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Динамика воспроизводительных качеств коров в зависимости от длительности использования

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РЕЗЮМЕ

Уральский тип отечественной черно-пестрой породы отличается высокими показателями продуктивности, хорошей пригодностью к использованию в условиях промышленной технологии молока, но длительность его продуктивного долголетия составляет 2,4–2,6 лактаций, хотя в стадах имеется поголовье коров с продолжительность использования до 10 лактаций. Снижение продуктивного долголетия связано в частности с их воспроизводительными качествами. В результате проведенных исследований установлено, что наиболее устойчивыми к длительному использованию в условиях молочных комплексов промышленного производства молока племенных репродукторов оказались коровы линии Силинг Трайджун Рокита, продолжительность продуктивного периода у которых составляет 4,0 лактации. В других линиях она колебалась от 1,8 (линия Пабст Говернера) до 2,5 (линия Монтвик Чифтейна) лактаций. Низкий коэффициент воспроизводительной способности (менее 0,95) указывает на имеющиеся проблемы с воспроизводством в стаде. Современный голштинизированный черно-пестрый скот, разводимый в Свердловской области, обладает высокими племенными качествами. Потенциал их использования достаточно высок и, несмотря на определенные проблемы с воспроизводством, они могут длительное время продуктировать в эколого-кормовых условиях зоны разведения.

Ключевые слова: productive period, cows, genotype, milk productivity, productive longevity

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Dynamics of reproductive qualities of cows depending on the productive longevity

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ABSTRACT

The Ural type of the domestic black-and-white mottled breed features high productivity rates, good suitability for industrial milking technology, but the duration of its productive longevity is 2.4–2.6 lactations only, although in herds there are cows with productive longevity up to 10 lactations. The decline in productive longevity is associated in particular with reproductive qualities. As a result of the research, it was found that the Sealing Trijun Rockit cows proved to be the most resistant to their long use within the conditions of dairy farms for industrial milk production of pedigree reproducers; their productive longevity was 4.0 lactation. In other lines the productive longevity ranged from 1.8 (Pabst Governor line) to 2.5 (Montvic Chieftain line) lactations. A low fertility rate (less than 0.95) proves the existence of reproduction problems in the herd. Modern Holsteinized black-and-white mottled cattle bred in the Sverdlovsk region has high breeding qualities. The potential of their use is quite high and, despite certain reproduction problems, they are able to produce for a long time in the ecological and forage conditions of their breeding zone.

Key words: productive period, cows, genotype, milk productivity, productive longevity

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Introduction

Food safety in any country imposes large challenges for farmers to increase production and improve the quality of agricultural products, including those of animal origin [1–5]. Great importance is referred to the development of dairy farming as a branch of animal husbandry, where the national economics gets milk — the valuable food product and raw material for the food industry [6–9]. For its production, highly productive dairy cattle are used; the main livestock is represented by related breeds of Dutch origin — Holstein, black-and-white mottled, etc. [8–12].

The gene pool of the Holstein breed, which is considered the best dairy breed in the world, for more than four decades has been widely used and continues to be used to improve domestic livestock, including the black-and-white mottled breed in order to increase plentiful milk yield and improve technological characteristics in industrial production [13–17].

A large array of Holsteinized black-and-white mottled cattle has been created with a high share of Holstein breed genetics. These cattle feature economically useful traits and phenotypic characteristics depending on the breeding region and breed resources used for cattle crossing. An increase in breeding stock productivity led to decline in productive longevity due to a decrease in the cows reproductive functions. In Sverdlovsk region the Ural type of Holsteinized black-and-white mottled cattle is used. The average productive longevity in agricultural enterprises varied within the range of 2.4–2.6 lactations with the service period over 120 days. When breeding, the farms used world gene pool of Holstein servicing bulls and breed the cattle by the breeding lines, including the Holstein breed line. Assessment of the reproductive qualities of cows depending on the breeding line and productive longevity is relevant and of practical importance.

Materials and method

The objects of research were cows of Holsteinized black-and-white mottled cattle. The studies were run in pedigree cattle breeding farms for Holsteinized black-and-white mottled cattle of the Ural type of Sverdlovsk region.

The research included all cows who finished lactating. The data of zootechnical and veterinary records of the IAS “SELEX-Dairy Cattle” database were used. Milk yield for 305 days of lactation, MFF and MFP in milk were taken into account. Milk yield per lactation was assessed by control milking once a month, the quality indicators of milk were determined in average milk sample from each cow once per month in the dairy laboratory of the Uralplemcenter. The reproductive qualities of cows were assessed by duration of their service period, the calving interval, the frequency of inseminations, the coefficient of reproductive capability

Figure 1. The ratio of cows of different lines in the pedigree cattle breeding Farms of Sverdlovsk region, %

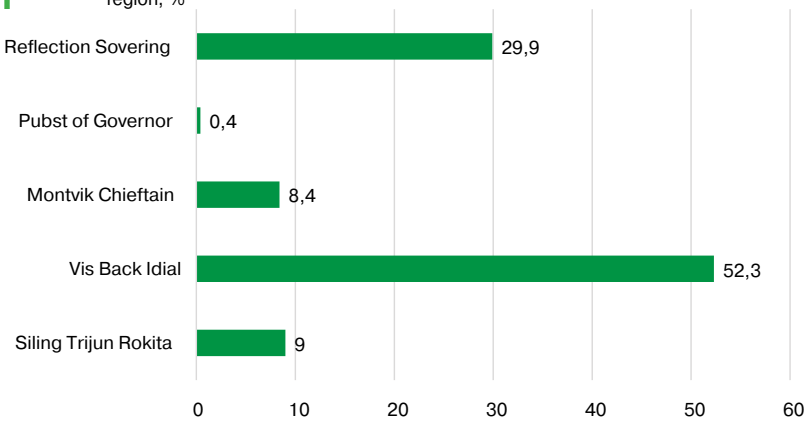
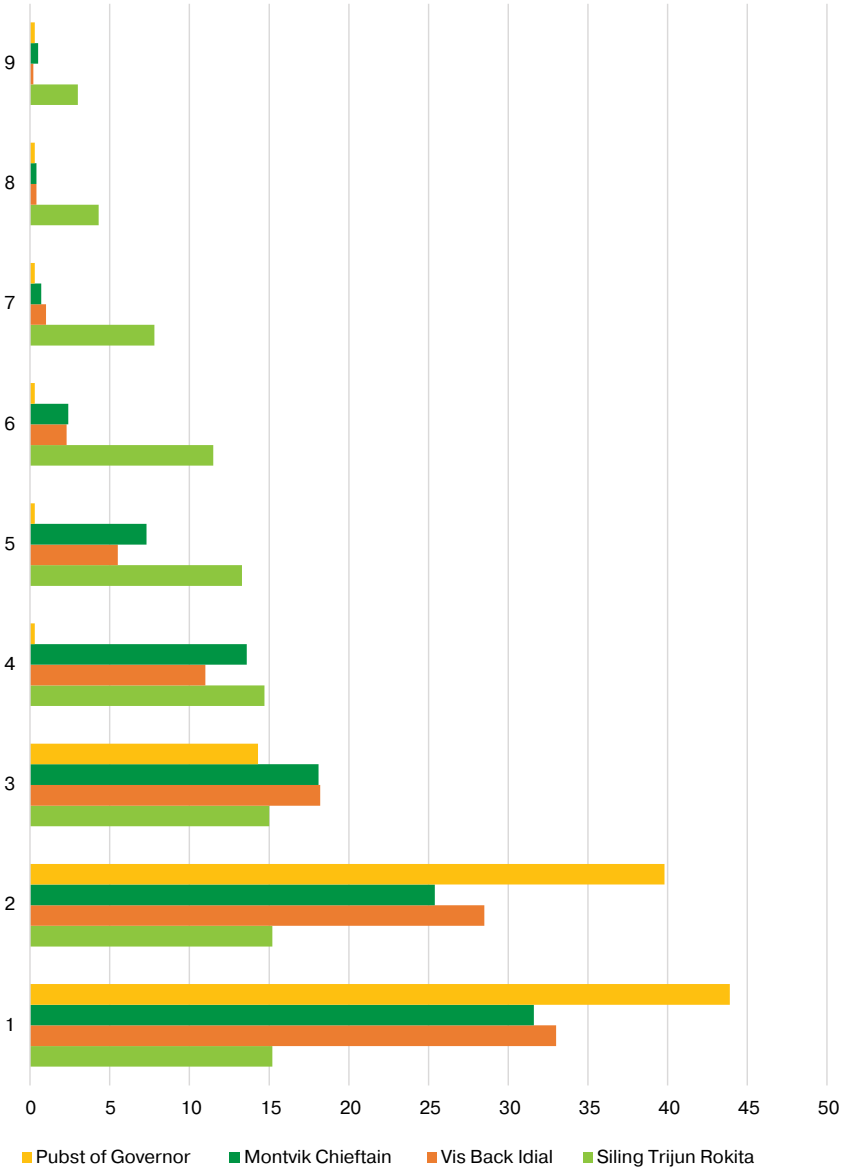


Figure 2. Structure of line by quantity of cows in lactations, %



(CRC) and the fertility index (FI of Doha) in the context of lactations. The animals were divided into groups depending on their linear origin: group 1 — Vis Back Ideal line; group 2 — Montvic Chieftain line; group 3 — Pabst Governor line; group 4 — Refaecti Soveringcline; group 5e— Sealing Trijun Rockit line.

Results and discussion

The ratio of cows along the lines is shown below in the diagram (Figure 1).

The figure clearly shows that in pedigree cattle breeding farms, animals belonging to two lines — Vis Back Idial and Reflection Sovering — are used in greater extent — 52.3 and 29.9%, respectively. 9.0 and 8.4% are cows belonging to the Sealing Trijun Rockit ane Montvic Chieftaia lines. Cows from thei Pubst of Governor line amounted only to 0.4%.

Each line contains cows of different ages. Data on the percentage of animals depending on age in lactation is presented in Figure 2.

The ratio of cows of different ages depends on their affiliation to one or another breeding line, which is obviously seen in the figure. Cows of the Siling Trijun Rokita line proved to be the most resistant to long-term use in conditions of dairy farm complexes for industrial milk production of pedigree cattle breeding farms, the productive longevity amounted for 4.0 lactation. In other lines, the producti longevity ranged from 1.8 (Pubst Governor line) to 2.5 (Montvik Chieftain line) lactations.

The dynamics of cows' milk yield by lactation is interesting, as it's necessary to assess their ability to sustain productive qualities with age and to assess the relation of productive longevity with productive qualities (Figure 3).

The figure obviously shows that the cows of the first three lines feature a general pattern of increasing milk yield till their mature lactation. The cows of Pubst of Governor line showed the highest productivity at the 9th lactation, which is most likely related to small number of cows and their selection for milk yield and lactation duration. However, it can be noted that they increase milk yield for a longer time to the 4–5th lactation, but it is lower than milk yield of cows of other lines. The Reflection Sovering cows showed the best milk yield at the 2nd lactations. Further, all lines showed stable milk yields, but the slight decrease was observed among the mature cows at their 3–4th lactations with minor

Figure 3. Dynamics of milk yield per lactation of cows depending on lactation, kg

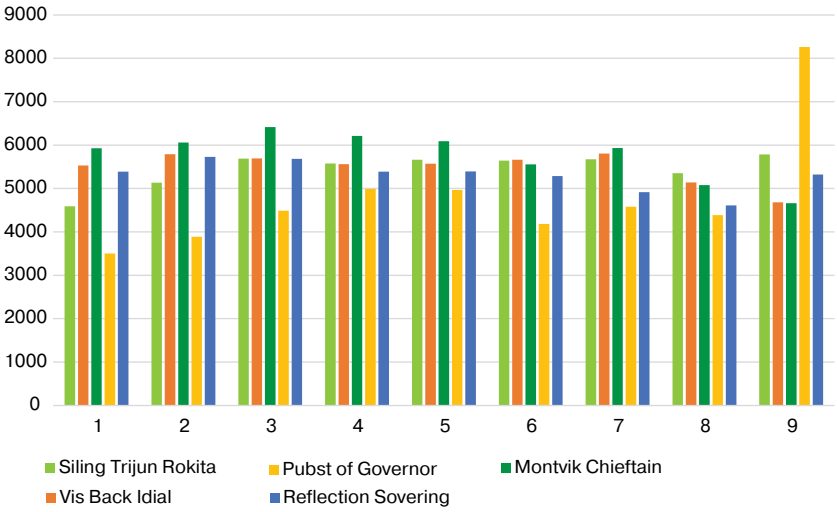


Figure 4. Duration of the service period and calving interval in cows by lactation, days

Figure 5. Frequency rate of insemination and coefficient of reproductive capability of cows by lines

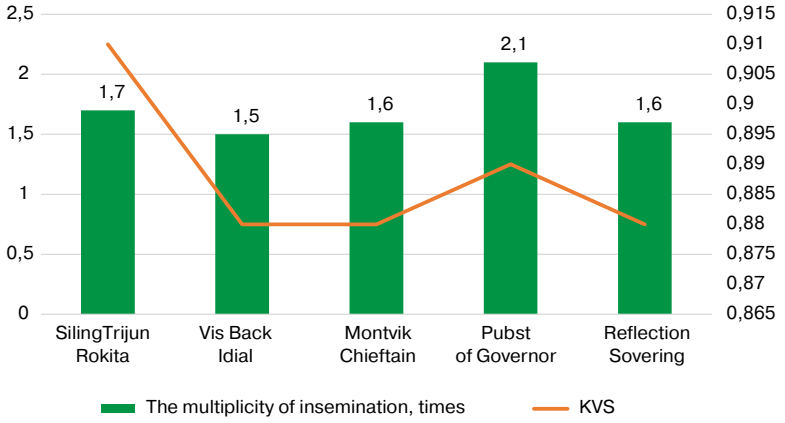
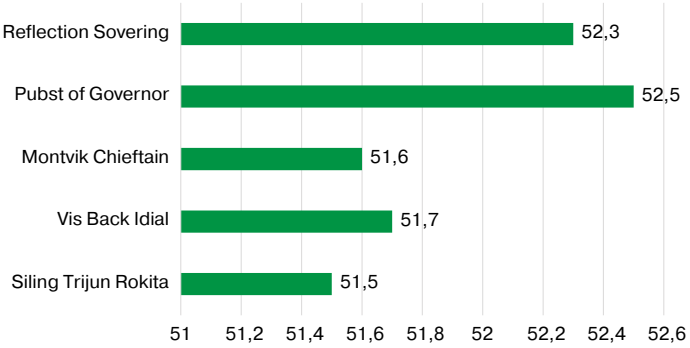


Figure 6. Cows fertility index of cows by lines, %



fluctuations to higher or lower yield, which is explained by rejection of low-yielding cows.

In the herd the milk yield per lactation was higher than the milk yield per 305 days of lactation on average by 284 kg or 4.9% due to longer lactation, which is interrelated with the service period duration (Figure 4).

As a result of the analysis of data on duration of the service period and calving interval, it was found that they exceed the optimal duration in all groups of cows along the lines and in cows of different ages. The shortest service and calving intervals were recorded among the cows of Siling Trijun Rokita line, which allows drawing a conclusion on influence of reproduction on productive longevity of cows in the herd. Among the cows of the Montvik Chieftain line they were the longest, which affected the milk yield per lactation, but also led to decline of productive longevity to 2.5 lactations, which is 1.5 lactations less than among Siling Trijun Rokita cows.

The decrease in the reproductive functions of cows is also confirmed by such indicators as the frequency of insemination and the coefficient of reproductive capability, which are presented below in Figure 5 by lines on average.

The frequency of insemination in cows of all lines, with the exception of animals of the Pubst of Governor line, where it exceeds 2 times. This leads to an overuse of semen doses and an increase in the cost of obtaining a calf. The low index of reproductive capability (less than 0.95) indicates existing problems with reproduction in the herd, which leads to a decrease in the duration of productive use of cows in the herd as a whole. The best indicators of this coefficient were established in the group of cows of the Siling Trijun Rokita line, the duration of productive use of which is 4.0 lactation.

The cow fertility index (Doha index) is an indicator reflecting the female fertility for life. The data of this indicator for the lines of Holsteinized black-and-white mottled cattle used in pedigree breeding farms of Sverdlovsk region is shown below in Figure 6.

It follows from the figure above that the fertility of cows in the herd is quite good, since the fertility index of cows exceeds 48%. Thus, it is possible to conclude that the potential of the livestock is quite high for selection, and this livestock can be used for a long time both for milk production and for production of offspring.

Conclusion

Therefore, it can be concluded that the modern Holsteinized black-and-white mottled cattle bred in the Sverdlovsk region possesses high breeding qualities, which is confirmed by their productive qualities. The potential of their use is quite high and, despite certain problems with reproduction, they can produce milk for a long time in the environmental and forage conditions of the breeding zone.

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Все авторы внесли равный вклад в эту научную работу.
Авторы в равной степени участвовали в написании рукописи и несут равную ответственность за плагиат.
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All authors bear responsibility for the work and presented data.

All authors have made an equal contribution to this scientific work.
The authors were equally involved in writing the manuscript and bear the equal responsibility for plagiarism.
The authors declare no conflict of interest.

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