

Additive genetic relationship of longevity with fertility and production traits in Nellore cattle based on bivariate models

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ABSTRACT. Survival or longevity is an economically important trait in beef cattle. The main inconvenience for its inclusion in selection criteria is delayed recording of phenotypic data and the high computational demand for including survival in proportional hazard models. Thus, identification of a longevity-correlated trait that could be recorded early in life would be very useful for selection purposes. We estimated the genetic relationship of survival with productive and reproductive traits in Nellore cattle, including weaning weight (WW), post-weaning growth (PWG), muscularity (MUSC), scrotal circumference at 18

months (SC18), and heifer pregnancy (HP). Survival was measured in discrete time intervals and modeled through a sequential threshold model. Five independent bivariate Bayesian analyses were performed, accounting for cow survival and the five productive and reproductive traits. Posterior mean estimates for heritability (standard deviation in parentheses) were 0.55 (0.01) for WW, 0.25 (0.01) for PWG, 0.23 (0.01) for MUSC, and 0.48 (0.01) for SC18. The posterior mean estimates (95% confidence interval in parentheses) for the genetic correlation with survival were 0.16 (0.13-0.19), 0.30 (0.25-0.34), 0.31 (0.25-0.36), 0.07 (0.02-0.12), and 0.82 (0.78-0.86) for WW, PWG, MUSC, SC18, and HP, respectively. Based on the high genetic correlation and heritability (0.54) posterior mean estimates for HP, the expected progeny difference for HP can be used to select bulls for longevity, as well as for post-weaning gain and muscle score.

Key words: Beef cattle; Reproduction; *Bos indicus*; Growth traits; Bayesian approach; Genetic correlation