

Features of the growth of repair heifers depending on the inbreeding degree

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Abstract. The Ural type of the domestic black-and-white breed is distinguished by high productivity indicators, good suitability for use in the conditions of industrial milk technology. To obtain modern dairy cattle, related breeds were used in the herds, a significant number of animals obtained as a result of closely related breeding were revealed. The study of the influence of the degree of inbreeding on the growth and development of repair young is relevant and has practical significance. It was found that the live weight of heifers in all accounting periods practically did not differ, that is, it can be said that the method of obtaining heifers using unrelated or related selection did not affect the dynamics of live weight during their cultivation. The average daily gains in live weight differed slightly by growth periods and by groups. So they were higher in the periods from the first to the first fruitful insemination and from 10 to 12 months, lower gains were noted in the period from the moment of fruitful insemination to 18 months of age. The highest milk yield for lactation was obtained from the first heifers with a remote degree of inbreeding.

1 Introduction

Ensuring the food security of any country poses great challenges to farmers to increase production and improve the quality of agricultural products, including of animal origin [1-3]. Great importance is attached to the development of dairy cattle breeding as a branch of animal husbandry, from which such a valuable food product and raw material for the food industry – milk, is received [4-5]. For its production, highly productive dairy cattle is used, the main livestock of which belongs to related breeds of Dutch origin – Holstein, black-and-white, etc. [6-7].

The improvement of dairy cattle, to increase its productive qualities, has been systematically carried out over the past four decades by using the gene pool of the world's best breed – the Holstein. Good results have been obtained to improve the productive and technological qualities of modern dairy cattle, especially the breeding stock of the domestic black-and-white breed [8-12]. High productivity is accompanied by a decrease in

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productive longevity, which raises new questions for animal husbandry workers to improve reproductive functions and technology for raising repair young.

Since related breeds were used to produce modern dairy cattle, a significant number of animals obtained as a result of closely related breeding were revealed in the herds [13-16]. Data on the effect of the inbreeding degree on the productive qualities of animals vary. In this regard, the study of the effect of the inbreeding degree on the growth and development of repair young is relevant and has practical significance.

2 Materials and Methods

The objects of research were replacement heifers of Holsteinized black-and-white cattle. The research was carried out in one of the typical breeding farms of the Sverdlovsk region - a breeding reproducer for breeding Holsteinized black-and-white cattle of the Ural type. The study involved all replacement heifers raised on the farm over the past 3 years, which were divided into groups according to inbreeding degree. The live weight was determined for the growth periods by the method of individual monthly weighing, the live weight gains - according to generally accepted formulas. The age and live weight were assessed during the first insemination. The heifers were divided into 4 groups, depending on the breeding form and the inbreeding degree: group 1 – outbred; group 2 – distant inbreeding; group 3 – moderate inbreeding.

3 Results and Discussion

The main indicator of the weight growth of replacement heifers is their live weight according to the accounting age periods – 6, 10, 12, and 18 months. Separately, the live weight and the age of its achievement are considered for the first insemination. Currently, due to the increase in the requirements for the number of replacement young animals for the renewal of a productive herd, many agricultural enterprises have adopted an intensive technology for growing replacement young animals. The live weight of heifers by growth periods is shown in Figure 1.

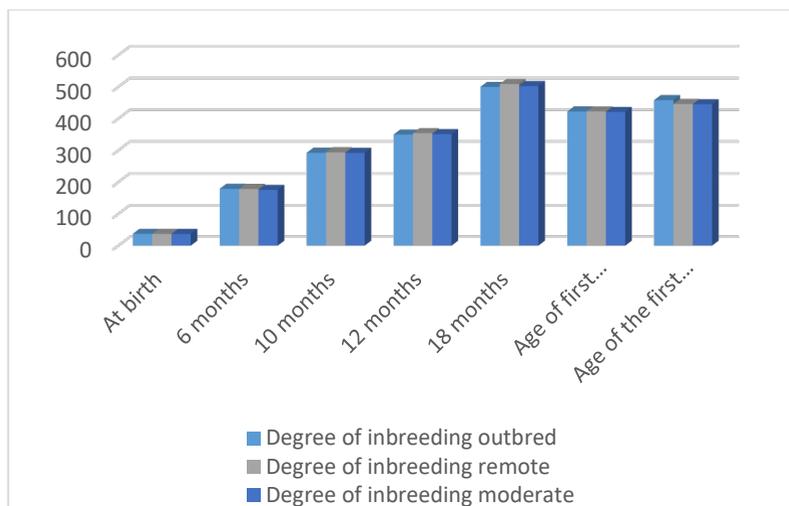


Fig. 1. Live weight of replacement heifers by periods, kg.

The figure clearly shows that the live weight of heifers in all accounting periods practically did not differ, that is, we can say that the method of obtaining heifers using

unrelated or related selection did not affect the dynamics of live weight during their cultivation.

As already mentioned, the farm uses intensive cultivation technology with high average daily gains in live weight during all growth periods (Fig. 2).

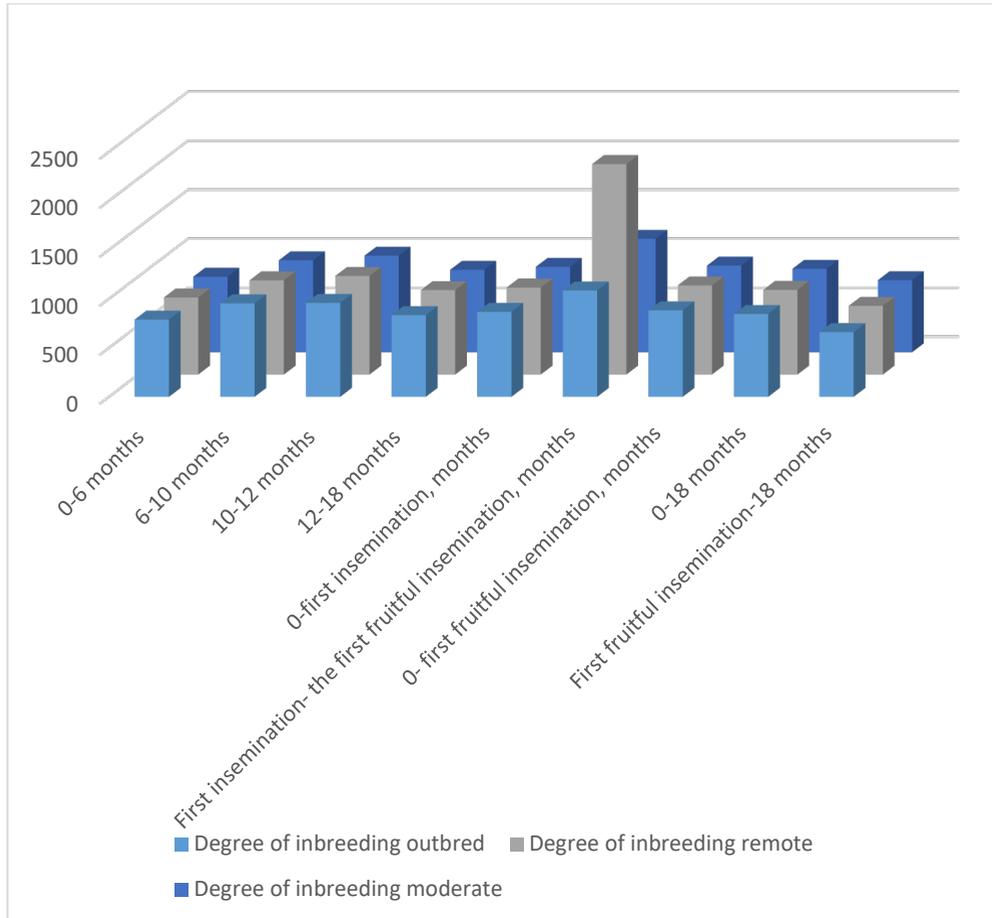


Fig. 2. Average daily increments by growth periods, g.

The figure shows that the average daily gains in live weight differed slightly by growth periods and by groups. Thus, they were higher in the periods from the first to the first efficient insemination and from 10 to 12 months, lower gains were noted in the period from the moment of efficient insemination to 18 months of age. At that time, they ranged from 660 g (outbred heifers) to 735 g (heifers obtained as a result of moderate inbreeding).

High rates were noted in the period from the first to the first efficient insemination. The age difference between these periods, both between groups and within groups, is of interest (Fig. 3).

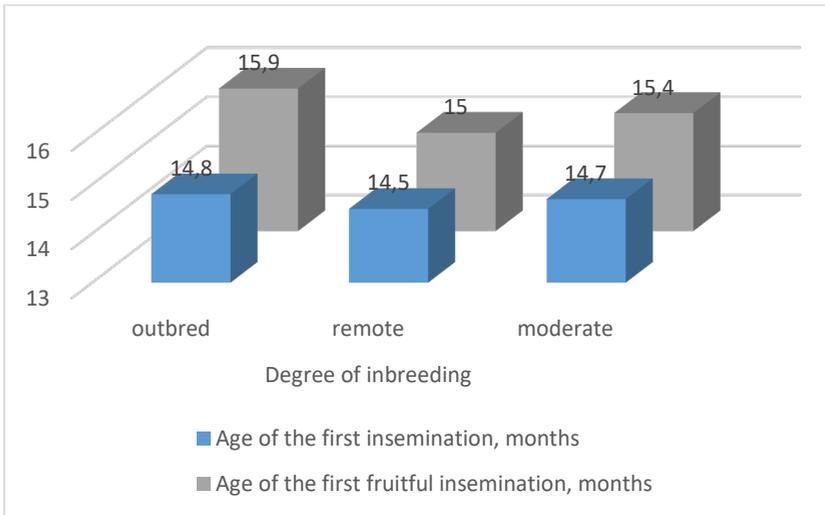


Fig. 3. The age of the first insemination of replacement heifers, months.

From the presented data it can be seen that heifers obtained as a result of outbred (unrelated) mating, despite the fact that in terms of live weight gains do not lag behind heifers obtained as a result of inbreeding, are inferior to the latter in terms of growth intensity and are ready for the first effective insemination 5-9 months later. This is also confirmed by such an indicator as the growth intensity or the relative increase in body weight (Fig. 4).

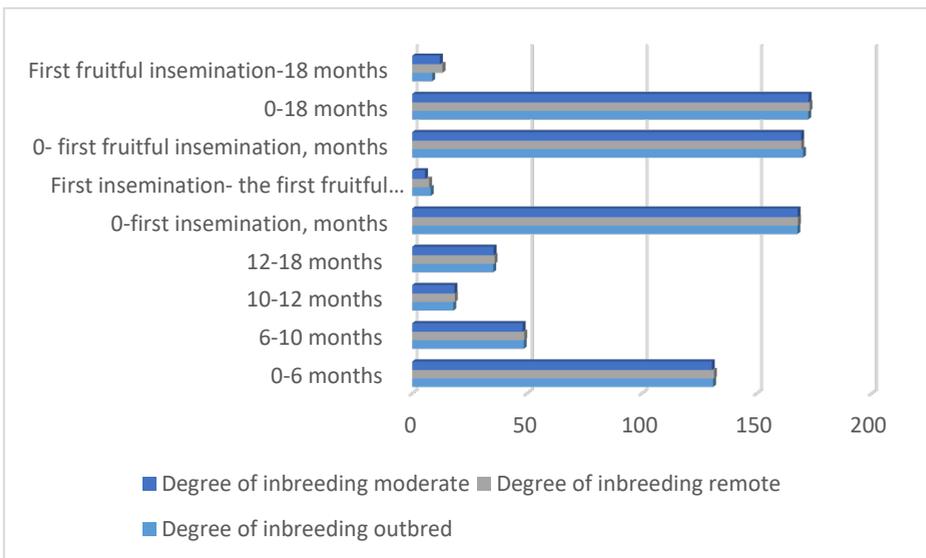


Fig. 4. Relative increase in live weight of replacement heifers, %.

The figure shows that with age, the growth intensity naturally decreases in all groups of heifers, slightly, but the growth intensity is lower, starting from the age of 6 months in the group of heifers obtained as a result of unrelated mating. This is even better seen in Figure 5, where the weighted average monthly indicators of the growth intensity by period are presented.

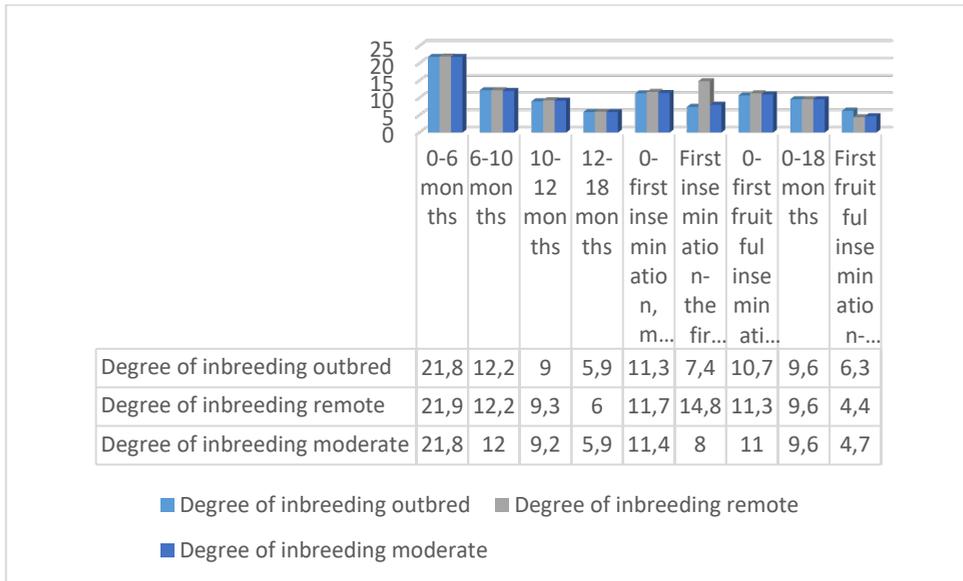


Fig. 5. Average monthly indicators of the relative increase in the live weight of replacement heifers, %.

The figure shows that there is a decrease in the growth intensity from birth to 18 months of age. The heifers obtained as a result of distant inbreeding have the highest intensity, inbred heifers with a moderate inbreeding degree are in second place.

The breeding value of the breeding stock is most often determined by their own productivity, namely milk yield per lactation. Figure 6 shows data on the milk productivity of the studied replacement heifers for the first lactation, depending on the inbreeding degree.

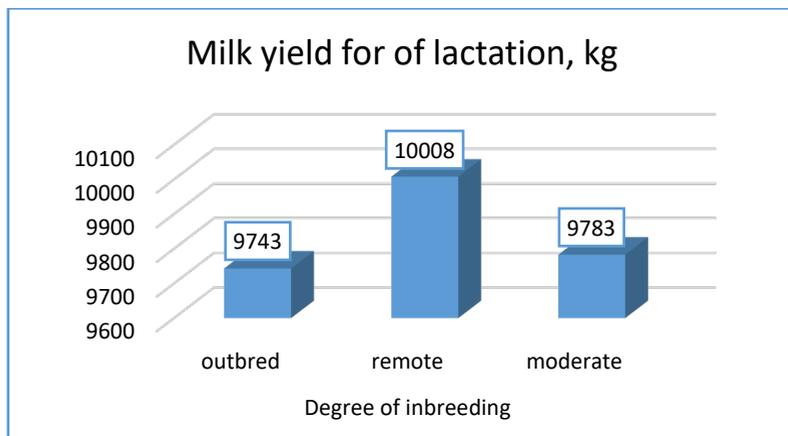


Fig. 6. Milk yield per the first lactation, kg.

The figure shows that the highest milk yield per lactation was obtained from the first heifers with a remote degree of inbreeding. They outperformed their peers from other groups by 265-225 kg, respectively, in groups. The difference is not reliable.

4 Conclusion

Thus, it can be concluded that the origin, and in this case, the method of selecting animals for mating and obtaining repair heifers with varying inbreeding degrees does not affect their growth and further productivity. We can only talk about a positive trend in the best growth rate of replacement heifers and the best productivity of the first heifers obtained by remote inbreeding.

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