The relationship between the duration of the service period and the milk yield of the Holsteinized black-mottled breed

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Abstract. The article says that all over the world, dairy livestock is used for dairy production. They use such breeds as a black-mottled breed, Holstein, Dutch ones. Breeding livestock differs in economically useful qualities depending on the climatic and ecological-forage conditions of the breeding zone, and the gene pool of breed resources. The widespread and long-term use of the Holsteinisation, along with a positive effect, i.e., an increase in milk yield, revealed problems associated with a decrease in the reproductive functions of the livestock. The aim of the work is to study the milk yield of the Holsteinized black-mottled breed of the Ural type depending on the duration of the service period. The article notes a significant percentage of dairy cows with a service period of more than 200 days and 121-160 days. Dairy cows with a service period of up to 120 days turned out to be 32%, taking into account the presence of dairy cows with optimal insemination period of only 19%. This indicates a decrease in reproductive functions in the Holsteinized black-mottled breed of the Ural type. The change in milk yield per three lactation depending on the duration of the service period is mainly determined by the individual characteristics of dairy cows and but not on the service period. Dairy cows with a service period of 103 days have the highest milk yield indicators. Dairy cows of other groups with other duration of the service periods had milk yield by 209 - 656 kg, or 1.96 - 6.15% less. The difference was not reliable due to the significant variation in milk yield within the groups. The duration of the service period does not affect the quality indicators of milk. The optimal duration of the service period for livestock breeding, namely the Holsteinized black-mottled breed of the Ural type is considered to be 81-120 days. An increase in the duration of the service period does not lead to an increase in milk yield, but affects the duration of productive longevity of dairy cows.

1. Introduction
The main problem of maintaining the health of the nation and food security of any country is ensuring an uninterrupted and sustainable supply of the population with high-quality food, including milk [1-7]. Increasing the production of high-quality products is one of the most important tasks in the development of animal husbandry, including dairy livestock breeding. It is becoming very important due to the growth
of the population of our planet and the satisfaction of humanity's needs for nutritious food. In this regard, the development of dairy stock breeding is of the great national economic importance [7-13]. An increase in the milk yield of cows is inseparably associated with an improvement in the quality of milk. It has a significant impact on the quality of ready-made dairy products [14-25 dairy cattle are used for milk production, including such related ones as black-mottled breed, Holstein, Dutch, which differ in economically useful qualities depending on the climatic and ecological-forage conditions of the breeding zone, and the gene pool of breed resources [25-26]. All over the world farmers use such breeds as a black-mottled breed, Holstein, Dutch ones. Breeding livestock differs in economically useful qualities depending on the climatic and ecological-forage conditions of the breeding zone, and the gene pool of breed resources. The widespread and long usage of the Holsteinization, along with a positive effect, i.e., an increase in milk yield, revealed problems associated with a decrease in the reproductive functions of the livestock [27-31]. The physiological foundations of milk yield are based on the fact that it is necessary to breed offspring in order to have milk. Calving is a basis for lactation. After calving, a cow restores its reproductive functions. A period between calving and insemination is called a service period. The optimal duration of the service period is 80 days; an increase in it indicates a decrease in reproductive functions in cows. It is often associated with the dominant of productivity. This indicator to a certain extent can be an indicator of reproductive functions [27-31]. The study of the duration of the service period influence on the dairy efficiency of dairy cows is significant and of practical importance.

The aim of the work is to study the milk yield of the Holsteinized black-mottled breed of the Ural type depending on the duration of the service period.

2. Materials and methods
The research was carried out at the dairy complex of one of the breeding reproducers of the Sverdlovsk region. The object of research was Holsteinized mottled breed of the Ural type with a high interbreeding taking into account the Holstein breed (more than 94%). During the research period, the cows were under the same feeding and keeping conditions. The data of zootechnical and breeding records, a Selex program database were used. Also, breeding cards of dairy cows that had completed the first and third lactation at the moment of the research were used. The milk yield of cows was estimated according to the control milking, milk yield indicators, amount of milk fat and milk protein per lactation were calculated. Milk quality was determined by FMF (fat mass fraction) and PMF (protein mass fraction).

To study the relationship between milk yield and the duration of the service period, cows that completed the third lactation were divided into groups according to the duration of the service period: up to 80 days, from 81 to 120 days, from 121 to 160 days, from 161 to 200 days and more than 200 days.

3. Results
A large percentage of heifers reduces the duration of productive longevity of dairy cows, which is 2.1-2.4 lactation on farms. This indicator is also influenced by the reproductive functions of cows, since the productive age is often considered according to the number of lactations, and they, in turn, first of all, directly depend on the duration of lactation and the service period. The distribution of cows during the third lactations according to the duration of the service period is presented in figure 1. A large percentage of heifers entering reduces the duration of productive longevity of cows, which on farms is 2.1-2.4 lactation.
The authors assume a large percentage of dairy cows with a service period of more than 200 days and 121-160 days. Cows with a service period of up to 120 days turned out to be 32%, in the presence of cows with optimal insemination time only 19%. This indicates a decrease in reproductive functions in the Holsteinized black-mottled breed of the Ural type. The duration of the service period for each group of cows also arouses interest. Therefore, it is possible to talk about their ability to recover quickly after calving and readiness for further reproduction (figure 2).

An important direction of breeding work in any farm is the evaluation and selection of dairy cows according to productive qualities. Therefore, indicators of milk yield of cows are the most important breeding feature. Data on milk yield of cows for the period of 305 days of lactation, depending on the duration of the service period, are presented in figure 3.
Figure 3. Milk yield for lactation depending on the duration of service period, kg.

The change in milk yield during the third lactation depending on the duration of the service period is most likely determined by the individual characteristics of the animals and it does not depend on the service period. Cows with a service period of 103 days had the highest milk yield indicators (figure 2). Cows of other groups by the duration of the service period had milk yield by 209 - 656 kg, or 1.96 - 6.15% less. The difference was unreliable due to the significant fluctuations in milk yield within the groups.

A great attention is also paid also to the quality indicators of milk along with quantitative indicators, when evaluating cows by productive characteristics. The results of evaluating dairy cows according to the milk quality are presented in figure 4.

Figure 4. Quality indicators of milk depending on the duration of the service period, %.

Figure 4 shows clearly that quality indicators of milk are practically at the same level regardless of the duration of the service period and milk yield per lactation. That fact indicates a high level of breeding
work on the farm. However, milk yield per lactation had an impact on the yield of milk fat and milk protein with milk (figure 5).

The figure shows that the yield of nutrients with milk, both by type (amount of milk fat and amount of milk protein) and in total, depends on milk yield per lactation (figure 5).

The constitutional orientation of dairy cows in the direction of this or that productivity is judged by the indicators of milk yield. This indicator should be more than 1000. In our case, they all are dairy cows with high milk yield indicators (figure 6).

The difference in milk yield indicators depending on groups of dairy cows with different service periods is explained by the difference in live weight of cows fluctuated within 580-600 kg, and it was higher in cows with a short service period, i.e., up to 80 days.
4. Discussion
The analysis of the influence of the service period duration on the productive qualities of the Holsteinized black-mottled breed of the Ural type showed that dairy cows with a service period of 81 to 120 days duration (103 days) have the best indicators. It allows us to speak about its optimal duration in breeding livestock, exactly, Holsteinized black-mottled breed of the Ural type. Similar studies were carried out by V Mymrin, O Loretts, I Tkachenko, V Gridin, S Gridina, S Gridina, V Gridin, O Leshonok, S Gridina, O Shatalina they received identical data.

5. Conclusion
The optimal duration of the service period for livestock breeding, namely the Holsteinized black-mottled breed of the Ural type is considered to be 81-120 days. An increase in the duration of the service period does not lead to an increase in milk yield, but affects the duration of productive longevity of dairy cows.

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