Genetic parameters for milk production traits and breeding goals for Gir dairy cattle in Brazil

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ABSTRACT. To implement an animal breeding program, it is important to define the production circumstances of the animals of interest to determine which traits of economic interest will be selected for the breeding goal. The present study defined breeding goals and proposed selection indices for milk production and quality traits of Gir dairy cattle. First, a bioeconomic model was developed to calculate economic values. The genetic and phenotypic parameters were estimated based on records from 22,468 first-lactation Gir dairy cows and their crosses for which calving occurred between 1970 and 2011. Statistical analyses were carried out for the animal model, with multitrait analyses using the restricted maximum likelihood method. Two situations were created in the present study to define the breeding goals: 1) including only milk
yield in the breeding goal (HGL1) and 2) including fat and protein in addition to the milk yield (HGL2). The heritability estimates for milk, protein, and fat production were 0.33 ± 0.02, 0.26 ± 0.02, and 0.24 ± 0.02, respectively. All phenotypic and genetic correlations were highly positive. The economic values for milk, fat, and protein were US$0.18, US$0.27, and US$7.04, respectively. The expected economic responses for HGL2 and for HGL1 were US$126.30 and US$79.82, respectively. These results indicate that milk component traits should be included in a selection index to rank animals evaluated in the National Gir Dairy Breeding Program developed in Brazil.

Key words: Gir dairy cattle; Genetic parameters; Breeding goal; Economic selection index