



IMPACT OF INTENSIVE BREEDING TECHNOLOGY OF SIMMENTAL HEIFERS ON GROWTH, DEVELOPMENT AND DAIRY PRODUCTIVITY

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ABSTRACT

The research determines the effectiveness of using the intensive rearing of heifers by increasing the level of heifer feeding at different stages of growth and development by 20-30% and reaching a live weight of 380-400 kg at the age of 15-16 months, the early insemination, the possibility of forming the herd of highly productive cows aged 24-25 months and their early transfer to the main herd of cows to prolong the period of economic use.

Introduction. With the acceleration of milk production, requirements for quality indicators of animals increase and there is a need to create highly productive herds. For this purpose, it is necessary to add heifers having high natural resistance of organism, close to each other by live weight and productivity to dairy complexes and farms. Formation of such qualities in cows is mainly connected with the way young cattle are raised from the moment of their birth to the beginning of lactational activity. The conditions of their care, especially the level of feeding and conditions of rearing are important for the formation of animals. Thus, along with heredity, the key factor in the formation of dairy qualities in cows is feeding.

Therefore, it follows that study of regularity of development of milk

productivity of young cattle under different conditions of feeding has great scientific and practical importance in the process of ontogenesis. When working with imported high-productive herds the expected productivity from imported cows is not achieved due to the lack of special feeding system, housing technologies to adapt them to local conditions.

Materials and research methodology. The research was conducted in 2017-2019 on the cattle farm of UE "Sardoba" AK "Uzbekistan temir yullari", in Mirzaabad district of Syrdarya region. As an object of the study the progeny of purebred Simmental cows imported from Germany were chosen. For the experiment 2 groups of heifers were formed, 15 heifers in each group, of Simmental breed at the age of 1 day. Group



I was bred on the economic ration, Group II was bred on a 20-30% increased ration. Feeding in all groups was the same.

Results of the study. During the dairy period (Table 1) for 180 days of research on the average, the experimental group consumed 6654.9 MJ of metabolizable energy, 553.65 kg.k.e. nutrients, 561.8 kg of dry matter, 72.4 kg of digestible protein, 98.3 kg of fiber, 11.7 kg of sugar, 126 kg of fiber. starch, 37 fat, calcium 5.6 kg, phosphorus 2.1 kg, carotene

20.0 g, salt 2.65 kg, BMC 1.1 kg, and in the control group - exchange energy 5124.5 MJ, feed unit 426.2 kg, dry matter 414, 2 kg, digestible protein 51.6 kg, fiber 78 kg, sugar 9.1 kg, starch 95.2 kg, fat 28.4 kg, calcium 4.4 kg, phosphorus 1.6 kg, carotene 16.1 g, table salt 2.65 kg. As shown in Table 1, there are differences in the structure of the diet between the control and experimental groups of calves under 6 months of age.

Table 1

Feed consumption by calves up to 180 days of age during the milk period, kg (average per head)

Fodder	Control	Experimenta
Milk	405	540
Hay (alfalfa)	198	249
Corn silage	300	378
Corn flour	100	120
Wheat bran	68	104
Table salt	2,35	2,65
Monocalcium phosphate	2,8	2,8
In the feed composition		
Exchange energy, MJ	5124,5	6654,9
Fodder unit	495,0	594,0
Dry matter	414,2	561,8
Digestible protein	63,2	72,4
Fiber	78,0	98,3

In the total structure of the diet whole milk was 24.3% more in the experimental group than in the control group. In the composition of the diet concentrates in the experimental group were 3.4% more than in the control group, roughage by 2.4%, succulent forage by 1.9%. At this stage, great attention was paid to milk feeding during the first 3 months of life. Good milk

feeding in the first 3 months has a positive effect on subsequent growth and productivity.

Feeding rations of experimental heifers up to 15-18 months of age are shown in Table 2.

Table 2

Feeding technology of experimental heifers to 15-18 month old, on average per head, kg



Feeds	Feed	Exchan-geable energy, MJ	ECU Feed	Fod-der unit	units Dry matter	matter Digestible protein
Hay (alfalfa)	135	904,5	90,45	63,45	120.05	13,64
Hayage	550	2255	225,6	159,5	247,5	21.45
Silage (Corn)	555	1276,5	127,65	99,9	138,75	7,77
Corn bran	31	396,8	39,68	35,65	26.35	2,23
Barley bran	60	708	70,8	63,6	53,4	3,78
Wheat bran	65	578,5	57,85	46,15	55,25	6.31
Total	-	6119,3	611,93	468,25	633,3	55,18

The feeding technology during the period of age from 18 months to 24 years was developed for both experimental control and experimental heifers in the same way. During the 180-day breeding period of heifers, the diet of both groups was the same, with the developed feeding technology averaging 14415 MJ of metabolizable energy 1441.5 kg of energy feed unit, 1099.45 kg of feed unit, dry matter 1499.8 kg, digestible protein 131.3 kg, Ca 16.03kg, R 4.68 kg. To enrich the diet with minerals, 35 g of table salt and 40 g of monocalcium phosphate were added to the rations of both groups.

The main indicator of intensive technology is the dynamics of changes in live weight by growth periods (Table 3).

The data in the table indicate that an increase in the level of feeding of group II heifers by 20-30% had a positive effect on the dynamics of changes in live weight. In all age periods they surpassed their

counterparts: at 3 months of age by 13.4 kg (14.9%), at 6 months by 22.6 kg (3.8%), at 9 months by 52.0 kg (19.4%), at 15 months by 65.4 kg (20.2%), at 18 months by 20.6%. Group II heifers were first inseminated at 15.6 months of age with a live weight of 391.4 kg, while Group I controls were inseminated at 17.3 months of age with a live weight of 360.2 kg.

At all ages, Group II heifers surpassed their counterparts in absolute and average daily gain of live weight. At 6 months of age they outweighed their analogues by 8.8 kg and 102.2 g, at 12 months by 11.4 kg and 126.7 g, at 15 months by 13.4 kg and 148.9 g and at 18 months by 12.6 kg and 140.0 g, respectively.

Table 3
Dynamics of changing the live weight of experimental heifers

Age, month	I		II	
	Live weight, kg	Average daily gain, g	Live weight, kg	Average daily gain, g



At birth	31,9 ± 0,29	-	30,8 ± 0,24	-
3	90,5 ± 0,51	651,1 ± 3,0	103,1 ± 0,68	803,3 ± 4,93
6	153,7 ± 0,51	702,2 ± 3,09	175,5 ± 0,80	804,4 ± 3,18
9	211,5 ± 0,44	642,2 ± 2,10	251,3 ± 0,52	842,2 ± 3,93
12	269,0 ± 0,78	638,9 ± 4,80	320,2 ± 0,40	765,6 ± 1,70
15	325,1 ± 1,16	623,3 ± 8,50	389,7 ± 1,04	772,2 ± 7,20
18	378,9 ± 1,36	597,8 ± 9,11	456,1 ± 1,47	737,8 ± 5,60
At the first insemination	360,2 ± 1,16	623,5 ± 12,10	391,4 ± 1,04	774,6 ± 7,30

At all ages, Group II heifers surpassed their counterparts in absolute and average daily gain of live weight. At 6 months of age they outweighed their analogues by 8.8 kg and 102.2 g, at 12 months by 11.4 kg and 126.7 g, at 15 months by 13.4 kg and 148.9 g and at 18 months by 12.6 kg and 140.0 g, respectively.

During the period from birth to 18 months of age (Table 4) the heifers of group II spent 2706.8 kg of fodder units and 297.0 kg of digestible protein and obtained 425.3 kg of absolute live weight gain. The heifers of group I spent 2186.2 kg of fodder units and 263.01 kg of digestible protein and obtained 347.0 kg of live weight gain.

Increasing the level of feeding of heifers in group II by 20-30% lowered the feed expenses per 1 kg of live weight gain to 6.36 kg of feed units and 698 g of

digestible protein. Compared with group I the expenses of feed units were the same and the expenses of digestible protein were lower by 9.2%.

From birth to first insemination, Group II heifers spent 6.12 kg of feed units and 682 g of digestible protein per 1 kg of live weight gain. Compared to group I, the indicators were lower by 3.7% and 8.9%, respectively.

The study of the clinical parameters of the animals showed that they were within the physiological norm. Between the groups, there was an increase in body temperature in heifers of group II by 0.1-0.30C in the summer period.

Table 4
Consumption of feed by heifers per 1 kg live weight gain

Growth periods, months	Absolute live weight gain, kg	Feed expenses, total kg		Feed expenses per 1 kg live weight gain	
		Fodder Unit	Digestible Protein	Fodder Unit	Digestible Protein
I group (control)					
0-3	58,6	170,5	20,64	2,91	0,352



3-6	63,2	227,5	31,1	3,57	0,492
6-9	57,8	392,15	46,65	6,78	0,807
9-12	57,5	444,95	53,12	7,74	0,924
12-15	56,1	510,8	59,8	9,11	1,066
15-18	53,8	440,3	51,7	8,18	0,961
ИТОГО	347	2186,2	263,01	6,30	0,758
Before first insemination	328,3	2083,5	250,95	6,35	0,764
II group					
0-3	58,6	170,5	20,64	2,91	0,352
3-6	63,2	227,5	31,1	3,57	0,492
6-9	57,8	392,15	46,65	6,78	0,807
9-12	57,5	444,95	53,12	7,74	0,924
12-15	56,1	510,8	59,8	9,11	1,066
15-18	53,8	440,3	51,7	8,18	0,961
TOTAL	347	2186,2	263,01	6,30	0,758
Before first insemination	328,3	2083,5	250,95	6,35	0,764

Hematological studies of blood showed an increase in the number of blood cells in the summer period. Group I heifers had an increased number of erythrocytes by 3.0; 7.9 and 5.7% in summer compared to autumn, winter and spring, while group II had an increased number by 2.9; 8.7 and 2.0%, respectively.

The increased level of feeding of experimental heifers of group II improved their reproductive qualities. They came into first heat 13 days earlier ($P>0.99$) with a live weight of 215.2 kg ($P>0.999$), physiological maturity came 50 days earlier at the age of 468 days with a live weight of 394.1 kg, the average calving period was 751.3 days against 811.5 days in group I heifers. The service period was reduced by 8 days to 78 days.

Preparation of heifers for calving by udder pneumomassage contributed to

better development of the mammary gland. In the period from 6 to 8 months of pregnancy, heifers of the experimental groups have increased the udder girth by 71.1%, udder width by 37.2%, udder length by 53.6%, front lobe depth by 64.1%, back lobe depth by 68.9%.

The milk productivity of the Group II cows with bowl-shaped udder during lactation was 4344 kg, which is 643 kg (17.4%) more than that of the cows with rounded udder shape. Similar results were obtained for Group I cows 3790, 588 (18.3%).

Measurement of udder showed advantages of bowl-shaped udder of first-calf cows over rounded shape. So the cows from group II were superior in width 2,1 cm (8,3%) and length 8,4 cm (29,7%), udder girth, 8 cm (9,0%), udder depth 2,6 cm (10,3%), teat length 0,19 cm (2,6%) and



teat diameter 0,08 cm (3,5%). For first-calf cows of group I the results were similar: 1.6 cm (6.8%); 5.1 cm (20.3%); 2.6 cm (2.5%); 1.6 cm (6.6%); 0.21 cm (3.1%) and 0.07 cm (3.2%) respectively.

The number of first-calf cows with cup-shaped udder was 80% in group II and

73.3% in group I. There were no dairy cows with goat udder shape in both groups.

The method of milking (advanced feeding) of the first 100 days of lactation of first-calf cows shows the best use of feed nutrition for milk formation (Table 5).

Table 5

Indexes of payment for fodder with milk during the period of milking

Indexes	Groups	
	I	II
Fodder consumption per 1 head during the period of milking, kg	1964,6	1990,2
Milk production, kg	2090,0±29,7	2370,0±39,7
Fodder unit costs per 1 kg of milk of natural fat content, kg	0,94	0,84
4 % milk produced, kg	1980,3±42,5	2263,4±47,5
The consumption of fodder units for 1 kg of milk 4 %-fat, kg	0,99	0,88

The analysis of the table shows that the cows of the first group II in the first 100 days of lactation produced 280,0 kg more milk of natural fat content and consumed 25,6 kg more fodder units than their contemporaries of the I group. The consumption of fodder units to produce 1 kg of full-fat milk was lower by 0.1 kg or 11%. In conversion to 4%-fat milk, the first-calf cows of group II surpassed their counterparts of group I by 283.1 kg (14.3).

In the groups, during the milking period, 56.2% of milk was milked from cows of the first group for the whole lactation. During the milking period the

highest daily milk yield was 27.6 kg for group II and 24.6 kg for group I cows.

First-calf cows bred at a high level of feeding were characterized by fairly high milk production (Table 4). The milk productivity of the first heifers of group II for 305 days of lactation was 4218.6 kg of milk with fat content of 3.82% and protein content in milk 3.35%, the yield of milk fat was 90.53 kg, which exceeded the control group in indicators by 13.4; 0.8; 1.2 and 14.3% respectively. The coefficient of milk yield of group I cows was 2.5% higher. Than in the analogues.

Table 6

Milk productivity of first-calf cows

Indexes	Groups	
	I	II
First 100 days of lactation, kg	2090±29,7	2370±39,7
For 305 days of lactation, kg	3720,2±47,7	4218,6±54,8
Average daily milk yield for the first 100	20,9±0,55	23,7±0,49



days of lactation, kg		
Fat content in milk, %	3,79±0,02	3,82±0,02
Protein content of milk, %	3,31±0,01	3,35±0,01
Milk dry matter, %	12,35	12,51
Milk fat yield, kg	79,21±1,31	90,53±1,43
Milk protein yield, kg	69,18±1,27	79,4±1,47
Produced on the recalculation of 4% fat milk, kg	1980,3±42,5	2263,4±47,5
Live weight, kg	510,8	593,9
Milk yield coefficient, kg	728	710

Increasing the level of feeding of the experimental animals by 20-30% ensured high payment of expenses for production of one unit, getting high daily and absolute weight gain of live weight, saving of forages and increasing of milk productivity that, of course, reflected in the economic efficiency of growing of heifers (Table 7).

Intensive breeding of the experimental group cows allowed to get 4702,6 thousand soums more production than the control group, the cost of milk was reduced by 270,0 soums, the profit was 5660,28 thousand soums, which is 32,2% higher than in the control group.

Table 7

Economic efficiency of the first heifer cows breeding

Indicators	Group	
	I	II
Fertile insemination, day	516	469
Live weight at insemination, kg	360,2	391,4
Age of first calving, days	801,7	751,3
Calving live weight, kg	478,9	563,1
Milk productivity per 100 days, kg	2090	2370
Absolute live weight gain, kg	447	532,3
Realizational value of 1 kg of milk, sum	4000	4000
Realizational value of 1 kg of live weight, soum	42000	42000
Profit from selling products, total, thousand sum	27134	31836,6
Milk, thousand sum	8360	9480
Animal weight, thousand sum	18774	22356,6
Total expenses, thousand sum	22853,02	26176,32
Milk, thousand sum	7252,3	7584



For additional, thousand sum	15600,72	18592,32
Cost price of 1 kg of milk, sum	3470	3200
Cost of 1 kg of livestock gain, sum	34900,9	34928,27
Fodder consumption from birth to calving, kg fodder units	4937,5	4655,5
Profit, thousand sum	4280,98	5660,28
Level of profitability, %	18,7	21,6

Discussion of the results of the study. It was determined that with increasing the fodder unit by 25-30% at the rapid rearing of heifers in a hot climate the heifers of the experimental group at the age of 15 months had a live weight of 389.7 kg; as a result of intensive feeding the heifers showed rapid formation of their bodies and live weight at the first calving at the age of 25 months was 593.9 kg. When feeding heifers from the earliest age on the basis of complete balanced diet the milk production in 100 days of lactation has increased by 13.4% in comparison with the control group; it is established that by increasing the level of feeding the profitability of milk production from the first generation cows of Simmental breed can increase from 18.7 to 21.6%.

Conclusions

1. Application of the intensive technology of heifer breeding by increasing the level of feeding by 20-30% in the hot climate conditions promoted early sexual maturity of heifers and increased live weight. The experimental heifers at the age of 15.6 months had a live weight of 389.7 kg and were 65.4 kg or 20.2% ahead of their counterparts with a significant difference ($P > 0.999$).

2. The level of feeding had a significant effect on changes in body weight, build and productivity. Group II heifers spent 121.8 kg less feed units than

Group I from birth to first insemination, while the average daily live weight gain was 24.2% higher.

3. The data of the exterior and body mass indexes show the superiority of the experimental group of heifers by such indicators as sprawl, density, breast index, which indicates the formation of dairy type of cattle.

4. Intensive balanced feeding ensured high growth of live weight and at the age of 15,6 months fecundly inseminated them.

5. Intensive feeding of the heifers has promoted intensive development of the build and at the age of 25 months after calving their live weight, build and the general development have approached to the indicators of full age cows. The first heifers at 25 months of age had 593.9 kg of live weight, which is 16.3% more than the control heifers.

6. The reproductive ability of females depends largely on the growth and development of the organism. Balanced intensive feeding of group II heifers allowed the heifers to come into the first heat 13 days earlier and to inseminate fruitfully 50 days earlier than the heifers of the control group. This reduced the timing of transferring heifers to the main herd.

7. Intensive rearing of heifers and an increase in the level of feeding by 20-30% from birth to calving ensured rapid growth



of live weight, early insemination and preparation of them for calving. As a result, 13.4% more milk was obtained from Group II heifers during the first 100 days of lactation.

8. Preparation of heifers for calving in the period from 5 to 7 months of pregnancy by pneumomassage of udder promoted early induction to machine milking and udder development. Compared with the control group, milk productivity of experimental cows increased by 280.0 kg.

9. Intensive rearing of heifers and an increase in the level of feeding by 20-30% affected the economic efficiency of the study. Additional production to the amount of 2027,2 thousand soums was received from intensively grown cows, reduction of the cost price of milk by 270,0 soums was reached, the received profit made up 5660,28 thousand soums, profitability of growing made up 21,6%.

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