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RANDOM REGRESSION MODEL FOR ESTIMATION THE GENETIC PARAMETERS FOR GROWTH TRAITS IN CHAROLAIS BREED

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The aim of this study was the estimation the genetic parameters with random regression model for growth traits in Charolais cattle breed. The records were the body weight at birth, 200 and 365 days. The pedigree consisted in 2213 cattle: 159 sires, 1025 dams and 1029 cattle with records. The data were from Romanian Breeding Association for beef cattle. The mean for birth weight was 40.297 ± 0.202 kg, for weaning weight was 220.287 ± 1.296 kg, and the mean for weight at 365 days was 330.275 ± 2.097 kg. The heritability for the birth weight and body weight at 200 and 365 days was 0.244, 0.519, 0.561. The genetic correlations between body weight at 1, 200 and 365 days were positive. The random regression model was adequate to estimate the genetic parameters for growth traits in Charolais beef cattle breed. For increase the profitability of farms it is necessary to improve the growth traits.

Introduction

The random regression model was used for growth traits for account the genetic correlation between measures of the same trait over time (Mc Gowan, 2023). The aim of this study was the estimation the genetic parameters for growth traits in beef with random regression model in Charolais cattle breed.

Materials and methods

The pedigree consisted in 2213 cattle: 159 sires, 1025 dams and 1029 cattle with records. From 1029 cattle with record 708 were females and 321 males. The data were from 2020 year. The data were from Romanian Breeding Association for beef cattle.

The growth traits were analyzed using a random regression test-day model (Jamrozik & Schaeffer, 1997):

$$y_{tijk} = TD_i + \sum_{m=0}^3 (\beta_m * Z_{tm}) + \sum_{m=0}^3 (\alpha_{jm} * Z_{tm}) + \sum_{m=0}^3 (\gamma_{jm} * Z_{tm}) + e_{tijk}$$

y_{tijk} = test day (TD) body weight record "k" of cattle "j" at time "t";

TD_i = the data of body weight recording (the fixed effect)

β_m = fixed regression coefficient; α_{jm} = random regression coefficients for the breeding value;

γ_{jm} = random regression coefficients for the permanent environmental effect;

Z_{tm} = Legendre Polynomials at time t;

e_{tijk} = residual error.

• Results and discussions

Table 1. The descriptive statistics for growth traits

Traits	Mean \pm standard error	Standard deviation	Coefficient of variability (%)
Birth weight (kg)	40.297 ± 0.202	6.5	16.137
Weight at 200 days (kg)	220.287 ± 1.296	41.6	18.884
Weight at 365 days (kg)	330.275 ± 2.097	67.297	20.376

Table 2. The heritability for growth traits

Traits	The heritability
Birth Weight	0.244
Weight at 200 days	0.519
Weight at 365 days	0.561

Table 3. The genetic correlation between growth traits

	Birth weight	Weight at 200 days	Weight at 365 days
Birth weight	1	0.086	0.391
Weight at 200 days	0.086	1	0.034
Weight at 365 days	0.391	0.034	1

• Conclusions

The heritability for weight at 200 days and weight at 365 days were high. The correlations between birth weight and weight at 365 days was medium and positive. The random regression model was adequate to estimate the genetic parameters for growth traits in Charolais beef cattle breed.