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MOLDOVAN TYPE OF BLACK-MOTLEY CATTLE

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Abstract

The object of research was the cattle of dairy production. In the Republic of Moldova to the early 80-ies of the last century were used Red Steppe and Simmental cattle breeds that have a low potential for milk production, poor adaptability to machine milking. The material is animals, which was converted to the type of high-yielding dairy cattle. The transformation was carried out by cross-breeding cows the Red Steppe and Simmental bulls with black-and-White and Holstein breeds. The purpose was to study the effectiveness of selection for a new breed of dairy cattle. As a result of breeding hybrids of different genotypes it was found that they had an average milk production advantage the cows local breeds. On the efficiency of the selection process in the dairy farming is evidenced by the fact that by the end of the third stage of launch a new type in the country for 550 farms and complexes average milk yield per cow per year was 3500 kg of milk and in 51 - more than 5000 kg. Yield of milk from one cow in all categories of farms reached 4016 kg of milk.By 2000, the program for launch a new type has been completed, and in 2008 was approved Moldavian type of black-and-white cattle. In the alelophond of a new type of bulls in locus AEB prevails genetical markers $G_2Y_2E'_1Q'$, G_2Y_1D', G_1I_1, I_2, O_1, B_2G_2, $B_2O_1Y_2D'$, B_2O_1, $B_1O_3Y_2A'_2E'_1P'Q'G''$, $Y_2E'_2G'O'$, Q', E'_3, E'_3Q', I' .

Keywords**:** *alleles, body measurements, cattle, hybrids, new type of cattle.*

INTRODUCTION

In the province of Bessarabia, in pieces, which is now the territory of Moldova, primordial breeds of cattle were Simmental and Red Steppe, and in more remote times bred gray Bessarabian steppe cattle.

Red Steppe breed was formed in the late 19th and early 20th century, in the south of Ukraine and Moldova of the German population of red cattle imported by colonists. Red steppe cattle for a body type are typical of dairy breeds. It is well adapted to local, tough enough climatic and fodder conditions. Animals of Red Steppe breed, bred in the country, distinguished by low milk production. Thus, according to appraisal of cows (1975-1979 years) at 62661 cows milk yield per I lactation amounted 2816 kg of milk with fat content 3.68%.

Simmental breeds. Animals of this breed were imported into Bessarabia from Switzerland - the birthplace of the breed. Under the influence of specific local conditions of feeding and management, and as a result of cross-breeding with local Bessarabian gray cattle he purchased some of the features distinguishing it from Simmental cattle in other countries. Cattle of this breed have a great diversity of types (coarse, medium and soft) and well adapted to local conditions. The area of its distribution is the farms of the northern zone of the country.

Signs of milk yield of Simmental cows are expressed medium. Productivity of young cows in the farms of the republic for 1970-1975, reached 2692-2711 kg of milk with fat content of 3.61-3.66%. Under high level of feeding into force of the combined productive direction at cows of this breed often comes obesity that entails a reduction of milk yield.

Addition to the above species in the country are widely used other breeds of cattle, which at the beginning of 80th years of the last century had a low potential for milk production, poor adaptability to machine milking, making them unsuitable for the industrial management of dairy cattle breeding industry. Therefore, the Government of the Republic decided on the industrialization of dairy farming industry in

connection with which any number of problems, one of which was the creation of a population corresponding the conditions of industrial milk production technology, which is a new type of breeding animals.

MATERIALS AND METHODS

The conversion of low productivity of local Red Steppe and Simmental breeds in the type of high-yield dairy cows were conducted by cross-breeding with the best global gene pool of specialized breeds of dairy productivity - Black-and-White and Holstein. Employees of laboratory breeding technology and exploitation of cattle was developed program breeding animal populations of the "northern" and "southern" zone subtypes of Moldavian-type black-and-white cattle (The program launch Moldavian black and white breed of cattle, 1985) and the materialization of this process - the importation of seed material and producers of black-and-White and Holstein breeds.

The purpose was to study the effectiveness of selection for a new breed of dairy cattle.

Blood samples from the animals, the assay of hemolysis of erythrocytes, and the study of blood groups was performed by the standard technique, 1983. Blood group determined hemolytic test using 49 reagents of cattle, unified in international comparative tests, which detect antigens controlled by allelic genes 9 genetic systems. Frequency of antigens and alleles EAB locus (q) determined the standard method, (Merkuryeva et al., 1983). The materials obtained were treated on a personal computer.

RESULTS AND DISCUSSION

The experience of industrial complexes showed that their performance is dependent on a number of factors, among which one of the most important is the presence of animals that are highly productive, ability of well-paying food, long maintain high productivity.

In terms of industrial technology from an economic point of view the breeding of cows with the productivity less than 4.0 thousand kilograms of milk per year is not justified.

The breeding program of Moldavian-type black-and-white cattle with two subtypes of zonal "northern" and "southern" was of incremental and for each of which pose a particular challenge. Already in the early stages of the breeding program was found on milk yield advantage in F1 hybrids of different genotypes in comparison with the original (parent) species (Table 1).

Table1. Approbation of the productivity of cows of different genotypes

Breeds and breed	Number of cows	Productivity		
		Milk yield, kg	Fat	
			%	kg
Red Steppe, purebred	2105	2991	3.74	111.8
Red Steppe × Black-and-White, F_1	1839	3192	3.63	117.5
The difference (±) in favor F_1	-	201	-0.06	5.7
Simmental purebred	467	2529	3.63	91.8
Simmental × Black-and-White, F_1	1087	3136	3.63	113.8
The difference (±) in favor F1	-	607	0	22.0
Simmental × Holstein, F_1	1116	3385	3.60	121.8
The difference (±) in favor F_1	-	856	-0.03	30.0
For all the initial breeds	2572	2907	3.72	108.2
For all F_1	4042	3230	3.64	117.4
The difference (±) in favor F_1	-	323	-0.08	9.2

The analysis showed that hybrids F_1, as the Bulls of Black-and-White as well as Holstein breeds, on average, a dairy cow productivity advantage over native species. The fat content in the milk of several hybrids below without significant difference, and the output fat of milk in all variants the higher have hybrids.

As a result, hybrids breeding of different genotypes in 1985 the average milk yield per cow was 3420 kg milk in a number of breeding farms have been bred herds with a yield of 4.0-

4.5 thousand kg of milk, and in the breeding groups - 5,0-5,5 thousand kg of milk per cow with fat content 3.7-3.9% with 3-3.3% protein.

About the effectiveness of the selection process in the dairy farming is evidenced by the fact that by the end of the third stage of breeding a new type in the country in 550 farms and complexes average milk yield per cow per year was 3.5 thousand kg of milk and in 51 - more than 5.0 thousand kg. The dynamics of the milk production of a new type of animals at different stages of its elimination is presented in Figure 1.

As can be seen from the material presented at the maximum efficiency of a new type of animal was in the third stage.

During this period in the country produced 1.548 thousand tons of milk, and the milk yield per cow, as seen in the figure, in all categories of farms reached 4016 kg of milk, milk production per inhabitant of the republic amounted to 353 kg.

By 2000, the launch program of a new type has been basically completed, and in 2008 was approved by the Moldavian type of Black-and-White cattle with the contents of Holstein genes in the "northern" zonal subtype 75-87.5% and the "southern" - 62.5-75% respectively (Table 2).

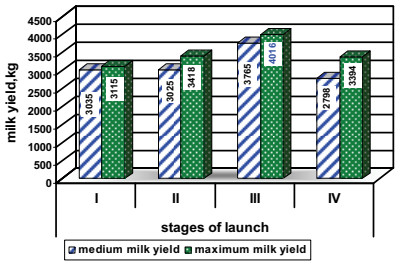

Figure 1. Milk production of the cows in different stages of launch of the Moldavian type of black-and-white cattle

Table 2. The main parameters of cows' zonal subtypes of the Moldavian type of Black-and-White cattle

Indicators		Zonal subtypes	
		"northern"	"southern"
The genetic potential for milk production		7000-8000	6000-7000
The actual milk yield and fat content per lactation:	1st lactation	5070 – 3.63%	4420 – 3.72%
	Third lactation and older	6340 – 3.67%	6200 – 3.79%
Live weight:	heifers 18 months	400 kg	380 kg
Cows:	1st lactation	550 kg	500 kg
	Third lactation and older	600 kg	550 kg
Form of udder		Bath-shaped, rounded	Bath-shaped, rounded
Speed of milk let		1.8-2.0 kg/min	1.8-2.0 kg/min
Height at withers, cm		133-135	132-134

The animals of the new type - dairy production. The cows head is clearly defined, proportional to the body, a broad nasal mirror, moderately concave forehead, limbs correctly placed, the hoof has an optimal angle setting 43.7˚.

The high-altitude measurements of body of cows "southern" zone subtype 132-134 cm, the "northern" subtype - 133-135 cm, (Smirnov et al., 2007). Chest width the shoulder blades – 42.7-42.9 cm, the depth of the chest – 68.4-68.0 cm, width at the hip joints – 46.8-46.7 cm, respectively, the "northern" and "southern" subtypes. The length of the body 150.4-151.1 cm and girth of the metacarpus - 18.1 cm. The udder with a large margin tightly attached and balanced development of the teats of medium length and thickness. Animals of the new type are well suited for use as industrial complexes, and in the farms.

One of the most important elements in creating Moldavian type Black and White cattle was to study its genetic structure.As a result of a detailed analysis of the antigen spectrum of blood group found that crossbred animals on the basis of Red Steppe (Table 3) in the dynamics of generations the concentration of antigens Y_2 , P ', G "(B - system), R_2 (C - system) gradually decreased from 56.6 to 54.0 %, from 28.5 to 5.3 %, from 35.1 to 12.7 %, from 57.4 to 25.5 % (agrofirm "Friendship") and from 47.8 to 44.5 %, from 36.0 to 18.5 %, from 21.7 to 15.4 %, from 52.2 to 30,8% (STE

"Maximovca") respectively. Conversely, the frequency of antigen G_2, G_3, E'_2, O', D' (B - system), X_2 (C - system), M (M - system) with increasing of blood on black-motley breed grew. Thus, the number of carriers antigen G_2 increased from 13.7 to 38.1 and 42.0 %; O_1 antigen from 1.9 to 20.0 and 26.4, M antigen from 0.0 to 8.5 and 9.2 % respectively in the standard of herds agricultural firm "Friendship" and experienced department STE „Maximovca".

Table 3. Genetic features of hybrids on the basis of red steppe dynamics for some generations antignam,%

System	Antigens	Red Steppe breed	Agricultural firm "Friendship"				STE „Maximovca"			
			F_1	F_2	F_3	F_4	F_1	F_2	F_3	F_4
B	G_2	13.7	12.1	31.7	37.7	38.1	47.8	36.2	45.9	42.1
	G_3	0.0	0.0	31.2	40.5	44.0	43.5	36.2	58.3	46.5
	Y_2	62.7	56.6	55.3	61.5	54.0	47.8	60.9	57.3	44.5
	D′	23.5	25.4	14.6	22.9	36.2	15.2	20.3	8.3	31.3
	E_2'	11.7	17.9	32.4	33.1	38.3	30.4	42.0	46.8	34.6
	O′	1.9	2.3	4.2	8.1	20.0	19.5	20.3	19.8	26.4
	P′	31.4	28.5	19.2	8.1	5.3	26.0	23.2	11.5	18.6
	G″	31.4	35.1	24.1	21.9	12.7	21.7	31.9	12.5	15.4
C	R_2	66.7	57.4	41.9	36.3	25.5	52.2	50.7	42.7	30.8
	X_2	56.8	40.6	64.6	70.3	59.7	73.9	78.2	73.9	78.3
M	M	0.0	1.2	4.6	13.5	8.5	10.8	11.6	7.9	9.2

Significant changes have occurred in crossbred on the basis of Simmental breed animals (Table 4). Thus, with increasing relationship on black and white breed increased incidence antigens G2, Y2, E'_2 (B - system), X_2 (C - system) from 36.0 to 43.5% and from 26.2 to 56.1 %, 32.0 to 38.2% and from 18.3 to 51.2%, from 56.0 to 61.7% and from 57.6 to 63.4% in the herds of agricultural association "Tetskan" and STE "Selectsia"

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Table 4. Genetic features of hybrids on the basis of the dynamics of Simmental generations for some antigens,%

System	Antigens	Simmental breed	Agricultural association "Tetskan"			STE "Selectsia"			
			F_1	F_2	F_3	F_1	F_2	F_3	F_4
B	G_2	38.2	36.0	41.3	43.5	26.2	24.7	46.9	56.1
	Q	29.4	12.0	8.6	12.3	16.6	12.8	6.1	2.4
	Y_2	41.2	68.0	49.8	50.0	56.3	54.4	75.5	73.2
	D′	32.3	32.0	23.2	18.2	21.8	20.85	26.5	29.3
	E_2'	20.6	32.0	36.5	38.2	18.3	16.8	51.0	51.2
	O′	20.6	8.0	9.2	10.6	17.0	21.8	34.7	29.3
	Y′	8.8	20.0	7.0	8.8	12.2	9.9	2.0	9.7
C	R_2	73.5	64.0	64.4	62.9	47.1	39.6	40.8	46.3
	X_2	50.0	56.0	51.4	61.7	57.6	64.3	53.1	63.4
M	M	2.9	8.0	3.2	1.7	8.3	1.9	2.0	0.0

If the hybrids on the basis of Red Steppe in the dynamics generations, an increase in frequency of antigen M, then the crossbred based on Simmental breed the contrary, with the increase of relationship on black-motley breed is a gradual decrease in the frequency of its occurrence from 8.0 to 1.7% (agricultural association "Tetskan") and from 8.3 to 2.0% (STE "Selectsia").

In the alelophond of a new type of bulls in locus AEB prevails genetical markers $G_2Y_2E'_1Q'$, G_2Y_1D', G_1I_1, I_2, O_1, B_2G_2, $B_2O_1Y_2D'$, B_2O_1, $B_1O_3Y_2A'_2E'_1P'Q'G''$, $Y_2E'_2G'O'$, Q', E'_3, E'_3Q', I' .

The population of the nev type has a high genetic potential, due to the homozigotic level (Cα) which varies in limits 2.6 till 7.9% that allows the maintaining of varied genetics of

structural units in the process of improvement of the bulls of new type.

CONCLUSIONS

By the end of the third stage launch of a new type in the country for 550 farms and complexes average milk yield per cow per year was 3.5 thousand kg of milk and in 51 - more than 5.0 million kg.

Milk yield per forage cow in farms of all types have reached 4016 kg of milk, milk production per inhabitant of the republic amounted to 353 kg.

In the alelophond of a nev type of bulls in locus AEB prevails genetical markers $G_2Y_2E'_1Q'$, G_2Y_1D', G_1I_1, I_2, O_1, B_2G_2, $B_2O_1Y_2D'$, B_2O_1, $B_1O_3Y_2A'_2E'_1P'Q'G''$, $Y_2E'_2G'O'$, Q', E'_3, E'_3Q', I' .

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