



## Comparison of random regression models to estimate genetic parameters for milk production in Guzerat (*Bos indicus*) cows

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**ABSTRACT.** Random regression models have been widely used to estimate genetic parameters that influence milk production in *Bos taurus* breeds, and more recently in *B. indicus* breeds. With the aim of finding appropriate random regression model to analyze milk yield, different parametric functions were compared, applied to 20,524 test-day milk yield records of 2816 first-lactation Guzerat (*B. indicus*) cows in Brazilian herds. The records were analyzed by random regression models whose random effects were additive genetic, permanent environmental and residual, and whose fixed effects were contemporary group, the covariable cow age at calving (linear and quadratic effects), and the herd lactation curve. The additive genetic and permanent environmental effects were modeled by the Wilmink function, a modified Wilmink function (with the second term divided by 100), a function that combined third-order Legendre polynomials with the last term of the Wilmink function, and the Ali and Schaeffer function. The residual variances were modeled by means of 1, 4, 6, or 10 heterogeneous classes, with the exception of the last term of the Wilmink function, for which there were 1,

3, 6, or 10 classes. The models gave similar heritability estimates, ranging from 0.20 to 0.33. Genetic correlations between adjacent records were high values (0.83-0.99), but they declined when the interval between the test-day records increased, and were negative between the first and last records. The model employing the Ali and Schaeffer function with six residual variance classes was the most suitable for fitting the data.

**Key words:** Covariance function; Parametric functions; Test-day milk yield; Zebu