Genetic association of productive and reproductive traits with stayability in Nellore cattle: analysis using Bayesian models

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ABSTRACT. We evaluated the genetic association of growth traits [weight adjusted to 205 days of age (W205), 365 days of age (W365), and 550 days of age (W550); weight gain between 205 days of age and 365 days of age (WG1) and between 365 days of age and 550 days of age (WG2)] and reproductive traits [age at first calving (AFC); first calving interval (FCI)] with stayability in the herd (STAY), using Bayesian inference in linear and threshold models. We defined STAY as the probability of a cow calving three or more times before the age of 76 months, given that she had calved at least once. We assigned binary codes (0, failure; 1, success) to each female. We used a sire model for analysis and formed different contemporary groups for the investigated traits. We analyzed the results by applying a two-trait sire model that included STAY (threshold trait) and

linear traits (W205, W365, W550, WG1, WG2, AFC, and FCI). We used Gibbs sampling to estimate variance components and heritabilities. In all the analyses, we found that the mean heritability estimates for STAY were of moderate magnitude (0.20-0.25). The mean heritabilities for W205, W365, W550, WG1, WG2, AFC, and FCI were 0.20, 0.23, 0.39, 0.08, 0.14, 0.12, and 0.11, respectively. We observed wide variation in the posterior distributions of genetic correlations; however, with the exception of those obtained for the reproductive traits, the mean estimates were of low magnitude. Selection for WG2 can results in favorable correlated response in STAY.

Key words: Heritability; Longevity; Selection of females; Threshold model