STUDY OF HETEROGENEITY OF VARIANCE AND GENETIC PARAMETERS FOR MILK PRODUCTION OF GYR CATTLE

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The aim of this study was to verify the effect of heterogeneity of variance (HV) on milk production up to 305 days of lactation (L305) of Gyr bull's daughters, as well as on genetic evaluation of Gyr sires raised in Brazil. Data from 2,884 animals sired by 79 Gyr bulls, calving between 2000 and 2014 were obtained from the Girolando breed Progeny Test coordinated by the Genetic Improvement Program of the Girolando Breed. The model included contemporary groups (comprised by herd, year and calving season) as fixed effect, cow's age at calving (linear and quadratic effects) and heterozygosity (linear effect) as covariates, and direct additive genetic, residual and permanent environment as random effects. Each herd was classified in Low and High standard deviation (SD) of milk production according to the standardized L305 means for herd-calving year. The class of Low SD was comprised of herds with SD equal to or less than zero and the class of High with values of positive SD. Animals without birth and/or calving date and pedigree information were excluded. Only cows with lactation length between 90 to 450 days were used and data from sires that did not have at least two daughters in each SD class were excluded. The analyzes were performed in two scenarios: S*i*) single-trait animal model with the L305 records and, S*ii*) two-trait model considering the standardized Low and High classes based on L305. The (co)variance components estimates and breeding values were obtained separately for each scenario by using Bayesian inference via Gibbs sampling. Different heritabilities were estimated for L305 (S*i*), Low and High SD (S*ii*) with posterior means of 0.19, 0.25 and 0.34, respectively. The heritability changed in agreement with the increase in production and it could be due to the fact that Gyr bull's daughters express their genetic potential in high productivity herds. The genetic correlation between Low and High phenotypes was of high magnitude (0.90) and the Spearman's rank correlation coefficients were above 0.96. These results indicate that the use of S*i* to estimate genetic merit will not negatively influence the efficiency of sire selection for Low and High SD herds. Thus, the presence of heterogeneity of variances had a minor impact for L305 and did not affect the genetic evaluation of Gyr bulls.

Keywords: bovine, heritability, conditional probability