



Comparison of factor-analytic and reduced rank models for test-day milk yield in Gyr dairy cattle (*Bos indicus*)

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ABSTRACT. We analyzed 46,161 monthly test-day records of milk production from 7453 first lactations of crossbred dairy Gyr (*Bos indicus*) x Holstein cows. The following seven models were compared: standard multivariate model (M10), three reduced rank models fitting the first 2, 3, or 4 genetic principal components, and three models considering a 2-, 3-, or 4-factor structure for the genetic covariance matrix. Full rank residual covariance matrices were considered for all models. The model fitting the first two principal components (PC2) was the best according to the model selection criteria. Similar phenotypic, genetic, and residual variances were obtained with models M10 and PC2. The heritability estimates ranged from 0.14 to 0.21 and from 0.13 to 0.21 for models M10 and PC2, respectively. The genetic correlations obtained with model PC2 were slightly higher than those estimated with model M10. PC2 markedly reduced the number of parameters estimated and the time spent to reach convergence. We concluded that two principal

components are sufficient to model the structure of genetic covariances between test-day milk yields.

Key words: Factor analysis; Principal components; Milk production