

CONSTRUINDO SABERES, FORMANDO PESSOAS E TRANSFORMANDO A PRODUÇÃO ANIMAL

BREEDING STRUCTURE AND GENETIC VARIABILITY IN NELLORE AND GYR BREEDS FROM BRAZIL AND INDIA

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Among the several cattle breeds reared in Brazil, the Nelore (beef cattle) and Gyr (dairy cattle) increased their importance over the years due to their fitness to the tropical environment and production system. The objective of this study was to evaluate the genetic variability using genotyped animals from India and Brazil. This study was carried out using the Illumina BovineHD BeadChip. Embrapa Dairy Cattle (Juiz de Fora, Brazil) and Embrapa Beef Cattle (Campo Grande, Brazil) provided genotypes from Gyr (GBR - 594 animals) and Nelore (NBR - 220 animals) breeds, respectively. A total of 27 Gyr (GIN) and 95 Nelore (NIN) DNA samples from different animals, were obtained from India. Only autosomal chromosomes and markers with known positions, according to the UMD_3.1 bovine genome assembly map were used. Genotype quality control, principal component analyses (PCA), and heterozygosity (Het) were carried out using plink v.1.9. Individual ancestry estimates and population divergence (pair-wise F_{ST}) were obtained using the maximum likelihood method implemented by the admixture v.1.3.0. software. The PCA was able to aggregate NBR and NIN, forming cluster 1, and separated them from cluster 2, formed by GBR and GIN. Admixture analyses was consistent between breeds, showing low levels of introgression when analyzing K (number of populations) from 1 to 4. Observed and expected (in brackets) Het for NBR, NIN, GBR, and GIN were similar and equal to 0.22 (0.22), 0.21 (0.20), 0.21 (0.21), and 0.19 (0.17), respectively. The F_{ST} between GBR x GIN and NBR x NIN were equal to 0.15 and 0.08, respectively, therefore, these results could be associated to the selection objectives carried out in Brazil for GBR and NBR, resulting in genetic differentiation between populations from different countries. Despite of the limited number of sires used to develop the Brazilian Nelore and Gyr cattle populations, genetic diversity was higher than those from India. Throughout selective breeding schemes in Brazilian cattle populations, which varied over the years, inbreeding was the main concern of breeding programs. According to what was observed here, there is sufficient genetic diversity to be explored for the genetic improvement of GBR and NBR.

Keywords: animal breeding, *Bos taurus indicus*, genetic diversity, Zebu cattle

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