

# The effectiveness of growing repair heifers-daughters of different servicing bulls

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**Abstract.** Since 2021, the Sverdlovsk region has switched to the cultivation and use of dairy cattle of the Holstein breed, obtained as a result of long-term use of the global gene pool of Holstein bulls. Evaluation of the effectiveness of rearing repair heifers from different servicing bulls is relevant and has practical significance. As a result of the conducted research, it was found that repair heifers increased their live weight with age, which by the age of 18 months reached from 508.0 kg (daughter of Thunderlight bull) to 529.3 kg (daughter of Seiner bull). The daughters of the Seiner bull have a higher growth rate. The daughters of the Thunderlight bull had lower live weight indicators for growth periods. The patterns of change in the average daily body weight gains in heifers-daughters of the evaluated servicing bulls were the same and corresponded to the general patterns of animal growth and development. The cultivation of repair young animals on the farm is profitable at a profitability level of 16.5-21.6%. Thus, the servicing bull has an impact on the growth and development of repair heifers, daughters, who are used to renew the herd. They differ in their features, despite the general patterns of growth and have different growth rates.

## 1 Introduction

The Food Security Doctrine of the Russian Federation, adopted in 2020, provides for ensuring the country's food security, which implies, above all, food independence. The solution to this problem primarily depends on the development of the agro-industrial complex of the country as a whole and productive animal husbandry in particular. Special attention is paid to dairy cattle breeding, which is explained by the production of full-fledged food products such as milk and dairy products. In addition, beef is obtained from cattle, meat that is in high demand among the population of the country. Dairy cattle of black-and-white, Holstein and other breeds are mainly used for this purpose [1-3]. Until 2021, the main livestock of dairy cattle was represented by black-and-white breed animals, which were improved for a long time using the global gene pool of Holstein bulls. A large array of crossbreeds with a blood density of over 87.5% for the Holstein breed was obtained. In the dairy herd of cattle in the Sverdlovsk region, there were more than 85% of such individuals. These are highly productive, large animals that differ in economically

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useful and biological parameters from the original breeding stock and according to the latest breed inventory are classified as the Holstein breed. Along with the positive results, in terms of productive qualities, suitability for use in industrial milk production, and typification, certain problems have been identified in this livestock breeding. This is a decrease in the duration of productive use, deterioration of reproductive abilities, increased demands on feeding and housing. The decrease in reproductive functions has put the issues of reproduction, obtaining young animals and their cultivation in the first place in technological solutions for milk production, which is explained by the need to constantly increase the number of repair young animals to update the herd. The result was the developed technology of intensive cultivation of repair heifers and their very-early and early first insemination. The growth of animals is influenced by many factors, including origin [5-8]. In this regard, the characteristics of the growth of repair young animals, depending on belonging to the servicing bull, are relevant and have practical significance.

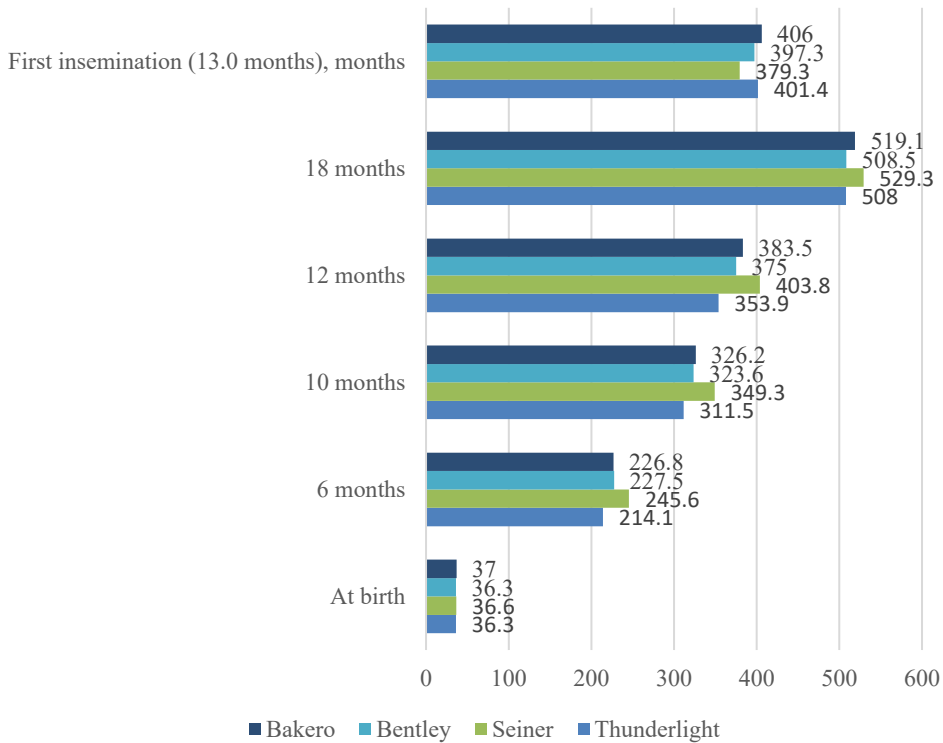
The purpose of the work is to study the dynamics of weight growth of repair heifers – daughters of servicing bulls of foreign breeding.

## **2 Materials and Methods**

The experimental part of the work was carried out in the period from 2022 to 2023 in a typical breeding reproducer for breeding Holstein cattle in the Sverdlovsk region. The research was carried out on the repair heifers of the Holstein bulls Thunderlight 928772375, Seiner 4861, Bentley 924557855, Bakero 920855469 formed into four groups. To study the growth of repair heifers, they were weighed monthly. The absolute, average daily and relative gains in body weight were calculated according to generally accepted formulas. The calculation of the growth efficiency indicators was carried out considering all costs.

## **3 Results and Discussion**

Studies have shown that repair heifers increased their live weight with age, which by the age of 18 months reached from 508.0 kg (daughter of Thunderlight bull) to 529.3 kg (daughter of Seiner bull) (fig. 1).



**Fig. 1.** Dynamics of the live weight of repair heifers by growth periods, kg.

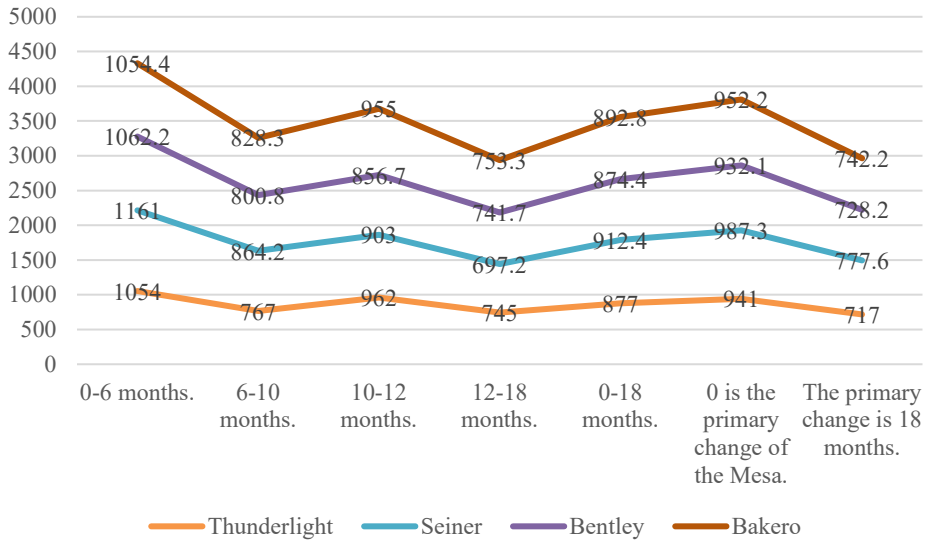
As a result, it was found that the daughters of the Seiner bull had a higher growth rate. The daughters of Thunderlight bull had lower live weight indicators for growth periods.

**Table 1.** Dynamics of the live weight of repair heifers by growth periods, kg.

	Thunderlight	Seiner	Bentley	Bakero
At birth	36.3	36.6	36.3	37.0
6 months	214.1	245.6	227.5	226.8
10 months	311.5	349.3	323.6	326.2
12 months	353.9	403.8	375.0	383.5
18 months	508.0	529.3	508.5	519.1
First insemination (13.0 months), months	401.4	379.3	397.3	406

To establish the characteristics of the development of heifers from different servicing bulls, we analyzed the indicators of the average daily and relative gains of the daughters of the evaluated bulls by comparing them with each other.

Figure 2 shows graphs of changes in the average daily live weight gain of heifers-daughters of bulls.



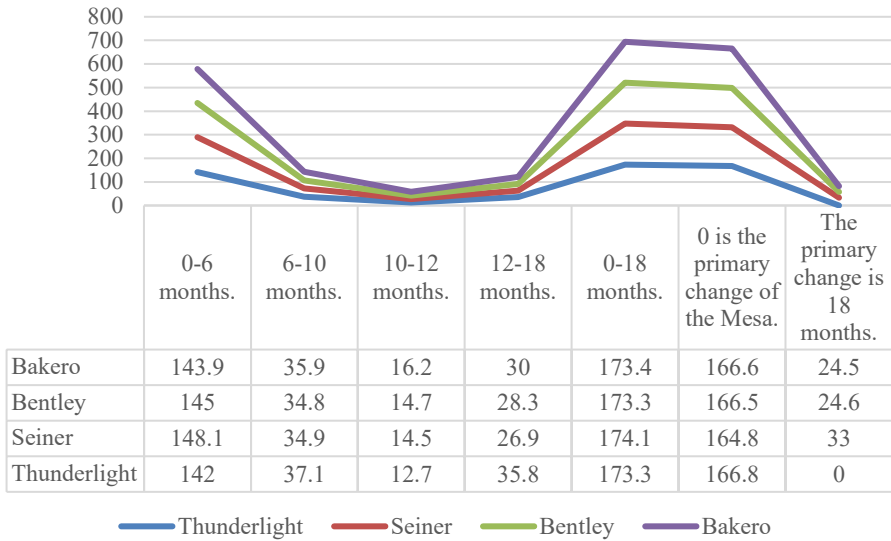
**Fig. 2.** Average daily weight gain of the daughters of breeding bulls, g.

**Table 2.** Average daily weight gain of the daughters of breeding bulls, g.

	Thunderlight	Seiner	Bentley	Bakero
0-6 months.	1054	1161	1062.2	1054.4
6-10 months.	767	864.2	800.8	828.3
10-12 months.	962	903.0	856.7	955.0
12-18 months.	745	697.2	741.7	753.3
0-18 months.	877	912.4	874.4	892.8
0 is the primary change of the Mesa.	941	987.3	932.1	952.2
The primary change is 18 months.	717	777.6	728.2	742.2

The patterns of change in the average daily body weight gains in heifers-daughters of the evaluated servicing bulls were the same and corresponded to the general patterns of animal growth and development. The highest average daily gains in all groups of heifers were in the dairy period from birth to 6 months of age. The best gains were noted in the daughters of the Seiner 4861 bull at the age of birth and up to 10 months and in general for the entire growing period.

The intensity of growth is estimated by the relative increase in body weight (Fig. 3).



**Fig. 3.** Relative gains in live weight of the daughters of breeding bulls, %.

**Table 3.** Relative gains in live weight of the daughters of breeding bulls, %.

	Thunderlight	Seiner	Bentley	Bakero
0-6 months.	142.0	148.1	145.0	143.9
6-10 months.	37.1	34.9	34.8	35.9
10-12 months.	12.7	14.5	14.7	16.2
12-18 months.	35.8	26.9	28.3	30.0
0-18 months.	173.3	174.1	173.3	173.4
0 is the primary change of the Mesa.	166.8	164.8	166.5	166.6
The primary change is 18 months.	-	33.0	24.6	24.5

With age, the growth intensity decreases. The intensity of growth was higher in the daughters of the bull Seiner 4861.

Thus, changes in the weight growth of repair heifers – daughters of the evaluated servicing bulls are in accordance with the general patterns of growth and development in animals and have certain features related to their origin.

The efficiency of product production is estimated by its profitability. When growing repair heifers, the product is an increase in live weight. Table 5 shows data on the efficiency indicators of the production of live weight gain in the farm when growing repair heifers (table 4).

**Table 4.** Efficiency of rearing repair heifers up to 18 months of age.

Indicator	Servicing bull			
	Thunderlight	Seiner	Bentley	Bakero
Live weight at the calving, kg	508	529.3	508.5	519.1
Absolute gain, kg	473.6	492.7	472.2	482.1
Cost of 1 c of growth, rub.*	16275.25	15644.33	16323.50	15988.30
Realization value of 1 kg of live weight	190.00	190.00	190.00	190.00

Total cost, rub.	77079.6	77079.6	77079.6	77079.6
Received from the sale, rub.	89984.0	93613.0	89813.0	91599.0
Profit, +; loss, -, rub.	12904.40	16633.40	12733.40	14519.40
Profitability, %	16.7	21.6	16.5	18.8

\*The cost of 1 c of increase is 16200 rubles, with an absolute increase of 475.8 kg

The calculation of the efficiency of growing repair heifers showed that it is cost-effective and the profitability level ranges from 16.5 to 21.6%.

## 4 Conclusion

Based on the above, the servicing bull has an impact on the growth and development of repair heifers, daughters, who are used to update the herd. They differ in their features, despite the general patterns of growth and have different growth rates. Similar data were obtained in the studies of O. Gorelik, M. Rebezov, A. Gorelik, S. Harlap et al. [6]; A.S. Gorelik, O.V. Gorelik, I.N. Mikolaichik et al. [7]

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