lag during the following breeding periods and by the age of 15 months to completely eliminate the lag and to leave the control group behind by 1.2% (6.1 kg) at the end of the experiment. Group III - bulls, despite increased intensity of feeding by 20-25%, were unable to fully cover the lag in live weight by the end of the experiment Group III steers, despite an increase in feed intensity by 20-25%, were unable to completely cover the lag in live weight by the end of the experiment, but reduced it to 9.1% (43.4 kg).

To examine the meat productivity we slaughtered 3 test bulls in each group at the ages of 7 and 18 months.

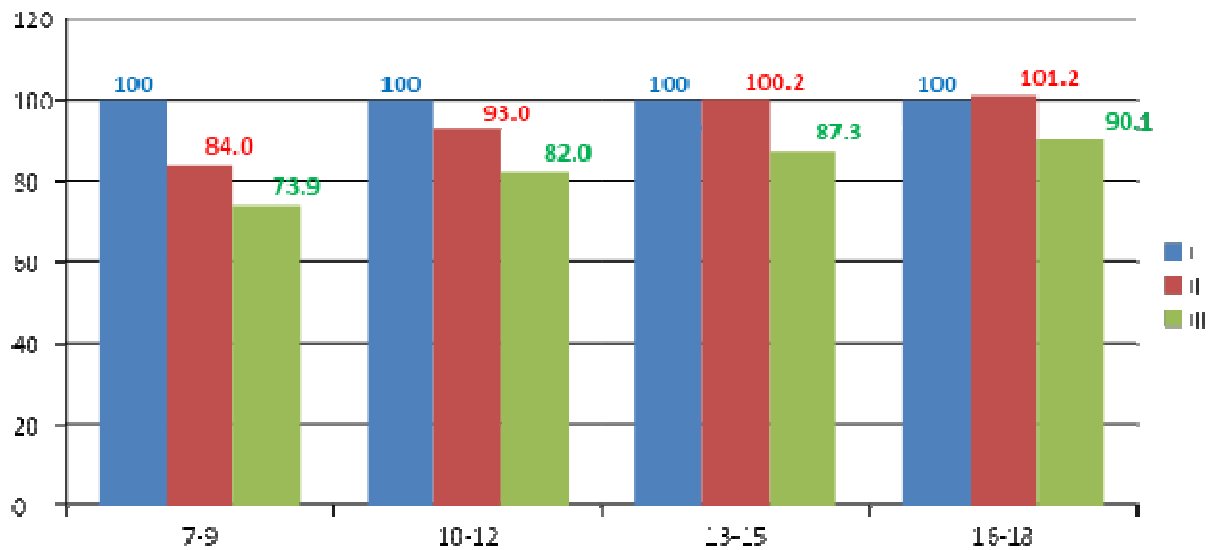


Figure 1. Compensatory growth of experimental steers, %

As can be seen from Table 3, the weight of bulls of Group I at the age of 7 months before slaughter was 192.2 kg, that of Group II - 161.5 kg and of Group III - 147.1 kg. Group I exceeded group II animals by 30.7 kg (19%). (19%), Group III - 45.1 kg (30.6%). The weight of the carcass of bulls of group I was 82.4 kg, of group II - 67.5 kg and of group III - 56.7 kg, i.e. the weight of the carcass of bulls of group I was 14.9 kg (24.7%) better than that of the animals of group II and of group III - 25.7 kg (45.3%) better. The weight of internal fat in bulls of the control group was 1.98 kg, in bulls of experimental groups it was 1.24-0.65 kg.

The slaughter yield was 44.9% for the control group steers and 42.5-39.0% for the experimental group steers.

An increase in the level of feeding of the experimental steers by 10-25% improved the meat indicators. Thus, according to the data of Table 3, bulls of group II at the age of 18 months surpassed their peers in preslaughter weight by 2.7-47.4 kg, in carcass weight by 0.7-30.3 kg and in slaughter weight by 2.4-8.3 kg. The slaughter yield was 55.6% in group I control; 55.8% in group II and 55.2% in group III.

It should be noted that at the age of 18 months of age the experienced steers produced carcasses with the weight of 275.5 - 245.2 kg when fed at the increased level of nutritiousness of diets. At the age of 7 months, the weight of the carcasses was 208.0 - 188.5 kg more than at the age of 7 months.

Thus, taking into consideration the results of the experiment we can say that the meat productivity of steers of the experimental groups increases as the nutritiousness of the ration increases. The meat productivity of bulls from group II was significantly higher than that of animals from group I and exceeded the analogues of group III. At the age of 18 months the desired heavier carcasses were obtained in bulls of experimental groups at the live weight of 470-525 kg.

Judging by the indicators of the morphological composition of the carcass, there is a pattern of increase in weight and yield of flesh with age.

Table 3. Slaughter yield of test steers, (X + S x)

Indicators	Group					
	I		II		III	
	7 months	18 months	7 months	18 months	7 months	18 months
Body weight,kg	202,3±2,89	517,3±20,7	170,0±14,4	523,4±27,7	150,0±1,73	473,9±13,2
Pre-slaughter live weight,kg	192,2±2,8	503,8±21,8	161,5±14,0	508,1±26,8	147,1±1,7	460,7±13,0
Weight of paired carcass,kg	84,2±6,6	274,8±13,0	67,5±6,12	275,5±14,4	56,68±1,62	245,2±6,9
Carcass yield,%	43,85	54,4	41,1	54,5	38,53	53,2
Weight of internal fat,kg	1,98±0, 2	6,2±0,57	1,24±0,12	7,0±0,66	0,65±0,06	9,0±0,3
Internal fat yield,%	1,03	1,24	0,77	1,39	0,43	1,95
Slaughter weight,kg	86,27±6,7	280,1±13,6	68,69±7,1	282,5±15,1	57,33±2,82	254,2±7,2
Slaughter yield,%	44,88	55,6	42,53	55,8	38,96	55,2

Thus, at the age of 7 months experienced steers of groups II and III yielded to their first group counterparts by 32,8% and 46,5% accordingly by weight of half carcasses, by 6,2 kg (27,4%) and 10,5 kg (56,6%) accordingly by weight of flesh, yield of flesh was 68,7%, 68,0% and 66,3% accordingly. The highest bone content of half carcasses was in group III - 30,65% (8,8 kg), the lowest in group I - 28,9% (11,43 kg). The lowest tendon content was in the half carcass of group II steers.

At the age of 18 months the yield of flesh in the carcasses of animals of all groups increased, namely in bulls of group I - by 11,7 %, in animals of group II - by 13,1 %, in group III - by 13,5 % in comparison with the age of 7 months. At that age, Group II steers outran their coevals in Group I by 1.0 kg and Group III steers by 13.7 kg.

The significance of the difference between groups II and I was $P > 0.99$, while the difference between groups II and III was not significant. The proportion of bones decreased in proportion to the increase in flesh. At 7 months of age, the weight of bones was 29.7% in group II steers, but at 18 months of age it was 17.1%. A similar decrease was observed in bulls of groups I and III, with 28.9, 17.8 and 30.6, 18.3% respectively. No significant difference was found between the groups. This is a logical result as these animals had more edible parts in the carcass.

Table 4. Morphological composition of half carcasses of experimental steers, kg (X + S x)

Indexes	Group					
	I		II		III	
	kg	%	kg	%	kg	%
At the age of 7 months						
Weight of half carcasses	41,3+4,6	100	31,1+3,1	100	28,2+1,44	100
pulp	28,95+3,0	68,76	22,72+2,7	68,0	18,49+1,0	66,31
bones	11,43+1,3	28,92	9,65+0,65	29,73	8,8+0,44	30,65
tendons	0,94+0,18	2,36	0,73+0,09	2,25	0,92+0,01	3,04
meat index	2,53		2,35		2,10	
At the age of 18 months						
Weight of half carcasses	137,24+9,7	100	137,42+12,1	100	122,44+3,7	100
pulp	110,46+6,4	80,49	111,46+8,8	81,11	97,72+2,9	79,81
bones	24,36+4,23	17,75	23,46+4,8	17,07	22,38+1,1	18,28
tendons	2,42+0,21	1,76	2,50+1,1	1,82	2,34+0,44	1,91
meat index	4,53		4,75		4,37	

Compared to the carcasses of steers aged 7 months at 18 months the weight of the fleshy part in the experimental group increased by 3.3 times; in group II - 4.2 and in group III - 4.3 times. Steers of Group III were noted for the build-up of flesh which exceeded their counterparts by 45.8-23.0% compared to carcasses at 7 months of age. The highest growth of bone tissue was noted in Group I - 19,63 kg, in Group II - 11,87 kg and in Group III - 8,77 kg; growth of tendon and cartilage tissue was 1,93; 1,89; 1,90 kg.

The meat index is an important indicator characterizing the quality of carcasses. In the course of the study of the index it was found that the flesh-to-bone weight ratio, i.e. the meat index at 7 months of age was higher in bulls of group I and amounted to 2.53, in bulls of group II - 2.35 and in group III - 2.10. At the intensive feeding and keeping of steers until 18 months of age the yield of edible parts of slaughter products in steers of group II was comparatively higher than in analogues of groups I and III.

In our research we studied 25 main muscles of the carcasses of experimental steers. Increased feeding of the experimental steers contributed to the weight gain of all muscles (Figure 2).

Intensity of growth of some muscles of the chest muscles of bulls of experimental groups had essential differences. In bulls of group III the growth coefficient of broad-back muscles was 13.2 and in groups I and II - 6.0 and 10.1 respectively. The rest muscles were growing in the range of 7.89-9.6. Bulls of group II had the most intensive growth of trapezius (11.2), rhomboid (10.3), dorsal latitude (10.1) and deep pectoral muscles (10.3). In bulls of group I, the intensity coefficient of growth of the pectoral muscles was in the range of 6.0-7.89.

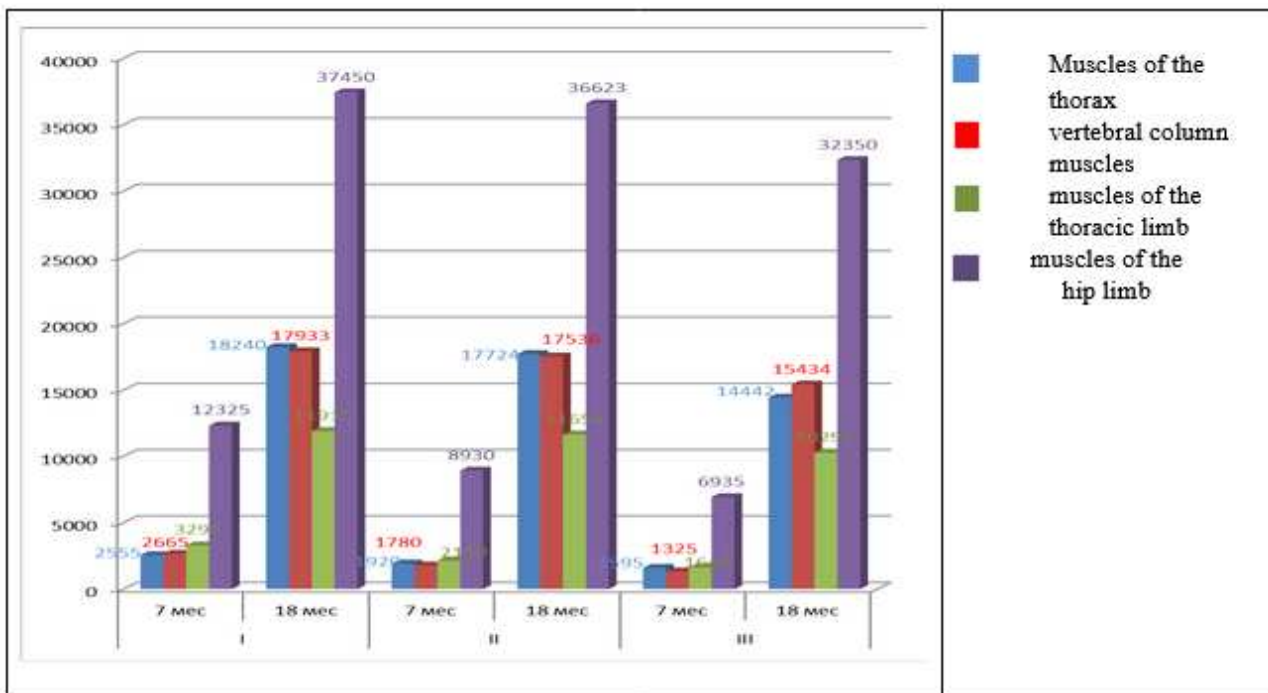


Figure 2. Weight gain of the muscles of experimental bulls

Totally the growth rate of all chest muscles in bulls of group II was 9,23 which was 29,3 % and 19,9 % higher than in groups I and III, in turn group III bulls were 26,7 % ahead of group I.

Analysis of the growth dynamics of vertebral column muscles revealed that the increase in the muscles of vertebral column by groups was: I- 6,73; II- 9,85; III-11,65 times compared to 7 months of age and reached 17536, 17933 and 15343 g respectively at 18 months.

At 18 months of age, the bulls of group II outweighed their counterparts of group I by 397g and group III by 2499g.

The weight gain of the muscles of the thoracic limb in bulls of the experimental groups increased by 8357, 9765, 8652 g from 7 to 18 months of age. Bulls of group II were superior by the weight gain of the muscles: they surpassed their peers of groups I and III by 263 and 1623 g. At 18 months of age bulls of group II were 16.8 % ahead of group I and 12.9 % ahead of group III on the total mass of muscles, but on the rate of growth of all muscles they were 15.9 % behind group III and 49.7 % ahead of group I.

The weight gain of the hip limb muscles in bulls of the experimental groups increased by 26426, 30641, 26067 g from 7 to 18 months of age. At 18 months of age bulls of the 2nd group surpassed their I group counterparts by 15.9% and Group III by 17.5%.

The table above shows the general pattern of muscular growth: bulls of group III were more intensive in muscular growth than their peers in groups I and II and growth rate was 39.5% and 7.8% higher, respectively.

Discussion of the results of the research. The peculiarities of intensive rearing influence on the meat productivity of the stunted young cattle of Simmental breed and the ways of rational using of genetic possibilities of the animals of the studied groups for increasing the production of high-quality beef and increasing the profitability of the branch have been revealed. The experimental data replenish the scientific information and substantiate the comprehensive research on improving the Simmental breed and give practical recommendations for organising the rearing of young animals, taking into account the weight and age specificity. The determined biological laws of growth and development of the tissues supplement and expand the views on the quantitative and qualitative estimation of the meat productivity of young animals

Conclusions. The following conclusions can be drawn on the basis of experimental work and summarizing the results of studying the compensatory characteristics of growing and fattening steers of Simmental breed.

1. At the intensive technology of growing steers of group II, whose diet nutritiousness was increased by 10-15%, were inferior to their peers of group III (increased diet nutritiousness by 20-25%) in fodder unit intake in the diet,

but still provided sufficiently high indicators. By the age of 18 months the live weight of bulls of group I has reached 571,3±11,2 kg, Group II - 523,4±11,8 kg, Group III - 473,9±9,9 kg ($P \leq 0,999$). The feed consumption per 1 kg of growth by groups was 8.46; 8.25; 9.33 fodder units and 916; 894 and 1022 g of digestible protein, respectively.

2. Despite the 20-25% increase in diet nutrition, group III steers were inferior in body weight to group I and II steers during all age groups. When they were bred for the experiment their live weight was 50.3 and 20.6 kg lower, at 9 months they were 47.9 and 29.3 kg, at 12 months - 45 and 37.5 kg, at 15 months - 42.2 and 43 kg, at 18 months - 43.4 and 49.5 kg respectively. ($P \leq 0,999$)
3. When put on trial, experimental steers of groups II and III were inferior in live weight to the control group by 16% and 35.3%, respectively. Increasing the nutritive value of the diet of steers of group II by 10-15% enabled bulls of group II to shorten the lag during the following breeding periods and by 15 months of age to fully eliminate the lag and to leave the control group behind by 1.2% (6.1 kg) at the end of the experiment. Group III-bulls, despite the increase of intensity of feeding by 20-25%, could not fully cover the lag in live weight by the end of the experiment, but reduced it to 9.1% (43.4 kg).
4. Increasing the level of feeding of experimental steers by 10-25% improved the meat indicators. At the age of 18 months, group II steers exceeded their coevals in the pre-slaughter weight by 2.7-47.4 kg, in the carcass weight by 0.7-30.3 kg and in the slaughter weight by 2.4-8.3 kg. The slaughter yield was 55.6% in the control group I; 55.8% in group II and 55.2% in group III.
5. The highest consumption of fodder protein and fodder energy for producing 1 kg of carcass meat was observed in bulls of group III and amounted to 2.23 kg and 162.4 MJ, which was 36.0% and 28.7% higher than in group I and 25.9% and 19.1% higher than in group II.
6. At 7 months of age the weight of the studied muscles in control steers was 20.84 kg, which was 5.5 kg (39.0%) more than in group I and 8.3 kg (74.4%) than in group III. Increasing the level of feed to steers in the experimental groups stimulated an increase in the weight indices of the musculature. At 18 months of age the weight of muscles in bulls of group II (increased feed nutrition by 10-15%) was 86.9 kg, which was 2.6 kg (3.1%) more than in group I and 14.1 kg (19.2%) more than in group III. Group III steers, in turn, were 11.5 kg (15.7%) behind the control group.

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