AMERICAN JOURNAL OF BOTANY AND BIOENGINEERING
https://biojournals.us/index.php/AJBB
ISSN: 2997-9331

Article

Intensive Rearing of Replacement Heifer Calves Intended for Herd Replacement During the Milk-Feeding Period

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Citation: Ismoilova D. U., Qurbonova Sh. E., & Gapparov Sh. T. Intensive Rearing of Replacement Heifer Calves Intended for Herd Replacement During the Milk-Feeding Period. American Journal of Botany and Bioengineering 2026, 3(11), 1-6.

Received: 10th Aug 2026
Revised: 11th Sep 2026
Accepted: 18th Oct 2026
Published: 18th Nov 2026

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Abstract: This article examines the effectiveness of intensive rearing of Holstein replacement heifer calves during the milk-feeding period. The study was conducted at the Chortut farm in Pastdargom District, Samarkand Region, using the paired-analogue method. Two groups of newly born female calves were formed, comprising 15 calves each: a control group and an experimental group. The experimental group was reared under enhanced feeding conditions, including increased amounts of roughage, succulent feeds, and compound feed, as well as additional skimmed milk during the third and fourth months of life. The results demonstrated that intensive feeding had a positive effect on calf growth and development. By six months of age, the live weight of calves in the experimental group exceeded that of the control group by 12.0 kg, or 7.4%. The findings indicate that improving feeding standards during the milk-feeding period can contribute to more effective development of Holstein replacement heifers and the formation of highly productive dairy herds.

Keywords: calf, Holstein breed, milk, skimmed milk, intensive rearing, alfalfa hay, live weight, technology

Introduction

In recent years, the importation of highly productive cattle breeds from foreign countries into the Republic of Uzbekistan has continued. One such breed is the Holstein, which is widely raised on farms due to its high milk productivity, good adaptability, and excellent technological characteristics. Intensive rearing of calves obtained from these animals makes it possible to increase the number of replacement heifers in dairy herds, expand production, and reduce production costs [1].

Scientific studies and on-farm experiments have demonstrated that intensive rearing of replacement heifers on balanced rations makes it possible to develop dairy cows capable of producing 8,000–10,000 kg of milk per lactation in the future [2].

The results of many years of research [3] indicate that the average daily live-weight gain of Holstein replacement heifers should be 700–800 g. At the time of their first insemination, their live weight should ideally reach 350–370 kg.[4]

Materials and Methods

The scientific and on-farm experiments were conducted at the Chortut farm in Pastdargom District, Samarkand Region. For this purpose, two groups (control and experimental) consisting of newly born female Holstein calves were formed using the paired-analogue method, with 15 calves assigned to each group.[5]

Results

The results of the scientific and on-farm experiment demonstrated that the intensity of feeding during the milk-feeding period has a significant influence on the growth and development of Holstein replacement heifer calves. The comparison of the control and experimental groups revealed differences in feed consumption and live-weight gain, confirming the importance of balanced and enhanced nutrition during the early stages of calf development.

The calves in the control group were reared according to the conventional feeding technology adopted at the farm, while those in the experimental group received an improved feeding ration. In particular, the experimental group was provided with greater quantities of roughage, succulent feeds, and compound feed. In addition, 200 kg of skimmed milk was supplied to each calf during the third and fourth months of the rearing period. This feeding approach was intended to promote more intensive growth, improve nutrient intake, and support the development of the digestive system.

An important element of the feeding technology was the early introduction of high-quality alfalfa hay. From 20 days of age, the calves were gradually accustomed to consuming roughage. This practice contributes to the development of the rumen, stimulates the formation of its functional capacity, and prepares young animals for the effective consumption and digestion of larger quantities of solid feed. The gradual transition from milk-based nutrition to a ration containing roughage, succulent feeds, and concentrates is particularly important for the normal development of replacement heifers.

The analysis of feed consumption showed that the experimental-group calves consumed 4.0 kg (1.5%) more roughage, 20.0 kg (5.0%) more succulent feed, and 14.0 kg (9.0%) more compound feed than the control-group calves. Furthermore, the additional provision of skimmed milk during the third and fourth months increased the nutritional value of the ration during an important stage of early development.

The differences in feeding conditions were reflected in the growth performance of the animals. During the period from one to six months of age, the experimental-group calves demonstrated higher growth indicators than those in the control group. By the end of the sixth month, their average live weight reached 173.0 kg, compared with 161.0 kg in the control group, representing a difference of 12.0 kg or 7.4%.

Calculation based on the reported control-group live weight of 161 kg and the stated difference of 12 kg (7.4%).

These findings suggest that increasing the nutritional level of the ration during the milk-feeding period can improve the growth performance of Holstein replacement heifers. The positive results may be associated with the combined effect of additional skimmed milk, increased feed consumption, and the early introduction of high-quality roughage. However, since several feeding factors were changed simultaneously, the individual contribution of each factor cannot be determined from this experiment alone.

From a practical perspective, intensive rearing during the milk-feeding period can help develop replacement heifers with better growth potential and prepare them for subsequent stages of breeding. Nevertheless, the effectiveness of this approach should also be assessed through further monitoring of live-weight gain, feed conversion, age at first insemination, reproductive performance, and subsequent milk productivity. The results of the present experiment provide a basis for considering

improved feeding standards as one of the important factors in the development of productive Holstein dairy herds.

The calves assigned to the control group were reared according to the technology adopted on the farm. This technology enables replacement heifers to attain 70% of the live weight of mature cows by the age of 18 months (Tables 1 and 2).[6] It complies with the feeding standards recommended by the Uzbekistan Research Institute of Animal Husbandry. During the summer period, the silage included in the ration was replaced with equivalent quantities of fresh alfalfa and maize green mass.[7]

The introduction of calves to roughage consumption began at 20 days of age, using high-quality alfalfa hay. This practice has a positive effect on the rapid development of the rumen and subsequently enables the animals to consume and digest larger quantities of bulky feed.[8]

As shown by the data in Tables 1 and 2, the calves in the experimental group consumed 4.0 kg (1.5%) more roughage,[9] 20.0 kg (5.0%) more succulent feed, and 14 kg (9.0%) more compound feed than those in the control group.[10] In addition, the calves in the experimental group received an extra 200 kg of skimmed milk during the third and fourth months of rearing.[11] As a result, the growth performance of the experimental-group calves was superior to that of the control group throughout the rearing period from one to six months of age.[12] At six months of age, their live weight was 12.0 kg (7.4%) higher.[13]

Table 1. Feeding of Replacement Heifer Calves in the Control Group up to Six Months of Age[14]

Age		Live weight, kg	Daily ration per head				
Month	Ten-day period		Whole milk, kg	Alfalfa hay, kg	Silage, kg	Mixed feed, kg	Salt, g
	1		5	-	-	-	-
1	2	53	6	Intro	-	Intro	5
	3		7	Intro	-	0.3	5
	Total, month 1		180	-	-	3.0	100
	4		6	0.2		0.3	10
2	5	74	6	0.3	Intro	0.3	10
	6		5	0.5	Intro	0.3	10
	Total, month 2		170	10	-	9.0	300
	7		-	0.7	0.5	0.7	10
3	8	95	-	1.0	10	0.9	10
	9		-	1.3	1.5	1.2	10
	Total, month 3		-	30	30	28	300
	10		-	1.5	2.0	1.2	15
4	11	117	-	1.5	2.0	1.2	15
	12		-	1.5	3.0	1.2	15
	Total, month 4		-	45	70	36	450
	13		-	2.0	3.0	1.3	20
5	14	139	-	2.5	4.0	1.3	20
	15		-	3.0	5.0	1.3	20
	Total, month 5		-	75	120	39	600
	16		-	3.0	5.0	1.3	20
6	17	161	-	3.5	6.0	1.3	20
	18		-	3.5	7.0	1.4	20
	Total, month 6		-	100	180	40	600
Total for the rearing period			350	260	400	155	2350

Table 2. Feeding of Replacement Heifer Calves in the Experimental Group up to Six Months of Age[15]

Age		Live weight, kg	Daily ration per head					
Mo.	Ten-day		Whole milk, kg	Skim milk, kg	Alfalfa hay, kg	Silage, kg	Mixed feed, kg	Salt, g
	1		5	-	-	-	-	-
1	2	53	6	-	-	-	-	5
	3		7	-	Intro	-	0.3	5
	Total, month 1		180	-	-	-	3.0	100
	4		6	-	0.2	-	0.3	10
2	5	73	6	-	0.3	Intro	0.3	10
	6		5	-	0.5	Intro	0.5	10
	Total, month 2		170	-	10	-	11	300
	7		-	4	0.7	0.5	0.6	15
3	8	96	-	4	1.0	1.0	0.7	15
	9		-	3	1.3	1.5	0.8	15
	Total, month 3			110	30	30	21.0	450
	10		-	3	1.5	2.0	1.0	15
4	11	123	-	3	1.5	2.0	1.1	15
	12		-	3	1.5	3.0	1.2	15
	Total, month 4			90	45	70	33	450
	13		-	-	2.0	3.0	1.4	20
5	14	150	-	-	2.5	4.0	1.6	20
	15		-	-	3.0	5.0	1.8	20
	Total, month 5			-	75	120	48	600
	16		-	-	3.2	6.0	1.8	20
6	17	173	-	-	3.5	7.0	1.8	20
	18		-	-	3.7	7.0	2.0	20
	Total, month 6			-	104	200	56	600
	Total for the rearing period		350	200	264	420	169	2500

Conclusion

Rearing replacement heifer calves intended for herd replenishment under higher feeding standards ensures an average increase of 12.0 kg (7.4%) in their live weight by six months of age. This makes it possible to shorten the rearing period, reduce associated costs, inseminate the heifers at an earlier age, and introduce them into the dairy herd sooner.

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