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LONGEVITY AND THE MAIN REASONS FOR COW RETIREMENT

Tatiana SHISHKINA, Tatiana GUSEVA, Alexey NAUMOV

Penza State Agrarian University, 30 Botanicheskaya Street, 440014, Penza, Russia

Corresponding author email: shishkina.tv@pgau.ru

Abstract

The influence of the genotype for the Holstein breed on the longevity and life-long productivity of black-and-white cows was studied, and the intensity and reasons for the retirement of animals from the herd were analyzed. For this purpose, in the conditions of the breeding farm of the CJSC "Konstantinovo" of the Penza region, two groups were formed from the number of retired animals: group I with a blood content of the Holstein breed of less than 75% and group II with a blood content of more than 75%. As a result of the studies, it was found that the lifetime productivity of cows in group I was 24908 kg, which is 3816 kg higher than that of cows in the second group (P>0.95). The indicator of the period of economic use of cows was also higher in animals with a blood content of less than 75% for the Holstein breed - 4.58 units versus 3.66 in cows with a blood content of more than 75% (P> 0.99). According to the analysis of the reasons for cow retirement, depending on bloodiness, it was revealed that with blood content in the Holstein breed of less than 75%, the highest dropout rate is low productivity and udder diseases; if the blood in the Holstein breed is more than 75%, the largest dropout rate is leg diseases and other reasons.

Key words*: duration of productive use, genotype, longevity, lifetime productivity, reasons for retirement.*

INTRODUCTION

The state program for the development of agriculture and regulation of markets for agricultural products, raw materials and food for 2013-2020 provides for an increase in milk production by 2020 to 38.2 million tons. Achievement of this goal can be ensured solely by increasing productivity and increasing the safety of the breeding stock of cattle, which is directly related to an increase in productive longevity (Shishkina et al., 2018). At the same time, in the last decade, a decrease in the terms of economic use of cows to 2-3 lactations has been noted by many authors (Abramova et al., 2018).

The milk production of cows is determined by a number of factors that can be divided into external and internal. External include feeding and keeping animals. The share of their influence, according to a number of authors, reaches 75%. The main internal factors should be considered genetic (breed and genotype of animals) (Shishkina, 2017; Shishkina et al., 2017). The degree of influence of these factors, cited by a number of scientists, is 25-30%.

Realization of the productive potential of livestock with an improved genotype is possible in appropriate conditions of feeding, housing and service (Kryukov, 2014).

Therefore, the dairy farming industry is being modernized: modern dairy farms are being built, existing farms and complexes are being reconstructed, progressive milk production technologies are being actively disseminated.

MATERIALS AND METHODS

To transform the genotype of black-and-white cows of local populations, reproductive and absorptive crossbreeding is widely used, while in most regions of Russia and in the Penza region in particular, the Holstein breed of dairy cattle is used as an improving one.

In connection with the above, we have set the goal to analyze the influence of the genotype for the Holstein breed on the longevity and lifetime productivity of black-and-white cows. The studies were carried out in the breeding farm of JSC Konstantinovo, Penza region.

At JSC "Konstantinovo" crossbreeding of related breeds is carried out, all the resulting hybrids are considered purebred black-and-white animals with different bloods according to the Holstein breed. From the number of retired animals, two groups were formed: group

I with a blood content of the Holstein breed of less than 75% and group II with a blood content of more than 75%. The selection of data for analysis was carried out from the cards of the breeding cow of the 2-MOL form.

JSC "Konstantinovo" is a pedigree reproducer for breeding black-and-white cattle. The total dairy herd of the farm is 1175 heads. Average milk yield per herd is 8881 kg of milk (Table 1).

At JSC Konstantinovo, a stall-walking system for keeping livestock has been adopted. The way of keeping is loose, boxed. The cows are kept in four barns with 250 stalls each. Two-row cowsheds with one aft aisle. Each row is divided into two sections. The section contains two rows of boxes. Walking areas are equipped to provide cows with exercise.

Table 1. Characteristics of cows in terms of milk productivity of JSC Konstantinovo

Groups animals	Total, heads	Milk yield, kg	Milk fat		Milk protein		Live weight, kg
			%	kg	%	kg	
All livestock	1175	8881	3.69	327.6	3.18	282.7	499
1 lactation	499	8446	3.68	310.7	3.18	268.9	480
2 lactation	313	9180	3.69	338.9	3.18	292.1	500
3 lactation	363	9221	3.70	341.2	3.18	293.6	524

The optimal microclimate parameters are set thanks to the movable side walls - "curtain system", which can be adjusted depending on the air temperature and wind.

The system consists of light-transmitting, UV-stable and low-temperature resistant tents that open from top to bottom. During the warmer months, the curtains can be fully opened, giving free access to fresh air.

In winter, the awnings are raised and protect the premises from cold winds and low temperatures.

To provide ventilation, as well as to enhance natural light, a light ventilation ridge (aerator) is installed in the barns. Drinking is carried out from automatic self-drinkers with heated water in the winter. The manure passages in the barns are shaped like a tray.

Manure removal is carried out three times a day during milking with the help of a bulldozer attached to tractors. After the manure is removed, the bedding material is covered with a spreader - straw cutting.

Milking of cows is carried out in two milking parlors on installations of the "Carousel" type for 36 milking places each. All milking equipment in the Westfalia Surge farm. Milking of cows - two times. The farm pays great attention to feeding and fodder quality.

The basic ration is corrected taking into account the level of productivity of cows in production groups. The diet includes the following types of feed: rump hay, oat straw, corn grains, beet pulp, corn, barley, sunflower cake, soybean meal, fodder treacle, protected fat, feed chalk, salt.

The breed and class composition of cattle for 2020 is presented in table 2. The total number of livestock on the farm is 2614 heads. Of these, 1683 are cows, 548 heifers, 101 heifers are up to one year old, 264 heads are heifers over one year old and 18 heads are heifers over 18 months old. The number of heads of cattle of the elite-record class is 1851. Of these, 1175 are cows. Class elite class includes 643 heads. Cows in this group were 495 heads, heifers - 83 heads. The total number of the 1st class reaches 120 heads. This group includes 83 heifers and 13 cows.

RESULTS AND DISCUSSIONS

As a result of the studies carried out, it was revealed that the lifetime productivity of cows in group I was 24908 kg, which is 3816 kg higher than that of cows in group II ($P>0.95$), in cows in group II this indicator was 21092 kg (Table 2).

Table 2. Lifetime productivity and the number of the last completed lactation of cows, M ± m

Holstein blood breed	Lifetime productivity, kg	Last number complete lactation
<75% (n = 43)	24908 ± 1173.9	4.58 ± 0.25
≥75% (n = 67)	21092 ± 882.6	3.66 ± 0.15
Δ - difference between comparative features (to determine if the means of two sets of data are significantly different from each other)	3816	0.92
td - Student's t-test	2.60	3.14

The indicator of the period of economic use of cows was also higher in animals with a blood content of less than 75% for the Holstein breed - 4.58 units versus 3.66 in cows with a blood content of more than 75% (P>0.99) (Figure 1).

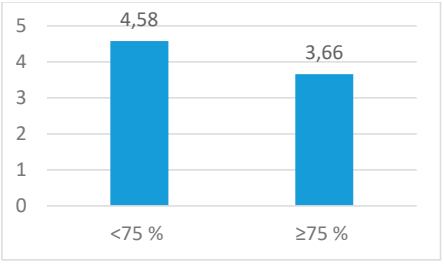

Figure 1. Number of the last completed lactation

Based on the research data, it can be concluded that in the analyzed herd, a tendency was revealed for a decrease in the economic use of animals with an increase in blood in the Holstein breed. Therefore, combinations of high milk yield and optimal periods of productive use of the broods are ideal.

Life span is the period from the birth of an animal to its natural death. Lifetime milk yield is the total milk yield for all lactations during the life of the animal. The genetic potential of cows' productive longevity is quite high and amounts to 12-15 years or 10-12 lactations or more.

The optimal duration of productive use in the Russian Federation can be considered a dairy cow, which, during five to six lactations, on average gives more than 6 thousand kg of milk, while maintaining normal fertility, that is, gives one calf per year, has good health and a strong constitution. In dairy breeds of intensive type, an average milk yield of 7-8 thousand kg for 3-4 lactations is acceptable. Lifetime milk yield from such cows will be at least 30 tons.

Longevity is a complex indicator that sums up the use of an animal in the production of offspring and the production of certain products. The heritability of this trait is very low. The heritability coefficient of longevity in animals is 3-13%.

The task was set - to study the duration of productive use of the breeding stock of JSC Konstantinovo.

As can be seen from Table 3, all animals in both control groups completed the first lactation. Already by the second lactation, the percentage of cows retired in the group of cows with a blood content of more than 75% was 18%, while in cows with a degree of "Holsteinization" less than 75%, only 5%. By the fourth lactation, the number of abandoned cows in group I was 53%, in group II - 81%, by 5 lactation - 72 and 91%, respectively. By the 6th lactation in the second group, 100% of the cows were eliminated, while in the first one animal reproduced milk production up to 9 lactation.

Summarizing the data of the study of the withdrawal of cows by JSC Konstantinovo of various degrees of Holsteinization, it was concluded that the best indicators for this parameter have cows with a blood blood level of less than 75%.

The increase in the terms of productive use of cows allows you to increase the lifetime productivity of cows, and, consequently, the profitability of production. Therefore, reducing the level of culling of cows is one of the leading values of the economic success of the enterprise. Knowledge of the main reasons for cow retirement and its decrease due to technological, organizational and various veterinary measures allows you to minimize this parameter.

In this regard, an analysis was made of the reasons for the withdrawal of the analyzed breeding stock of JSC Konstantinovo (Table 4).

Table 3. Intensity of retirement and safety of cows in controlled groups

Lactation by count	Indicator	By age periods		Disposal from the initial livestock	
		I Group	II Group	I Group	II Group
1	Number of cows at the beginning of lactation	43	67	-	-
	Successfully finished lactation, goal	43	67	-	-
	Lost cows, goal.	0	0	0	0
	Lost cows,%	0	0	0	0
	Livestock safety,% (percentage of disposal from the initial livestock)	100	100	-	-
2	Number of cows at the beginning of lactation	43	67	-	-
	Successfully finished lactation, goal	41	55	-	-
	Lost cows, goal.	2	12	2	12
	Lost cows,%	5	18	5	18
	Safety of livestock,%	95	82	-	-
3	Number of cows at the beginning of lactation	41	55	-	-
	Successfully finished lactation, goal	28	35	-	-
	Lost cows, goal	13	20	15	32
	Lost cows, %	32	36	35	48
	Livestock safety	68	64	-	-
4	Number of cows at the beginning of lactation	28	35	-	-
	Successfully finished lactation, goal	20	13	-	-
	Lost cows, goal.	8	22	23	54
	Lost cows, %	29	63	53	81
	Livestock safety, %	71	37	-	-
5	Number of cows at the beginning of lactation	20	13	-	-
	Successfully finished lactation, goal	12	6	-	-
	Lost cows, goal.	8	7	31	61
	Lost cows, %	40	54	72	91
	Livestock safety, %	60	46	-	-
6	Number of cows at the beginning of lactation	12	6	-	-
	Successfully finished lactation, goal	5	0	-	-
	Lost cows, goal.	7	6	38	67
	Lost cows, %	58	100	88	100
	Livestock safety, %	42	0	-	-
7	Number of cows at the beginning of lactation	5	-	-	-
	Successfully finished lactation, goal	3	-	-	-
	Lost cows, goal	2	-	40	-
	Lost cows, %	40	-	93	-
	Livestock safety, %	60	-	-	-
8	Number of cows at the beginning of lactation	3	-	-	-
	Successfully finished lactation, goal	1	-	-	-
	Lost cows, goal.	2	-	42	-
	Lost cows, %	67	-	98	-
	Livestock safety, %	33	-	-	-
9	Number of cows at the beginning of lactation	1	-	-	-
	Successfully finished lactation, goal	0	-	-	-
	Lost cows, goal	1	-	43	-
	Lost cows, %	0	-	100	-
	Livestock safety, %	100	-	-	-

As can be seen from Table 3, all animals in both control groups completed the first lactation. Already by the second lactation, the percentage of cows retired in the group of cows with a blood content of more than 75% was 18%, while in cows with a degree of "Holsteinization" less than 75%, only 5%. By the fourth lactation, the number of abandoned cows in group I was 53%, in group II - 81%, by 5 lactation - 72 and 91%, respectively. By the 6th lactation in the second group, 100% of the cows were eliminated, while in the first one

animal reproduced milk production up to 9 lactation.

Summarizing the data of the study of the withdrawal of cows by JSC Konstantinovo of various degrees of Holsteinization, it was concluded that the best indicators for this parameter have cows with a blood blood level of less than 75%.

The increase in the terms of productive use of cows allows you to increase the lifetime productivity of cows, and, consequently, the profitability of production. Therefore, reducing the level of culling of cows is one of the leading values of the economic success of the enterprise. Knowledge of the main reasons for cow retirement and its decrease due to technological, organizational and various veterinary measures allows you to minimize this parameter.

In this regard, an analysis was made of the reasons for the withdrawal of the analyzed breeding stock of JSC Konstantinovo (Table 4).

Table 4. The main reasons for the retirement of cows, depending on the degree of "Holsteinization"

Holstein bloodline	Low productivity		Gynecological diseases		Udder diseases		Diseases of the feet		Other reasons	
	Goal.	%	Goal.	%	Goal.	%	Goal.	%	Goal.	%
<75% (n = 43)	9	20.9	10	23.3	9	20.9	10	23.3	5	11.6
≥75% (n = 67)	12	17.9	16	23.9	11	16.4	17	25.3	11	16.5
Total for herd	21	19.1	26	23.6	20	18.2	27	24.5	16	14.5

According to the analysis of the reasons for cow retirement, depending on bloodiness, it was found that with a blood content of less than 75% for the Holstein breed, the highest dropout rate is low productivity and udder diseases; if the blood in the Holstein breed is more than 75%, the largest dropout rate is leg diseases and other reasons.

Thus, the main reasons for the loss of cows in the analyzed herd were leg diseases (24.5%), gynecological diseases (23.6%), low productivity (19.1%), udder diseases (18.2%) and other reasons (14.5%).

CONCLUSIONS

Based on the analysis of the influence of the genotype for the Holstein breed on the longevity and life-long productivity of black-and-white cows in the conditions of the breeding farm of JSC Konstantinovo of the Penza region, we made the following conclusions:

Among the studied cows of various degrees of blood in the Holstein breed, the best indicators of milk productivity in the first lactation were animals with a blood content of less than 75%, by the third lactation the best indicators were in cows with a blood content of more than 75%. It should be noted that in terms of milk yield and milk fat, cows with a blood content of more than 75% were more stable in the first and third lactation. By the third lactation, the values according to these indicators in cows with a blood content of less than 75% decreased;

By the second lactation, the percentage of retired cows in the group of cows with a blood content of more than 75% was 18%, while in cows with a degree of "Holsteinization" less than 75%, only 5%. By the fourth lactation, the number of abandoned cows in group I was 53%, in group II - 81%, by 5 lactation - 72 and 91%, respectively. By the 6th lactation in the second group, 100% of the cows dropped out, while in the first one animal reproduced dairy products up to 9 lactation. The main reasons for leaving cows in the analyzed herd were leg diseases (24.5%), gynecological diseases (23.6%), low productivity (19.1%), udder diseases (18.2%) and other reasons (14.5 %);

Lifetime productivity of cows with a blood content of less than 75% was 24908 kg, which is 3816 kg higher than that of cows of the second group (P>0.95) The indicator of the period of economic use of cows was also higher in animals with a blood content of less than 75% for the Holstein breed – 4.58 units versus 3.66 in cows with a blood count of more than 75% (P>0.99). Under the prevailing conditions, high-blooded Holstein animals poorly realize their genetic potential. We recommend to prolong productive longevity, as well as other indicators, to carry out careful selection and selection, directed rearing of young animals and the creation of a good forage base.

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