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Acclimatization of Holstein Cows of German and Slovenian Breed under Different Conditions Formation of Productivity and Breeding Qualities in the Process

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Abstract: The article presents the results of the manifestation of productive qualities, the exterior and some biological features of imported cows of the Holstein breed of German and Slovenian breeding in the hot climate of Uzbekistan.

Keywords: reproductive, pedigree, productive, lightly types of building, norms and rations, acclimatization.

Relevance of the topic. In the strengthening of the cattle breeding base in the republic, it is of great scientific and practical importance to establish reproduction farms at the expense of the imported Holstein breed, to demonstrate their acclimatization characteristics and productivity qualities.

It is known that the import of breeds improving the hot climate of Uzbekistan from European countries, their pure breeding and the effective use of productivity potential have a negative effect (Sh. Akmalkhanov, 1993; U.N. Nosirov, 2001). That's why it is important to form fertile breeding herds to adapt them to hot climate conditions.

Object and methods of conducting experiments. Experiments were carried out at the "Azizjon" breeding farm, Kybrai district, Tashkent region, with imported animals of the Slavic and German Holstein breeds. Optimizing storage and feeding conditions were established to show their productive genetic potential, and negative stress factors were prevented. Storage methods, feeding rates and rations specific to the nature and productivity of animals were used. Milk yield and lactation activity of cows were studied under optimized conditions of summer and winter.

Experimental results. The experimental cows were housed in tall, wide, light-type buildings with natural ventilation typical of the Israel State Farms Livestock Project. Buildings are 8-9 m high, next 30 m, and 60 m long, and differ in ventilation, coolness, cleanliness. It is useful in creating normal weather conditions for the summer period. But in the winter, when the weather is very cold (-10-15 ^{0} C), a negative situation occurs inside the building. Therefore, these conditions showed their positive and negative effects on the physiological condition and productivity of cows.

These factors were balanced by adequate feeding of cattle. The same type of feeding norms and rations in summer and winter period were adapted to the norm of maximum milk yield.

It is known that the manifestation of productivity qualities of cows with similar genotypes in the new climate depends on their individual characteristics. Therefore, we studied the manifestation of milk productivity during the acclimatization of the experimental cows. Their productivity indicators have been shown at different levels. The influence of past factors in the priority of external environmental conditions had a negative impact on the manifestation of the heredity of animals.

Heat and cold tolerance characteristics of Holstein cows

Since 1940, when purebred cattle were brought to Uzbekistan from European republics, experiments on heat tolerance have been conducted on them. Warm weather affects different breeds and their

representatives in different ways. The level of its effect is determined by the heat resistance index. Yu.O. Rauschenbach recommended the following formula for its determination: IChI=2(0.6t $_2$ - 10dt+26).

We also determined the heat tolerance indices of the experimental cows using this method and formula.

Their clinical indicators were studied in the summer months of August. They corresponded to II-III months of lactation of cows.

Table 1. **Clinical and heat tolerance indicators of Holstein cows in August X±S $_x$**

Indicators	Term	Slovenian Holstein cows (I-lactation)			German Holstein cows (II-lactation)		
		Experimental groups (n=5)			Experimental groups (n=5)		
		I	II	III	I	II	III
Body temperature, ^{0} C	in the morning	38.36±0.5	38.32±0.5	38.46±0.4	38.48±0.4	38.52±0.4	38.38±0.4
	in the dream	38.84±0.5	38.90±0.6	39.44±0.4	38.98±0.4	39.1±0.9	39.40±0.6
Breathing, times/minute	in the morning	38±0.71	37±1.1	39±1.0	39±0.74	40±0.81	41±0.75
	in the dream	40±0.81	43±1.3	46±1.1	44±0.51	47±0.51	46±0.81
Beats, times/minute	in the morning	74±0.81	70±1.24	72±1.7	66±0.6	68±0.68	74±1.28
	in the dream	82±0.29	76±1.22	78±1.0	75±0.24	76±0.18	83±1.70
Heat resistance index (IChI)		88.76	86.20	79.88	89.20	87.00	78,76

Outdoor temperature: in the morning (outdoors) -20 ^{0} C in the afternoon (indoors) -30 ^{0} C

Air humidity: in the morning (outdoors) - 28%, in the afternoon (indoors) - 22%.

These air temperatures and relative humidity are higher than the critical indicators of cows, and the negative effects are not completely prevented. The air velocity inside the building was not even 1.5 m/sec. Therefore, it is acceptable to install fans inside the building and use them in the months of May-September, like the Israeli technology.

In the summer months, the rising air temperature and increasing solar radiation affected the physiological characteristics of cattle. Their body temperature, respiration and pulse rate increased in the afternoon compared to the morning. The level of this increase was different in the cows of the experimental group with different phenotypic manifestations. In particular, in group I of Slovenian Holstein cows, the body temperature increased to 0.48 ^{0} C, respiration rate increased to 2 times/minute, and articulation increased to 8 times/minute, while in group II it increased to 0.58 ^{0} C, 6, 6 raand in group III 0 ,98 ^{0} C, 7 and 6 times/minute is observed. These indicators were 0.50 ^{0} S, 5 and 9 in group I, 0.60 ^{0} S, 7 and 8 in group II and 1.02 ^{0} S, 5 and 8 in group III in 9 raGerman Holstein cows (II-lactation), respectively. . If the increase in the rate of breathing and joint beating was relatively the same in the experimental groups, there was a difference in the increase in body temperature. These differences were more evident in their heat resistance indices.

A group of cows with a high level of phenotypic characteristics has priority with heat resistance characteristics. In particular, the heat tolerance index of Slovenian Holstein cows (I-lactation) is equal in I-group 88,76 ra, II-group 86,20 raand III-group 79,88 ra. In German Holstein cows (II lactation) it was 89.20, 87.0 and 78.76, respectively. The difference between them is 2.20-2.56, 6.32 8,24 ra. Difference between groups I-III was 8.80-10.44.

Therefore, heat tolerance qualities also had an effect on milk production of cows.

Therefore, the genetic potential of cows for productivity in warm climates is related to the positive combination of genetic stability and heat resistance qualities, metabolic rate and breeding.

We studied the hematological indicators of the cows in the experimental groups in the summer and winter months in order to determine the metabolism, oxidation-regeneration processes (Table 2).

Table 2. Hematological indicators of Holstein cows in winter and summer months ($X \pm S_x$)

Indicators	Slovenian Holstein cows (in I-lactation)		German Holstein cows (in II-lactation)	
	In the summer (n=4)	In winter (n=4)	In the summer (n=4)	In winter (n=4)
Hemoglobin, g/%	12 , 4±1.39	8.2±0.29	12.3±0.83	9.9±0.42
Number of erythrocytes, million/mm ^{3}	6.32±0.22	5.70±0.26	6.03±0.19	5.0±0.22
Number of leukocytes, thousand/mm ^{3}	7.70±0.31	6.5±0.49	7.67±0.19	6.6±0.34

As can be seen from the table, the hematological indicators of cows in the summer months are superior compared to the winter period. This difference is observed especially in the amount of hemoglobin and the number of erythrocytes.

In the summer months, i.e. in the first months of cows' lactation, the metabolic process (hemoglobin content equals 18.3-18.4 g/%) and oxidation-regeneration processes also took place at a high level (the number of erythrocytes 6.03-6.32 million/mm ^{3}) . During the second half of the cows' lactation in the winter months, metabolism, oxidation-regeneration processes decreased by 6.4-7.2%, and the number of erythrocytes decreased by 0.60-1.00 million/mm ^{3} .

But although the number of leukocytes is relatively different in summer and winter months, their indicators are close to each other. That is, the qualities of protection from the external environment have been preserved. Therefore, hematological indicators also had a positive effect on the manifestation of milk productivity of cows in the summer months . This is evidenced by the high rate of metabolism and the oxidation-reduction process.

We studied the effect of winter climatic conditions on the body of moles on their clinical indicators (Table 3).

Table 3. Clinical indicators of Holstein cows in winter

Indicators	Slovenian Holstein cows (in I-lactation)		German Holstein cows (II-lactation)	
	morning (n=4)	at noon (n=4)	morning (n=4)	At night (n=4)
Body temperature, ^{0}C	38.6±0.1	38.5±0.17	38.4±0.15	38.3±0.06
Breathing rate in beats/minute	36.7±3.19	35.2±0.07	40.5±2.3	38.2±0.5
Joint beat rate, times/minute	78.5±2.99	75.5±1.04	78.5±0.95	76.2±0.5

As can be seen from the table, the clinical indicators were relatively lower in the afternoon compared to the morning, but were kept close to each other. It is observed that the body temperature of cattle rises even though it is small in the cold night air temperature of winter. These indicate the properties of protection against cold.

Formation of phenotypic qualities of imported Holstein breed cows with similar genotypic adaptation to climate

It is known that the manifestation of phenotypic qualities of productivity of cows with similar genotypes in new climatic conditions depends on their individual characteristics. Therefore, we studied the manifestation of milk productivity during the acclimatization of the experimental cows. Their phenotypic indicators were manifested in different degrees. Even though the genotypic parameters mentioned above are relatively similar, the heredity passed from the ancestors'

generations to generations was not shown at a stable level. The influence of past factors in the priority of external environmental conditions had a negative impact on the manifestation of the heredity of animals. Genotype-environment interaction force revealed individual phenotypic indicators of animals.

Manifestation of milk productivity in the process of acclimatization of tested Holstein cows in the interaction of genotype and environment is presented in the following table.

Cows with high, medium and low phenotypic indicators are characteristic of different bull systems and similar genotypes, and the milk yield that formed them differed from each other at a high level of accuracy (P>0.999).

Table 4. Formation of milk productivity of Holstein cows during acclimatization ($X \pm S_x$)

Indicators	Slovenian Holstein cows			German Holstein cows		
	Groups according to the formation of phenotypic indicators			Groups according to the formation of phenotypic indicators		
	I (high)	II (intermediate)	III (low)	I (high)	II (intermediate)	III (low)
Number of goods, n	13	14	14	13	12	12
Lactation	I	I	I	II	II	II
Milk yield, kg	7563.4±96.9	6092.0±119.4	4832.3±80.9	7354.3±172.2	5587.5±125.8	3823.6±2
Fat content, %	3.96±0.09	3.88±0.05	3.81±0.06	4.09±0.06	4.08±0.05	4.07±0.0
Milk fat, kg	299.5±8.02	236.4±5.30	184.1±4.97	300.8±8.80	228.0±6.28	155.6±7.0
Live weight, kg	561, 8	541.2	532.5	602.7	596.8	580.1
Dairy coefficient	1346.2	1125.6	907.5	1220.2	936.2	659.1

In particular, the milk yield of Slovenian Holstein cows in I-lactation group I (highly expressed) was 1471.4 kg or 24.1% higher than that of group II (moderately expressed) (P>0.999), than that of group III (lowly expressed).) is 2731.1 kg or 56.5% higher (P>0.999). Differences in milk fat were 116.2 and 63.1 percent, respectively (P>0.999). The difference of these parameters in German Holstein cows was 1766.8 kg or 31.6 % and 3530.7 kg or 92.3 % respectively (P>0.999). Cows in these groups had similar live weights and 100 кгproduced different amounts of milk per live weight. In particular, in groups 1347,7 кгof Slovenian Holstein cows , 1125.3 and 907,5 кг, respectively, in German Holstein cows 1220,8 кг, 936.2 and 659,1 кг.

It is observed that the coefficient of milk yield is higher in Slovenian Holstein cows compared to German Holstein cows.

By comparing the milk yield of the tested Holstein cows with the indices of their mothers and the indices of the maternal ancestors, we determined the degree of differentiation or the norm of the manifestation of the productivity of the ancestors in the indices of the offspring (Table 5).

Table 5. Holstein cows show milk yield relative to maternal and sire indices

Indicators	Slovenian Holstein cows			German Holstein cows		
	Groups according to the formation of phenotypic indicators			Groups according to the formation of phenotypic indicators		
	I (high)	II (intermediate)	III (low)	I (high)	II (intermediate)	III (low)
Exposure to maternal indicators, %						
Milk milk	79.3	71.5	50.0	82.7	71.5	43.7
Milk fat	78.9	71.2	51.2	87.6	71.2	46.4
Manifestation relative to Ancestry Index, %						
Milk milk	74.5	63.9	47.1	75.1	63.9	40.3
Milk fat	74.5	62.8	47.3	79.2	60.1	39.9

As can be seen from the data in the table, cows imported to other climatic conditions gave less milk compared to their ancestors. It is observed more in all groups and especially in group III. Even when optimal storage and feeding conditions were created, the imported offspring could not reach the performance level of their maternal ancestors.

These are highlighted in the research results of a number of scientists. But some cows in the experiment had much higher milk fat than their mothers. In particular, the milk fat of Slovenian Holstein cows numbered 32353 and 93833 was 102 and 117 percent compared to that of their mothers. In German Holsteins, cows numbered 21346 and 37703 are 105 and 115 percent higher. They gave milk from 7200-8040 kilograms, milk fat equals 298-364 kilograms. The mothers of their mothers were dairy (10054- 13340 кг) and buttermilk (4.03-4.85%), and their fathers belonged to the category of high "improver".

The genetic stability embodied in the positive genetic combination of ancestors showed its positive effect even under the influence of the external environment in cows that showed high productivity characteristics. This positive heredity effect may have been relatively weak in cows exhibiting relatively low productivity. Therefore, cattle with good genotypes should be selected from among good phenotypes in selection work.

Productive herds were formed based on the selection of high-phenotype cattle from imported cattle.

According to the results of our experiments, Slovenian Holstein cows of group I achieved the productivity index of their mothers by 78.9-79.3%, while those of group II reached 71.2-71.5%. These indicators were 74.5 and 62.9 percent compared to the ancestral index. Indicators in group III equaled only 50.0-51.2 and 47.1-47.3 percent, respectively. The above cases are also observed in groups of German Holstein cows. Group I was dominant in their indicators compared to Slovenian Holsteins (82.7-87.6 and 78.9-79.3 and 75.1-79.2 and 74.5%, respectively), and equal indicators were shown in group II. has been The superiority of Slovenian Holsteins in III-groups is obvious (respectively at 50-51.2 and 43.7-46.4 and 47.1-47.3 and 39.9-40.3 %).

Taking into account the food consumption by groups, 1 кг0.94-0.98 food units were used for milk production in group I, 1.08-1.09 in group II, and 1.07-1.15 food units in group III. The feed unit spent on cows in group I was 7120 in Slovenian Holstein cows and 7190 in German Holsteins, 6669 and 6013 in group II, 5156 and 4382 in group III.

In the type of feeds consumed, concentrate feeds corresponded to 44.1 and 43.6% in groups I, 47.0 and 52.2% in groups II, and 61.0 and 71.1% in group III. Concentrates were the main part of the consumed feeds. Formulated feeding rations are aimed at feeding the cows as much as they want, and this activity has had a positive effect in identifying cows with a high phenotype.

Thus, the creation of optimal storage and feeding conditions for imported cattle, as well as the correct use of milking techniques, the selection of daily measures to protect against the negative effects of the weather, will make it possible to increase the productivity of cattle.

Conclusion. Thus, in the harsh continental climate, Holstein cows show their genetic potential for productivity, improve breeding reproductive herds and form a group of cattle with high genotypes, import improving Holstein cows from developed countries, create modern technological storage and feeding conditions for them, and cows in the I and II lactations. when testing for milk yield, cows with similar genotypes are distinguished into three types of high, medium and low phenotypic groups; although optimal storage and feeding conditions were created, the sharp continental climate changes had different effects on the formation of individual breeding and productivity qualities of cattle; Slovenian and German Holstein cows in the I and II lactations of high phenotype cows expanded the herd selection group and averages of the breeding nucleus; the weight of cows with a low phenotype corresponded to 33-35%, cows with this characteristic are weaned and removed from the herd in the I-lactation in developed countries.

References:

1. Decision of the President of the Republic of Uzbekistan, Decision No. PQ-5017 dated 03.03.2021. On additional measures for further state support of livestock industries.
2. Decision of the President of the Republic of Uzbekistan, Decision PQ-120 dated 08.02.2022. On approval of the program for 2022-2026 on the development of the livestock industry and its branches in the Republic of Uzbekistan.
3. Akmalkhanov Sh.A. Biological and zootechnical principles and introduction of dairy farming in Uzbekistan. Tashkent. "Cocktail", 1993.
4. Nosirov U.N., Maksudov I., Khamrokulov R., Dosmukhamedova M. Scientific and practical basis of transferring cattle to the same feeding type and increasing productivity. Zooveterinaria, No. 1, 2010, B. 29-34.
5. Nasyrov U.N., Shakirov Q., Mamtaliev Sh. Genotype-environment and development of productive potential import hay and conditions of hot climate in Uzbekistan. // "Zooveterinaria", J., No. 4, 2015, S. 31-32.
6. Nosirov U.N., Maksudov I., Dosmukhamedova M.Kh., Kholmatov A., Nasrullaev I. Breeding and productivity traits of German Holstein cows. Res. Proceedings of the scientific conference. Part I. Tashkent, 2010. B. 170-171.
7. Rauschenbach Yu.O. O prirody ustoychivosti selskohozyyastvennyx jivotnyx k spetsificheskim faktoram sredy. Tr. Soviet po biologicheskim osnovam povyshenia produktivnosti jivotnyx. M. Izd. 1952. 271 p.
8. Rauschenbach Yu.O. O prirody ustoychivosti selskohozyyastvennyx jivotnyx k vysokoy temperature sredy. V sb. Physiologically functional regulation of experience. T. IV . Izd. M-l., 1958. 218 p.
9. Rauschenbach Yu.O. Physiologicheskie osnovy selektsii jivotnykh na ustoychivost k usloviyam jarkogo klimata. V sb. Regulation of the metabolism of the body and other functions of the organism and the environment at high temperatures. Krasnodar. 1960. S. 209.
10. Sh akirov Q. J Sovershenstvovanie plemennyx i produktivnyx kachestv, adaptatsii holshtinskoy i flagfix simmenitalskoy porod v usloviyax to Uzbekistan . Abstract diss. doc. s/x nauk. - Tashkent, 2016. - S. 37-39.