Kh.Kh. Tagirov, L.A. Kalashnikova //Research Journal of Pharmaceutical, Biological and Chemical Sciences. -2018. -Т. 9. -№ 3. -С. 885-898.

3. Косилов, В.И. Потребление и использование питательных веществ рационов бычками симментальской породы при включении в рацион пробиотиотической добавки Биогумитель 2Г/ В.И. Косилов, Е.А. Никонова, Н.В.Пекина, Т.С. Кубатбеков, Д.С. Вильвер, Т.А. Иргашев//Известия Оренбургского государственного аграрного университета. -2017. -№ 1 (63). -С. 204-206.

4. Жаймышева, С.С. Влияние пробиотической кормовой добавки Биодарин на продуктивность тёлок симментальской породы/ С.С. Жаймышева, В.И. Косилов, Т.С. Кубатбеков, Б.С. Нуржанов//Известия Оренбургского государственного аграрного университета. -2017. -№ 3 (65). -С. 138-140.

5. Миронова, И.В. Эффективность использования пробиотика Биодарин в кормлениит тёлок/ И.В. Миронова, Г.М. Долженкова, Н.В.Гизатова, В.И. Косилов //Известия Оренбургского государственного аграрного университета. -2016. -№ 3 (59). -С. 207-210.

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BREEDING PARAMETERS THAT CHARACTERIZE THE DAIRY PRODUCTIVITY OF COWS

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Annotation*. The evaluation of heritability, genetic and phenotypic correlations of indicators of milk productivity of Holstein cows has been carried out. The obtained data allow us to recommend a wider use of genetic correlations to improve productive traits in Holstein cattle.*

Keywords*: heritability, correlation, milk productivity, trait.*

An evaluation of the heritability indicators that characterize the milk productivity of Holstein first-calf heifers in LLC "APC named after Lenin" in the Lukhovitsky district in the Moscow region has been carried out (table).

Thus, the level of heritability for milk yield for 305 days of lactation was 0,28, mass fraction of fat – 0,17, milk fat yield – 0,15, mass fraction of protein – 0,12, milk protein yield-0,25, daily milk yield – 0,15, milk flow rate - 0.35. The established heritability coefficients were statistically highly significant (P<0,001). The average value of heritability means that the studied traits are controlled by both heredity and environmental factors [1, 2]. In other words, they are sufficient for targeted breeding work in order to improve the herd.

Table 1

Heritability coefficients (diagonally), genetic correlations (above the diagonal), phenotypic correlations (below the diagonal) of productivity traits

Trait	Milk yield for 305 days of lact	Mass fraction of fat	Milk fat yield	Mass fraction of protein	Milk protein yield	Daily milk yield	Milk flow rate
Milk yield for 305 days of lact	**0,28 ±0,04**	-0,72 ±0,10	0,87 ±0,04	-0,31 ±0,12	0,96 ±0,09	0,95 ±0,03	0,77 ±0,07
Mass fraction of fat	-0,31 ±0,11	**0,17 ±0,04**	-0,29 ±0,11	0,31 ±0,17	-0,68 ±0,10	-0,59 ±0,16	-0,62 ±0,14
Milk fat yield	0,79 ±0,20	0,31 ±0,12	**0,15 ±0,04**	-0,21 ±0,10	0,85 ±0,06	0,89 ±0,16	0,65 ±0,10
Mass fraction of protein	-0,15 ±0,04	0,18 ±0,10	-0,04 ±0,01	**0,12 ±0,02**	-0,07 ±0,03	-0,06 ±0,03	-0,46 ±0,12
Milk protein yield	0,93 ±0,25	-0,25 ±0,09	0,76 ±0,31	0,19 ±0,07	**0,25 ±0,04**	0,98 ±0,22	0,69 ±0,08
Daily milk yield	0,62 ±0,27	-0,18 ±0,07	0,50 ±0,18	-0,09 ±0,02	0,58 ±0,24	**0,15 ±0,04**	0,66 ±0,10
Milk flow rate	0,49 ±0,17	-0,22 ±0,09	0,36 ±0,17	0,19 ±0,11	0,43 ±0,23	0,64 ±0,31	**0,35 ±0,05**

The level of genetic correlations between milk yield for 305 days of lactation and mass fraction of fat was r_g=-0,72, milk fat yield (r_g=0,87), mass fraction of protein (r_g=-0,31), milk protein yield (r_g=0,96), daily milk yield (r_g=0,95) and milk flow rate (r_g=0,77). The genetic correlation of milk yield for 305 days of lactation was high and negative, and between mass fraction of protein it was medium and negative.

At the same time, high and positive correlations of milk yield for 305 days of lactation with the milk fat and protein yield, daily milk yield and the milk flow rate ($P<0.001$) have been established.

The results have showed that selection by milk yield for 305 days of lactation will be associated with improvement of other traits, with the exception of mass fraction of fat and protein.

Genetic correlations between mass fraction of fat and other studied productivity indicators have been as follows: with milk fat yield (r_g=-0,29), mass fraction of protein (r_g=0,31), milk protein yield (r_g=-0,68), daily milk yield (r_g=-0,59), and milk flow rate (r_g=0,62). The yield of milk fat had a high, statistically significant genetic correlation with the yield of milk protein (r_g=0,85), daily milk yield (r_g=0,89), and milk flow rate (r_g=0.65) at $P<0.001$. The correlation between milk fat yield and mass fraction of protein was weak and negative (r_g=-0.21).

Genetic correlations between mass fraction of protein and milk protein yield, daily milk yield, and milk flow rate were negative and amounted to -0,07, -0,06, and -0,46, respectively.

Milk protein yield was highly correlated with daily milk yield (r_g=0,98) at $P<0.001$. Daily milk yield was positively and highly correlated with milk flow rate (r_g=0,66) at $P<0.001$.

A high positive genetic correlation between productivity traits indicates that these traits can be determined by the same number of genes, and such traits can be improved simultaneously by breeding methods.

Phenotypic correlations between milk yield for 305 days of lactation and other studied traits of milk productivity have been of different strength and orientation. Thus, the correlation between milk yield for 305 days of lactation and mass fraction of fat, milk fat yield, mass fraction of protein, milk protein yield, daily milk yield and milk flow rate, respectively, was: -0,31; 0,79; -0,15; 0,93; 0,62 and 0,49 (P<0,05-0,001). Analysis of these correlations indicates a negative association between milk yield for 305 days of lactation and mass fraction of fat and mass fraction of protein, which is consistent with data on genetic correlation coefficients and materials from other authors [3, 4].

Phenotypic correlations between mass fraction of fat and other traits of milk productivity were mostly low and negative, with the exception of the association with milk fat yield, which was 0.31, but was not statistically significant.

Among other phenotypic associations, the correlation between milk fat yield and milk protein yield should be distinguished, the correlation coefficient was 0,76 (P<0,05) and daily milk yield with the milk flow rate - r_p=0.64 (P<0,05).

Thus, a high positive phenotypic correlation between traits also indicates the possibility of simultaneous improvement of traits by breeding methods [5].

The analysis of genetic and phenotypic correlations showed that the first ones are more informative, which gives us a reason to recommend the wider use of genetic correlations in the breeding process, in order to improve the productive traits of Holstein cattle.

References

1. Estimation of Genetic Parameters for Live Weight in South African Holstein Cattle / N.I. Ramatsoma, C.B. Banga, K.C. Lehloenya et al. // Open Journal of Animal Sciences. - 2015. - Vol.5. - P. 242-248.

2. Genetic correlations of days open with milk yield and metabolic weight in Holstein and Brown Swiss cows / A. Ríos-Utrera, R.C. Calderón-Robles, J.G. Galavíz-Rodríguez et al // Revista Científica, FCV-LUZ . - 2015. - Vol. 15. - P. 51 - 56.

3. Genetic parameters estimation for milking speed in Croatian Holstein cattle / M. Špehar, M. Lučić , M. Štepec et al. // Mljekarstvo. - 2017. - Vol. 67. - P. 33-41.

4. Heritability and correlation among first lactation traits in Holstein Friesian cows at Holeta Bull Dam Station / G. Goshu, H. Singh, K. Petersson et al // International journal of livestock production. - 2014. - Vol. 5. – P. 47-53.

5. Rincón, J.F. Estimation of genetic and phenotypic parameters for production traits in Holstein and Jersey from Colombia / J.F. Rincón, J.A. Zambrano, J. Echeverri // Rev. MVZ Córdoba. - 2015. - Vol. 20. - P. 4962-4973.