



Estimates of genetic parameters for total milk yield over multiple ages in Brazilian Murrah buffaloes using different models

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ABSTRACT. The objective of this study was to estimate variance components and genetic parameters for accumulated 305-day milk yield (MY305) over multiple ages, from 24 to 120 months of age, applying random regression (RRM), repeatability (REP) and multi-trait (MT) models. A total of 4472 lactation records from 1882 buffaloes of the Murrah breed were utilized. The contemporary group (herd-year-calving season) and number of milkings (two levels) were considered as fixed effects in all models. For REP and RRM, additive genetic, permanent environmental and residual effects were included as random effects. MT considered the same random effects as did REP and RRM with the exception of permanent environmental effect. Residual variances were modeled by a step function with 1, 4, and 6 classes.

The heritabilities estimated with RRM increased with age, ranging from 0.19 to 0.34, and were slightly higher than that obtained with the REP model. For the MT model, heritability estimates ranged from 0.20 (37 months of age) to 0.32 (94 months of age). The genetic correlation estimates for MY305 obtained by RRM (L23.res4) and MT models were very similar, and varied from 0.77 to 0.99 and from 0.77 to 0.99, respectively. The rank correlation between breeding values for MY305 at different ages predicted by REP, MT, and RRM were high. It seems that a linear and quadratic Legendre polynomial to model the additive genetic and animal permanent environmental effects, respectively, may be sufficient to explain more parsimoniously the changes in MY305 genetic variation with age.

Key words: *Bubalus bubalis*; Random regression models; Heritability; Genetic correlation; Sire rank