



Thesis Abstract

Prospecting genetic markers' influence on growth, carcass and meat quality traits in Nellore cattle

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Data were collected on 3844 Nellore cattle reared under pasture conditions in two different farms in southwestern Brazil, where 1889 of them were measured by ultrasound for carcass traits and where 674 bulls finished in a feedlot for 90 to 120 days and slaughtered around 24 months of age. The data were analyzed to determine the association of genetic markers (DNA single nucleotide polymorphisms) with traits economically important for the Brazilian beef business. Growth traits considered were birth weight, weaning weight, yearling weight measured at 18 months, weight gain after weaning, visual scores for carcass conformation, finishing, and muscle. Carcass traits, measured by ultrasound, were ribeye area, backfat and fat depth at rump. Additionally, carcass traits measured after slaughter were hot carcass weight, ribeye area, and fat depth on longissimus muscle. Meat quality traits (weep loss, shrink loss and tenderness) were measured after 7, 14, and 21 days of age. Total lipids and cholesterol content of samples aged for 7 days were also included in the analysis. The genotypes of DNA markers were carried out in laboratories licensed by a private company using their microarray panels. Allele substitution effects were estimated in single- or multi-polymorphism analysis. Additive and dominance effects were also estimated. Many DNA polymorphisms analyzed were shown to be fixed or the frequencies for one of the alleles were too high, more than 99%. In those cases, analysis could not be performed. However, for many other polymorphisms there was variability in allele frequencies, which made it possible to do an association analysis. All traits analyzed were influenced by, at least, two polymorphisms with statistically significant ($P \leq 0.05$) or suggestive ($0.05 < P \leq 0.20$) effects, and thus, DNA polymorphisms could be used as additional and auxiliary criteria in the selection process of these 24 traits related to animal growth and carcass and meat quality in Nellore cattle. As allele substitution effects explain only a small part of the phenotype, the results of this paper suggest that the effect of these markers should be considered together.

Key words: Single nucleotide polymorphisms; Molecular markers; Nellore cattle; Genetic polymorphisms; Lipid profile; Marker assisted selection