



Genotype by environment interaction for post-weaning weight gain, scrotal circumference, and muscling score of composite beef cattle in different regions of Brazil

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Genet. Mol. Res. 13 (2): 3048-3059 (2014)

Received December 10, 2012

Accepted July 2, 2013

Published April 17, 2014

DOI <http://dx.doi.org/10.4238/2014.April.17.1>

ABSTRACT. The objectives of this study were to characterize and define homogenous production environments of composite beef cattle in Brazil in terms of climatic and geographic variables by using multivariate exploratory techniques; to evaluate the presence of genotype by environment interaction (GxE) for post-weaning weight gain (PWG), yearling scrotal circumference (SC), and yearling

muscling (MUS). Hierarchical and nonhierarchical cluster analysis was used to group farms located in regions with similar environmental variables into clusters. Six clusters of farms were formed. The effect of sire-cluster interaction was tested by single-trait analysis. Genetic parameters were estimated by multi-trait analysis considering the same trait to be different in each cluster. The effect of sire-cluster interaction was significant ($P < 0.01$) for PWG and MUS. Estimates of genetic correlations among clusters ranged from 0.31 to 0.93 for PWG, 0.64 to 0.89 for SC, and 0.18 to 0.80 for MUS. These results indicate the need for a genetic analysis on a regional basis or inclusion of the GxE effect in the statistical model to permit appropriate evaluation of the animals.

Key words: Cluster analysis; Genotype by environment interaction; Multibreed; Post-weaning gain; Temperature