THE GENETICS PARAMETERS AND THE RANK OF AMELIORATION TO A BLACK AND WHITE ROMANIAN COWS RACE POPULATION

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Abstract

The study was made on a BNR population bred in SCDCB Dancu conditions to estimate the genetic value of animals. Maximum lactation was in the third lactation with an average of milk production of 6670 kg with 4.13% fat and 3.34% protein. Were analysed main genetic parameters for some morphologic and productive features. Quantity of milk had a medium genetic determinism (h^2=0.28), the milk qualitative traits were strongly genetic determined with values of 0.64(h^2) for fat content and 0.57 (h^2) for protein content. Milk quantity is positively correlated and with high intensity level with fat and protein quantity (0.99 – 0.95). Correlation of milk quantity with qualitative features of milk was negative. Analyzing the breeding value of bulls for main characters take in study we observe that 17 of them are breeders for milk quantity noting the 51131 bull breeder for quantitative milk features.

Key words: milk, Black and White Romanian Cow, genetic determinism, correlation

INTRODUCTION

Study of genetic parameter are the base of selection and animal breeding and knowing heritability values give us information about selection accuracy and for genetic progress who can take for a trait. The genetic correlation between traits is indispensable for selection application. For the traits that is positive correlated, trait selection means indirect selection for another trait. For traits who are negative correlated, selection for a trait means indirect selection against other [1]. The constancy to the same trait in different moments of individual life is shows by repeatability [2].

MATERIAL AND METHOD

The study was conducted on 210 Black and White Romanian cow breed in Iasi area, which has, at least one finished lactation. The primary data about quantitative and qualitative production and ascendency, for this study, came from UARZ Iasi and from farm.

Complexity of the issues imposed the use of a varied methodology of work according to the pursued aspects, using and respecting the methodology of investigation specific for research in animal husbandry recommended by literature. When estimating genetic parameters the used method was REML (Restricted Maximum Likelihood).

This method is based on an iterative process of function maximization. Calculation techniques vary according to the chosen optimization algorithm, but they all require BLUP solutions for different effects of the model in every iterative cycle. Also, a large number of iterative processes are made until convergence is reached [2]. Estimated of breeding value was made using BLUP Sire Model methodology.

RESULTS AND DISCUSSIONS

Starting from heritability signification in substantiation of cattle breeding programs we present heritability value for main morphologic and productive traits in figure 1.

Milk production is in limits traits with a low genetic determinism (h^2=0.28). With a small to intermediary hereditary influence are traits: quantity of milk protein (h^2=0.29), quantity of fat from milk (h^2=0,30). Protein and fat content from milk have a strong

genetic determinism with value of 0.64 for fat content and 0,57 for protein content, for the age at first calving the genetic determinism had small value of 0.20 (Fig. 1).

Figure. 1 Variation of heritability coefficients
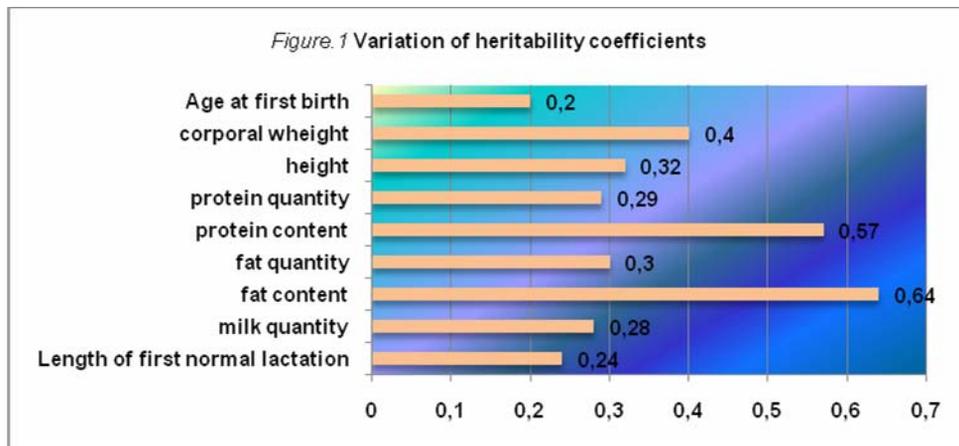
The repeatability coefficients for this research was 0.26 for first lactation days long, 0.31 for milk quantity at the first normal lactation, 0.70 for fat content, 0.32 for fat quantity, 0.63 for protein content and for quantity of protein (Table. 1). All this value is close to value from literature for each trait. The traits for corporal development had value of 0.35 for height and 0.43 for weight.

Table 1
The repeatability of the morphologic and productive characters for population take in study

Trait	Repeatability coefficients (r^2)
Length of first normal lactation	0.26
Milk quantity	0.31
Fat content	0.70
Fat quantity	0.32
Protein content	0.63
Protein quantity	0.30
Height	0.35
Corporal weight	0.43

A problem for the quantitative hereditary traits study is to know the interdependence rank between them and his direction. This interdependence is evident through correlation coefficients.

The genotypic and phenotypic correlation estimators between main morpho-productive traits are in table 2. The results shows a positive correlation with great value for quantitative milk production and fat quantity respectively protein quantity. Also positive correlation is between milk quantity and corporal development (r_G=0.58). Between quantitative milk production and fat content, protein content, the correlations are negative.
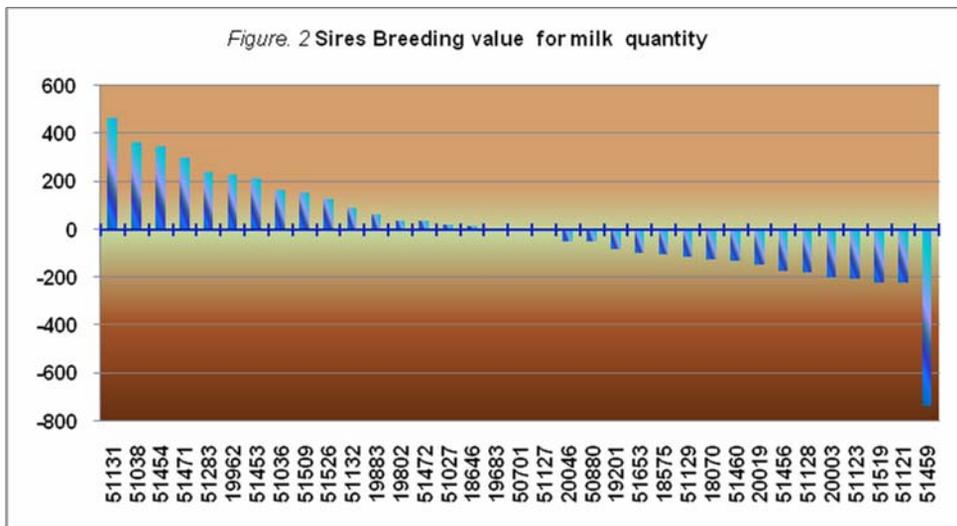
For milk quantity the biggest breeding value has sires: cod 51131 (VA=462.70), 51038 (VA=361.20), 51454 (VA=346.18). From 35 bulls 18 had a positive breeding value for milk quantity (Figure 2).

Positive influence to fat content had 13 bulls, the most valuable was sire cod 18070 (VA=0.2077) and for protein content 21 bulls, most valuable was sire 51653 (VA=0.076).

For body development nine sires was breeders for height noting sire cod 51036 (VA=1.23) and twelve sires breeders for weight.

Table 2
The correlations between some morphologic and productive features at first normal lactation

Corelated characters		r_P	r_G	r_E
Milk quantity and:				
X	Length of first normal lactation	-0.20	-0.22	-0.24
	Fat content	-0.21	-0.20	-0.23
	Fat quantity	0.99	0.97	0.99
	Protein content	-0.20	-0.19	-0.22
	Protein quantity	0.95	0.93	0.97
	Height	0.33	0.31	0.34
	Corporal weight	0.41	0.40	0.42
	Age at first parturition	-0.20	-0.18	-0.22
	Height × Corporal weight	0.62	0.58	0.64

Figure. 2 Sires Breeding value for milk quantity

CONCLUSIONS

After this study we can conclude that:

The milk quantity production is in a low genetic determinism limits (h^2=0.28). A small to intermediary hereditary influences had the traits for: quantity of protein from milk (h^2=0.29), quantity, fat quantity from milk (h^2=0.30). the fat and protein content from milk has a height genetic determinism with values of 0.64 for fat content, and 0.57 for protein content.

For milk quantity the biggest breeding value has sires: cod 51131 (VA=462.70), 51038 (VA=361.20), 51454 (VA=346.18). Positive influence to milk fat content had 13 sires the most valuable was sire cod 18070 (VA=0.2077) and for milk protein content had 21 sires and the most valuable was sire 51653 (VA=0,076).

REFERENCES

[1] Grosu H., Oltenacu Pascal A. – 2005 – Programe de ameliorare genetică în zootehnie, Editura Ceres, Bucureşti
[2] Maciuc V., Ujică V., Nistor I., 2003 – Ghid practic de ameliorare genetică a bovinelor pentru lapte, Editura Alfa, Iaşi
[3] Maciuc V. 2006 – Managementul creşterii bovinelor. Edit. Alfa, Iaşi
[4] Mihaela Ivancia 2005–Ameliorarea animalelor. Edit. Alfa, Iaşi
[5] Ujică V., Maciuc V., Nistor I. 2007 – Managementul creşterii vacilor de lapte. Edit. Alfa, Iaşi.
[6] Ujică V., Maciuc V., 2000 – The genetic evaluation of exterior character in Romanian cattel population Black and white (BNR), Interbull meeting, Uppsala, Sweden
[7] Ujică V., Dănăilă Rodica, Maciuc V., Nistor I., Creangă Şt. 2009 – Structura intrapopulaţională la taurinele de de rasă BNR exploatate în fermeleprivate din zona de N-E a României, Lucrări ştiinţifice seria Zootehnie Vol. 52 (14).