Genetic parameters of test day milk yield in Brazilian Girolando cattle using an autoregressive multiple lactation animal model

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The Girolando is a dairy cattle formed by crossing the Holstein and the Gir breeds. It is the most predominant cattle in dairy farming in Brazil. In the late nineties the Girolando Breeders Association (GBA) started running an AI progeny test of crossbred young sires. Genetic evaluation is currently based on fitting a lactation model. This study was aimed to estimate variance components and genetic parameters for test day milk yield of Girolando cattle, using an autoregressive test day multiple lactations (AR) animal model. Data consisted of test day (TD) records produced by Girolando cows under milk recording supervised by the GBA. After editing, 108,218 TD records from the first three lactations of 9,119 cows, sired by 1,285 bulls and calving from 1992 to 2008 in 214 herds were used to fit the AR model that included the fixed effects of herd, year-season of calving, days in milk within lactation order, regressions on age at calving (linear and quadratic), additive direct, dominance and recombination effects. The random effects were animal, short and long term environmental effects (fitted with autoregressive covariance structures) and the residuals (accounting for heterogeneity of variance by parity number). Medium heritability estimates, ranging from 0.17 to 0.27 of milk TD yield indicate opportunities for genetic gain by selection. Results from this study confirm the potential of using TD yields to replace the lactation model to estimate breeding values of Girolando sires and cows in Brazil. Further studies are needed to compare the resulting predictions of breeding values from these two models and the impact on selection decisions made by dairy farmers and on the expected genetic gain in milk yield of the Girolando cattle.