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## The Effectiveness Of The Use Of Dairy Cows In Highly Productive Herds Of National And Foreign Selection.

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### ABSTRACT

Currently, in large cattle-breeding complexes of the country, the herd is completed in two ways: importation of breeding stock from abroad and replenishment of the herd at the expense of its own reproduction with the use of bulls of foreign and domestic selection. The aim of the research is a comparative study of the effectiveness of the use of cows and reproduction of dairy cattle in the highly productive herds of two breeding plants, breeding cows of domestic and foreign selection. The main objectives of the research are to study the milk production, reproductive capacity, duration of productive use and to assess the type of physique of cows of different selection, as well as to assess the economic efficiency of milk production and the future return on livestock or its import. Milk yield for 305 days of lactation in JSC "Agrofirm Dmitrov Gora" are 8791kg, with a fat content of 3.97% and a mass fraction of protein of 3.29%. In the second, respectively, 7546 kg of milk with a fat mass fraction of 3.90% and a protein content of 3.26%. Consequently, the milk yield of cows in breeding plant JSC BP "Agrofirm Dmitrov Gora" is higher significantly ( $p < 0.001$ ) than the productivity of the herd breeding plant CJSC BP "Kalininskoe". In addition, it can be concluded that the highest milk production in the two breeding plants had cows whose father had the genotype BB on kappa-casein. According to the results of the study, it can be concluded that in two breeding plants the reproduction rates varied slightly. Analysis of these reproductive qualities of animals showed that their level varied slightly. The analysis of the results of the linear assessment of the exterior showed a significant difference between the heifers of the two herds (breeding). In highly productive herds in the conditions of industrial technology for the purpose of optimal herd reproduction and increase of milk production efficiency it is economically expedient to use Holstein cows of domestic selection.

**Keywords.** Breeding plant, genetic potential, dairy cattle, productivity, reproductive qualities, Holstein breed, duration of productive use, selection, linear assessment, body type.

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## INTRODUCTION

Without the creation and effective management of the development of large meat and dairy complexes in different regions of the country it is almost difficult to provide import substitution of meat and dairy products in our country [10]. Intensive use of dairy cattle in industrial complexes leads to an increase in premature disposal of cows for a variety of reasons. This reduces the breeding resources of bred cattle and causes an objective need to improve the system of cultivation of repair heifers, providing the formation of precocious, highly productive animals with a strong constitution, able to withstand high physiological loads associated with lactation, reproduction and maintenance conditions for long-term economic use (Ivanov V.A., 2016).

Productive qualities of dairy cattle breeds in Russian farms are largely determined by their genotype. Part of the influence of different factors depends on the applied breeding methods and the value of genetic potential [2]. The dynamics of the breeding process aimed at increasing milk productivity necessitates a systematic assessment of animals in herds and populations on the main economically useful features and the degree of their genetic potential realization in terms of interaction genotype-environment [3,4,6].

In this regard, in recent years, much attention has been paid to the study of biological features and identification of adaptation processes affecting the implementation of the genetic potential of cows, in order to organize further breeding work with imported livestock and their offspring.

Over the past decade, the modernization of existing and introduction of new high-tech livestock farms and complexes identified the need for the use of imported breeding resources, thanks to which a highly productive breeding base of Holstein cattle breed was formed. However, the import of foreign breeding stock does not completely solve the problem of dairy cattle breeding in the country. There are risks of transportation and quarantine, as well as the complexity of adaptation and accommodation to the local forage base, technologies of maintenance, as a result, the duration of productive use of cows is significantly reduced, which does not allow realizing fully the potential of highly productive animals (Dunin I.M., Amerkhanov Kh.A., 2017).

The import of potentially highly productive animals, their intensive exploitation, as well as the use of modern equipment for keeping and milking animals is one of the real ways to solve the "milk" problem. At the same time, it is important, both in theoretical and practical terms, to study the adaptive qualities, productive and reproductive characteristics of high-level Holstein animals imported from different countries to different environmental conditions of Central Russia, as well as the natural resistance of their offspring (Lozovaya G.S., Tsys V.I., Chekushkin A.M., 2014; Sinyakov S.S., 2013; Sudarev N.P. Abylkasymov D., 2009, 2012).

Currently, in large cattle-breeding complexes of the country, the herd is completed in two ways: importation of breeding stock from abroad and replenishment of the herd at the expense of its own reproduction with the use of bulls of foreign and domestic selection. In this regard, the effectiveness of the use of dairy cows in highly productive herds of industrial type of foreign and domestic selection, are relevant.

The aim of the research is a comparative study of the effectiveness of the use of cows and reproduction of dairy cattle in the highly productive herds of two breeding plants, breeding cows of domestic and foreign selection. To achieve this goal, the following objectives were defined:

- to study milk productivity, reproductive capacity, duration of productive use and body type of cows of different selection;
- to assess the economic efficiency of milk production and payback of cows of different selection.

## MATERIALS AND METHODS OF RESEARCH

Research was conducted in the period from 2014 to 2018 on the basis of two breeding plants (JSC BP "Agrofirma Dmitrov Gora", CJSC BP "Kalininskoe") for breeding Holstein and Holstein black-and-white breeds of cattle in Tver region.

The herd of breeding plant JSC "Agrofirma Dmitrov Gora" was formed due to the intensive import of Holstein breed cows and heifers from the Netherlands. In the process of breeding the genetic resource of

bulls-improvers of North American Holstein breeding was applied on. For the ten-year period in breeding plant more than 5.5 thousand Holstein breed heifers were delivered.

In CJSC BP “Kalininskoe” the herd is formed by the use of our own local breeding livestock of black-motley breed, which is in the process of selection and breeding work was improved with the use of bulls of Holstein breed, both domestic and imported. At the moment, the breeding stock is represented by high-level animals of the Holstein breed.

The study materials were the data of breeding and zootechnical accounting programs “SELEX-dairy cattle” and “Dairy Comp 305”. All of the digital material obtained during the research was processed by variation statistics with the use of a laptop and a package of applied programs “Excel 2016”, “SPSS Statistics 25” and “Minitab 17”.

Exterior features and body types were determined by the method of linear evaluation, exterior features were measured with a measuring stick and measuring tape. The evaluation of the body type of cows was carried out in accordance with the following methods: “Guidelines for assessing the exterior of cows of dairy and dairy-meat breeds” (2006) and “Rules for assessing the physique of daughters of bulls of dairy-meat breeds” (1996).

**RESEARCH RESULTS.**

In Russia, dairy cattle breeding is currently one of the profitable branches of animal husbandry, and the need for its further development is dictated by meeting the needs of the population in food products of native production [5,12,17].

Dairy herds breeding of two breeding plants have the following livestock: JSC “Agrofirm Dmitrov Gora” - 3509 cows, CJSC “Kalininskoe” - 951 head of dairy herd (tab. 1).

**Table 1 – Milk productivity of cows of different selection**

Indicators		JSC “Agrofirm Dmitrov Gora”	CJSC “Kalininskoe”	Difference
Number of cows, heads		3509	951	-
Milk yield for 305 days, kg		8791±25.4	7546±35.1	1245***
FMF	%	3.97±0.01	3.75±0.01	0.22***
	kg	349±1.2	283±1.3	66***
PMF	%	3.29±0.01	3.19±0.01	0.1***
	kg	289±0.9	241±1.1	48***

Note, here and further: \* -  $p < 0.05$ , \*\* -  $p < 0.01$ , \*\*\* -  $p < 0.001$

Milk yield for 305 days of lactation in JSC “Agrofirm Dmitrov Gora” amounted to 8791 kg, with a fat content of 3.97% and a protein mass fraction of 3.29%. In the second, respectively, 7546 kg of milk with a fat mass fraction of 3.90% and a protein content of 3.26%. Consequently, the milk yield of cows breeding plant JSC “Agrofirm Dmitrov Gora” is higher significantly ( $p < 0.001$ ) than the productivity of the herd breeding plant CJSC “Kalininskoe”.

An important and most effective measure to increase milk production, increase milk productivity of cows is the correct selection of the bull-producer of imported selection and its use to improve milk production and improve domestic breeds [5,12,17].

We analyzed the milk productivity of cows-daughters for the highest lactation depending on the genotype of bulls on kappa casein (CSN3) of bulls (tab.2).

**Table 2 – Milk productivity of daughters for the highest lactation depending on the genotype of bulls on kappa-casein**

Genotype (K-Cas)	n of cows		Number of highest lactation	Milk yield for 305 days high. lactation, kg	FMF		Average daily yield, kg
	head	%			%	kg	
JSC "Agrofirma Dmitrova Gora"							
AA	79	4,9	2,0±0,11	9736±172,2	3,99±0,03	387±6,6	31,9±0,57
AB	1248	76,7	2,0±0,03	9828±48,5	3,92±0,01	385±1,9	32,2±0,15
BB	307	18,9	2,3±0,06	10027±97,5	3,93±0,02	392±3,7	32,9±0,32
average (total)	1627	100,0	2,0±0,02	9861±42,2	3,93±0,07	386±1,6	32,3±0,14
CJSC "Kalininskoe"							
AA	294	40,7	1,7±0,05	8888±136,9** *	3,77±0,01	335±5,2**	29,1±0,49**
AB	254	35,2	2,2±0,07	9526±135,1	3,78±0,12	360±5,2	31,2±0,45
BB	174	24,1	2,2±0,10	9719±189,1*	3,84±0,02*	373±7,9*	31,9±0,62*
average (total)	722	100,0	2,0±0,03	9312±62,4	3,79±0,01	353±2,6	30,5±0,19

In BP JSC "Agrofirma Dmitrova Gora" the vast majority of bulls-producers had the genotype AA – 76.7 per cent. The best results on milk productivity were obtained from cows with the genotype of bulls BB (2.3 lactat.): milk yield for 305 days of lactation was 10027 kg, which is 2.1% higher than the average for the herd; the amount of milk fat – 392 kg, which is 1.5% higher than the average for the herd; the average daily yield is also the maximum - 32.9 kg, which is 1.1% higher than the average for the herd). In BP CJSC "Kalininskoe" most of the bulls also had the genotype AA – 40.7%. Similarly to the above results, the highest rates we observe in the genotype BB: milk yield for 305 days of lactation was 9719 kg ( $p < 0.05$ ), which is 4.2% higher than the average for the herd; yield of milk fat – 373 kg ( $p < 0.05$ ), which is 5.4% higher than the average for the herd, and the largest average daily yield - 31.9 kg ( $p < 0.05$ ), also higher than the average for the herd by 4.4%.

Thus, it can be concluded that the highest milk production in the two breeding plants had cows whose father had the genotype BB on kappa-casein.

**Reproductive qualities of cows of different selection.** Indicators of reproductive ability of cows of different lines in herds of breeding plants were studied (tab. 3).

**Table 3 – Indicators of reproductive ability of cows depending on linear affiliation**

Ancestor line *	Number of cows		Age of first calving, months	Service-period, days	Multiplicity of insemination	ICP, days	Index Doha
	heads	%					
JSC "Agrofirma Dmitrova Gora"							
WBI	2402	68,5	23,4±0,04*	120±1,3	2,5±0,03	405±1,3	49,6±0,01
MC	285	8,1	24,0±0,15**	134±3,8* *	2,7±0,08*	419±3,9**	48,1±0,03** *
RS	594	16,9	23,4±0,14	119±4,2	2,4±0,11	404±4,2	49,6±0,32
STR	228	6,5	23,8±0,08**	137±3,1* **	2,8±0,06***	422±3,1***	48,1±0,23** *
Average (total)	(3509)	(100)	23,5±0,03	122±0,5	2,5±0,02	407±0,7	49,4±0,16
CJSC "Kalininskoe"							

WBI	234	24,6	27,6±0,27*	123±0,9* **	2,1±0,07	405±1,0***	45,4±0,09
MC	504	53,0	28,1±0,18	112±1,2* **	1,9±0,04	392±1,2***	45,8±0,04** *
RS	192	20,2	28,9±0,40	127±1,4* **	2,1±0,03	410±2,3***	43,7±0,07** *
STR	21	2,2	29,1±0,15** *	133±2,3* **	2,4±0,11**	416±4,4***	43,2±0,36** *
Average (total)	(951)	(100)	28,2±0,06	118±0,4	2,0±0,09	399±0,11	45,2±0,11

\* Note: WBI – Wis Burke Ideal 1013415; MC – Montvic Chieftain 95679; RS - Reflection Sovereign 198998; STR - Sealing Trygen Rocket 252803.

Data analysis showed that in the first breeding plant minimum service period was possessed by animal line Reflection Sovereign 198998 – 119 days, and a longer – Sealing Trygen Rocket 252803 ( $p < 0.001$ ). However, the best indicators of the Doha index are observed in cows of the line Wis Burke Ideal 1013415 and Reflection Sovereign 198998 (49.6).

In the second breeding plant minimum service period was possessed by animal line Montvic Chieftain 95679 – 112 days ( $p < 0.001$ ), and the highest – Sealing Trygen Rocket 252803 (133 days significantly at  $p < 0.001$ ). In turn, the best index of fertility observed in cows lines Montvic Chieftain 95679 (45.8 significantly at  $p < 0.001$ ).

According to the results of the study, it can be concluded that in two breeding plants the reproduction rates varied slightly. In the first breeding plant descendants of the line Reflection Sovereign 198998 and Wis Burke Ideal 1013415 and in the second line Montvic Chieftain 95679 have the best indicators of reproductive ability of cows.

#### Duration of productive use of cows of different selection.

The duration of use of highly productive animals largely determines the economic efficiency of dairy cattle and, ultimately, the effectiveness of the improvement of breeds and herds. Premature culling of cows from the herd reduces the reliability of evaluation of animals for productive and breeding qualities, as they have few descendants [16].

The study of the age of disposal of cows (in lactation) showed that in the herd of the first breeding plant the longest period of use is observed in animals of the STR line (2.9 lactation), and in cows-representatives of the other lines the age was 2.2 lactation.

In turn, in a herd of the second breeding plant the greatest duration of use in animals of lines of MC and RS – 3.7 lactation, and the smallest, on the contrary, at representatives of the line of STR – 3.2 lactation. The average duration of use of cows in the two breeding plants, made in JSC “Agrofirm Dmitrova Gora” – 2.2 lactation, and in CJSC “Kalininskoe” – 3.4 lactation, which is 1.2 lactation higher than in the first breeding plant ( $p < 0.001$ ).

The value of lifetime milk yield of cows of different lines mainly depends on the duration of productive use and the number of milking days. The rate of yield per standard lactation in breeding plants was 7191 kg at first breeding plant, and consequently 6442kr milk in the second one. The maximum milk yield for 305 days of lactation and the highest mass fraction of fat and protein in the “Agrofirm Dmitrova Gora” in cows of the RS line (7341 kg of milk, fat - 3.74%, protein - 3.03%), in the “Kalininskoe” also representatives of the RS line (milk yield – 6560 kg, fat - 3.17%, protein - 2.57%).

The highest milk yield in one day of the animal life is in the first farm in the cows of the line RS (10.6 kg) and minimum in cows line STR (8.5 kg); in the second farm the highest milk yield observed in cows lines RS (12,6 kg) and the lowest in cows line STR (10.6 kg).

In terms of the average number of milking days, the superiority of cows of the MC line is observed in the breeding plant “Agrofirm Dmitrova Gora” (387 days), while in the BP “Kalininskoe” cows of the RS line have an average duration of lactation - 349 days.

With a more objective estimate of the duration of productive use of cows in the herds of two breeding plants two groups of cows-analogs of 200 animals in each one with an average lifetime milk yield in the range of 18.5 thousand kg of milk were selected. The group consisted of cows of different selection (tab. 4).

**Table 4– Productive longevity of cows of different selection (n=200; lifetime milk yield =18.5± 3σ thousand kg)**

Selection	The age in lact.	Average daily yield, kg		Milking days	Life expectancy, months
		all life	productive life		
I gr. Import. JSC “Agrofirm Dmitrova Gora”	2,0±0,06	10,2±0,15	21,7±0,25	687±12,3	52,8±0,52
II gr. Nation. CJSC “Kalininskoe”	2,8±0,05	10,3±0,07	22,5±0,23	837±10,0	59,8±0,48
Difference	-0,1***	-0,8	-150*	-7***	-0,1***

On the basis of the conducted research (tab.5) it can be concluded that the animals of domestic breeding (CJSC “Kalininskoe”) reliably in all indicators of productive longevity are superior to their counterparts of imported selection (JSC “Agrofirm Dmitrova Gora”).

**Evaluation of the body type of cows.** Comprehensive assessment and selection of farm animals according to the constitution and exterior in combination with other indicators that most fully characterize their breeding and productive qualities, contribute to the creation of a highly productive herd of the desired type[1,18]

The analysis of the results of the linear assessment of the exterior showed a significant difference between the first-calf heifers of the two herds (breeding).

Cows-heifers of imported selection (JSC “Agrofirm Dmitrova Gora”) outnumbered the cows-heifers of its own reproduction (CJSC “Kalininskoe”) at the most linear characteristics: growth (0.5 points), depth of body (+0.6 points), strength build (+0.5 points), dairy form (+0.7 points), muscled (+0.5 points), angle of the hoof (+0.6 points) and a separate exterior signs characterizing the qualitative properties of the udder (table 5).

However, heifers of the herd from CJSC “Kalininskoe” are not behind cows of imported selection on the grounds of rear legs placement, attachment of the front lobes of the udder, the position of the front teats, the length and the furrow of the udder.

In the classification of cows according to the set of features, the advantage is also saved for the imported animals. The tendency for improvement is strictly maintained in such important classification features as the volume of the trunk (+5.2 points), milk type (+3.4 points) and general appearance (+4.2 points). Cows of own reproduction (herd of CJSC “Kalininskoe”) on the grounds of “legs”and “udder” are not appreciably different from the imported heifers.

In cows of imported selection final evaluation (overall rating - OR) in the classification amounted to 83.2 points. A lower total score was given to animals of domestic breeding – 80.8 points.

In the analysis of the data on the degree of diversity of linear and complex features differences between the estimated herds of heifers can also be seen. Thus, almost all the features of the body type of cows of the herd of JSC “Agrofirm Dmitrova Gora” coefficient of variability is lower than that of the heifers of CJSC “Kalininskoe”.

The strength of the body in the first herd of heifers has a coefficient of variation of 18.9%, and in the second – 22.0%; coefficient of variation of such features as milk forms, respectively, 16 and 20%, muscularity – 23.8 and 29.3%, the attachment of the front shares of the udder – 26.8 and 32.3%, the position of the bottom of the udder – 25.6 and 34.3%. Therefore, the herd of first-calf heifers imported from abroad and belonging to the first breeding plant is more homogeneous in many estimated features.

**Table 5 - The values of the linear and complex exterior characteristics of heifers of different selection**

Linear characteristic		JSC "Agrofirma Dmitrova Gora", n=50		CJSC "Kalininskoe", n=66	
		M±m, point	Cv, %	M±m, point	Cv, %
Height		6,0±0,07	18,5	5,5±0,08	19,4
Depth of the trunk		5,8±0,05	14,9	5,2±0,07	15,5
Strength build		5,2±0,06	18,9	4,7±0,08	22,0
Milk forms		5,8±0,07	16,0	5,1±0,08	20,0
Length of sacrum		5,7±0,04	12,4	5,3±0,06	13,8
Position of the pelvis		5,3±0,08	24,8	5,0±0,09	25,0
Width of the pelvis		5,6±0,06	17,1	5,5±0,08	17,9
Musculature		4,8±0,07	23,8	4,3±0,09	29,3
Rear legs placement		5,0±0,04	12,1	5,2±0,05	14,2
Angle of the hoof		4,7±0,06	21,4	4,1±0,07	24,7
Attaching the front lobes of the udder		4,2±0,08	26,8	4,1±0,08	32,3
Length of the front lobes of the udder		5,8±0,07	16,8	5,3±0,09	20,8
Height of attachment of the rear udder lobes		5,4±0,06	17,7	4,9±0,08	21,1
Width of rear udder lobes		5,5±0,07	20,0	5,1±0,09	22,4
Udder furrow		4,8±0,07	23,1	4,7±0,09	26,1
Position of the bottom of the udder		6,1±0,10	25,6	5,8±0,11	34,3
Location of the front teats		5,1±0,09	22,0	5,0±0,09	25,5
Teats length		5,0±0,06	16,7	5,0±0,08	19,4
Complex characteristics	TV – volume of the trunk	86,1±0,47	9,8	80,9±0,58	14,8
	MT – milk type	83,3±0,45	10,2	79,9±0,60	12,2
	L – legs	86,3±0,47	7,3	85,2±0,46	12,1
	U – udder	81,8±0,45	10,3	80,7±0,64	13,3
	OV – overall view	82,6±0,44	8,8	78,4±0,50	11,8
	<b>OR – overall rating</b>	<b>83,2±0,30</b>	<b>8,3</b>	<b>80,8±0,38</b>	<b>12,6</b>

It should be noted that the evaluation of cows on a set of features has a lower variability than the evaluation of animals for individual linear features. Thus, the degree of diversity of linear features ranges from 12.1 (rear legs placement) to 34.3% (the position of the bottom of the udder), and the complex features from 7.3 (legs) to 14.8% (overall view). This means that the herd is more homogeneous in terms of a set of features. In this regard, the results of linear evaluation are more suitable for selection of bulls for breeding use and consolidation in the herd than the results of classification of daughters by a set of features. To do this, it is advisable to use the linear profile of the bull, which shows on what basis the bull is an improver, and what signs this producer can worsen.

Linear features are characterized by a sufficiently high variability, which makes it possible to carry out the selection effectively in the herds on the most important exterior indicators and to carry out the selection of bulls taking into account their assessment on the exterior of daughters.

Animals that received a rating of 90 points or more, categorized as “excellent”, 85-89 — great, 80-84 - good with plus, 75-79 – good, 65-74 -50-64 satisfactory and bad (tab. 6, Fig.1).

In breeding plants, there are nice animals according to the severity of the specialized milk type. Cow-heifers in herds of two farms differing in genotype differed from each other by their appearance of the physique (height, depth of the body, the manifestation of dairy traits, musculature, etc.).

In the category “excellent” (90 or more points) in the breeding plant of JSC “Agrofirm Dmitrova Gora” 14.0% (7 heads) of the estimated cows, excellent — 24% (12 heads), good with a plus of 32.0% (16 heads) were, and in the breeding plant CJSC “Kalininskoe” the category “excellent” included only 4.5% (3 heads), “great”- 16.7% (11 heads) and “good with a plus” -31.8% (21 heads).

The main reasons for obtaining high ratings on the complex features of imported heifers are, apparently, a careful selection of heifers on the exterior in preparation for sale by foreign breeders and our customers.

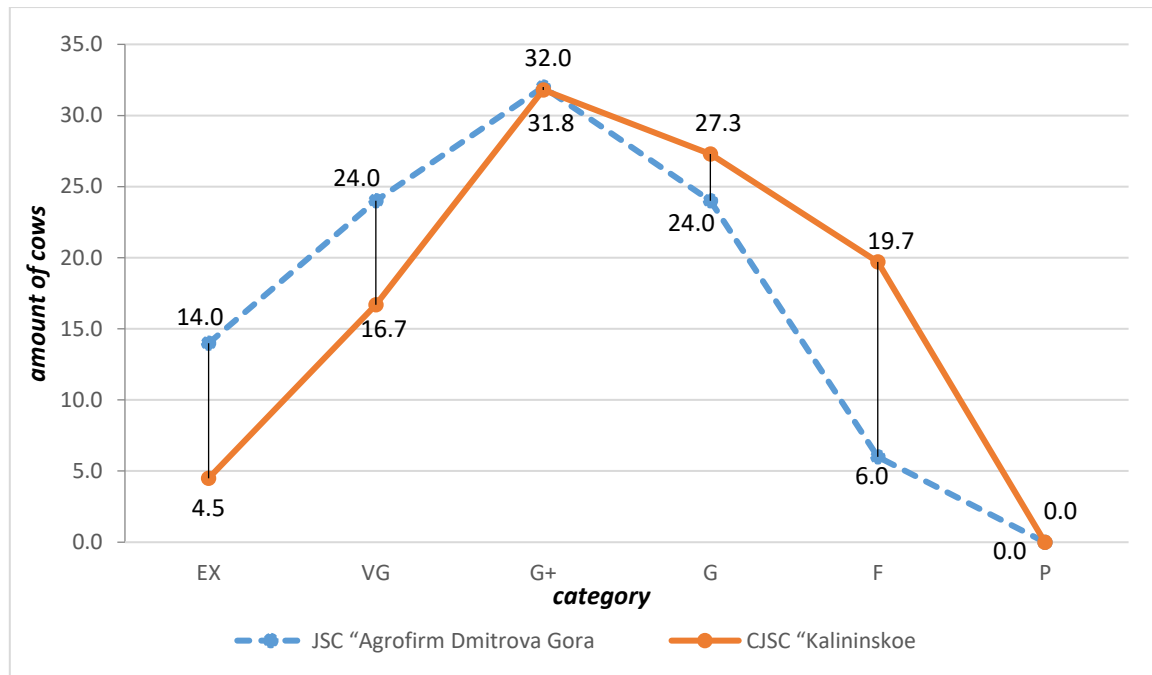
At classifying cows by body type in both farms, the most valued cows are classified as “good with plus” (G+) and “good” (G+). The category “satisfactory”(F) included, respectively, in the first farm only 3 heads (6,0%), and in the second much more - 13 heads (19,7%), which is probably due to the fact that in addition to the influence of “selection pressure”, bulls are used in the herds of two selections, probably without taking into account the assessment of the physique of their daughters.

Evaluation of over 80 points scored cows in the breeding farm of JSC “Agrofirm Dmitrova Gora” - 70% and CJSC BP “Kalininskoe” - 53%.

**Table 6 - Classification of cows of different selection by body type**

Category	Point	JSC “Agrofirm Dmitrova Gora” Mountain»			CJSC “Kalininskoe”		
		Number of cows	% from total amount	M ± m (point)	Number of cows	% from total amount	M ± m (point)
Excellent (EX)	90 и более	7	14,0	93,0 ±0,52	3	4,5	91,6±0,21
Very great (VG)	85 - 89	12	24,0	87,6 ±0,21	11	16,7	86,5 ±0,86
Good with plus (G+)	80 - 84	16	32,0	82,3 ±0,18	21	31,8	82,8 ±0,41
Good (G)	75 - 79	12	24,0	77,4 ±0,12	18	27,3	76,9 ±0,22
Satisfactory (F)	65 - 74.	3	6,0	69,3 ±0,10	13	19,7	67,4 ±0,34
Bad (P)	50 - 64	-	0,0	-	-	0,0	-
Total		50	100	-	66	100	-





**Figure 1. Classification of cows by body type**

During the evaluation of cows' body types, all the shortcomings and features of the exterior were registered. Disadvantages of the exterior, as a rule, have an impact on the level of productivity and reproductive function of animals. Such animals are undesirable for further breeding in the herd. They were recorded separately and, accordingly, reduced points in the final evaluation. In herds of two breeding plants such disadvantages were marked as the most common: additional nipples, the sharp corner of the hooves, weak attachment of the front lobes of the udder, weak ribs and a raised root of the tail.

At present, even many breeding farms do not regularly assess cows by body type. At the same time, the annual selection on the grounds of the exterior makes it possible to increase the share of genetic variability.

**Economic efficiency of the research.** In the conditions of dairy cattle breeding, the problem of formation of production costs is complicated by the specifics of the industry, as the main means of production is a biological object, the state of which, the conditions of development, maintenance, etc. are sometimes crucial for the effectiveness of work [9].

Realization of the genetic potential of dairy cattle increases its profitability and reduces production costs. In the conditions of two breeding plants, we also analyzed the effectiveness of importation of imported cattle and the use of domestic animal reproduction (tab. 7).

**Table 7 – Payback of expenses on cultivation (purchase) of dairy cattle in two breeding plants**

Indicator	Breeding plant		
	JSC "Agrofirma Dmitrova Gora"		CJSC "Kalininskoe"
	Own reproduction	Imported cattle	
The costs of growing a cow from birth to first calving, rub.	99320	-	104120
Purchase and maintenance costs to calving on imported heifers, rub.	-	149000	-
Payback on the results of the first lactation, %	112,1	74,7	118,0
Full cost recovery in lactations	0,89	1,34	0,85
Profit from the cow for the entire period of use, rub.	142995	55680	272784

At the similar level of feeding and the maintenance in two breeding plants the period of cultivation of a heifer is the most expensive. Thus, in the breeding plant of JSC "Agrofirma Dmitrova Gora" the cost of growing one animal of its own reproduction to the first calving is 99320 rubles, in the breeding plant CJSC "Kalininskoe" similar costs are 104120 rubles, that is, the difference is insignificant. However, the practice of importing heifers in the first breeding plant showed that in addition to the cost of heifers (123000 rubles), the cost of four months of maintenance cost the plant 26,000 rubles, thus the total cost of purchase, transportation, quarantine and maintenance to calving of imported heifers in the plant is 149,000 rubles. After the first calving, from the beginning of milking comes the period of cost compensation, taking into account the average annual purchase price of milk 28 rubles and its cost 16.4 and 15.2 rubles, respectively. According to the results of lactation of heifers, excluding offspring, profit in JSC "Agrofirma Dmitrova Gora" was 111360 rubles., which fully pays for the cost of growing heifers of own reproduction, including 12.1% profit, and the payback of imported animals is only 74.7%. In the second breeding plant CJSC "Kalininskoe" costs are fully recovered, including the extra 18% profit.

The payback of the costs on imported heifers comes only through 1.34 lactations. Profit for the period of operation of the animal before disposal without regard to profits from the by-products from meat and offspring, is from cows of the first breeding plant (if profitable period is 1.32 lactations) own reproduction – 142995 rub., from cows of imported reproduction (if profitable period is 0.52 lactation) – 55680 rub. and cows from the second breeding plant (if profitable period is 2.22 lactation) -272784 rub.

Thus, it can be concluded that the import of imported cattle without a sharp need at a shortage of own resources is low payback.

#### CONCLUSION

In highly productive herds in the conditions of industrial technology for the purpose of optimal reproduction of herd and increase of efficiency of milk production it is economically expedient to use Holstein cows of domestic selection as more adapted and adapted to natural-climatic and fodder conditions of Tver region, and at shortage of own resources, and also at the expanded reproduction of herd it is necessary to import breeding animals from abroad.

#### REFERENCES

- [1] Biological and organizational aspects of reproduction of dairy cattle: a manual / V.Yu. Kozlovsky [and others]. – Velikie Luki: Publishing house "Velikolukskaya State Agricultural Academy", 2012. - 216 p.
- [2] Bolgova N.V. Efficiency of selection in cattle breeding using bulls-producers of the world gene pool // Actual problems of intensive development of animal husbandry. – 2014. – № 2. – p. 33-39.
- [3] Bykadorov P.P. Analysis of determination of environmental and genetic factors of dairy cattle / P.P. Bykadorov, V.Yu. Afanasenko // Innovative ways of import substitution of agricultural products: mater. of International scien..- pract. conf. – Persianovsky, 2015. - p. 6-12.
- [4] Bykadorov P.P. Analysis of factors influencing the development of economically useful features of dairy cattle of different origin. Bulletin of Voronezh State Agrarian University. – 2017. - № 2 (53).–74-78.
- [5] Babaylova G.P., Kopaneva Yu.V., Kovrov A.V. The influence of different factors on milk production of Holsteins cows of black-motley breed // Modern Science Success. - 2017. – Vol.1. - №6. - P. 146-149.
- [6] Genetic factors affecting the reproductive quality of dairy cows / M.N. Lapin [et al.]. // Husbandry. - 2008. - № 7. - p. 4-5.
- [7] Dunin, I.M. Selection and technological aspects of dairy cattle breeding development / I.M. Dunin, H.A., Amerkhanov // Husbandry. - 2017. - № 6. - P. 2-8.
- [8] Ivanov, V.A. Breeding animals for herd maintenance in intensive dairy cattle / A.A. Ivanov // Husbandry. - №6. - 2016. - P. 11-14.
- [9] Kruglyak O.V. Increase of efficiency of cost management in dairy cattle / O.V. Kruglyak, I.S. Martynyuk, V.N. Semchak // Actual problems of intensive livestock development. - 2018. - № 2. - p. 364-370.
- [10] Karaeva Z.M. Peculiarities of organization and management of establishment and development of large meat-cell complexes // Modern Science Success. - 2017. - Vol. 5. - № 3. - P. 141-145.
- [11] Lozovaya, G.S. Safety and productivity of imported cattle in the conditions of Belgorod region / G. S. Lozovaya, V.I., Tsys, A.M., Chekushkin // FARMANIMALS. -2014. - № 2 (6). - P. 66-71.

- [12] The breeding of Holstein and black-motley breeds cattle in the farms of Russia, Central Federal district and Tver region / N.P. Sudarev, G.A. Sharkaeva, M.E. Zhuravlev et al. // Husbandry. 2015. No. 2. P. 7 – 8.
- [13] Sinyakov, S.S. Efficiency of breeding of black-and-white cattle of import and domestic selection in the conditions of industrial production / RAAS. - 2013. - P. 2-4.
- [14] Sudarev, N. Preference for domestic Holstein / N. Sudarev, D. Abylkasymov, T.Shchukina, A. Metkin // Farming of Russia. - №8. -2009. - P. 49.
- [15] Sudarev, N. Restraining factors of reproduction in highly productive dairy cattle breeding / N. Sudarev, D. Abylkasymov, M. Kotelnikova, A. Romanenko // Dairy and beef cattle. - №1. -2012. - P. 19-20.
- [16] Zavivaev S.N., Danilov D.Yu. Increase of the productive longevity of dairy cows for the purpose of effective use for the production of livestock products // Modern Science Success. - 2017. - Vol. 2. - №4. – P. 135-138.
- [17] Sharkaeva G.A., Sharkaev V.I. The potential of the breeding base of imported dairy cattle in the Russian Federation. Husbandry. 2016. No. 1. P. 2 – 4.
- [18] Yakovleva S.E. The influence of exterior indicators and the type of constitution on the level of milk productivity of cows of black-motley breed / S.E. Yakovleva, S.I. Shepelev, E.A. Lemesh // Actual problems of intensive livestock development. - 2018. - № 1. - p. 11-16.