

**Inbreeding in Girolando cattle**

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The genetic progress achieved in dairy cattle breeding is notorious and is directly related to the use of genetically superior sires. However, the large-scale adoption of fewer sires can reduce genetic variability and increase the levels of inbreeding in populations of interest for animal production. In this scenario, the Girolando breed stands out at a national level for its productive efficiency. The aim of this study was to find out about the genetic diversity of Girolando animals by estimating the levels of inbreeding through pedigree analysis. Pedigree information collected by the Brazilian Association of Girolando Breeders was used, which refers to 988,124 animals, from all genetic groups of the breed, born between 1955 to 2020. RelaX2 software was used to estimate the individual inbreeding coefficient (F) according to Meuwissen and Luo (1992). The F indicates the probability of an individual having two identical genes per offspring. The average inbreeding coefficient (F) of the total population was slightly lower than the reference population (animals born between 2012 to 2020), with values of 0.57% and 0.74%, respectively. When considering the total number of animals evaluated in the reference population, 31% were found to be inbred, with an average F of 2.40%. In the total population, only 23.4% of the animals are inbred, with an average F of 2.46%. Only 1.46% and 1.52% of the animals in the total population and the reference population, respectively, showed a F value higher than 6.25%, which is considered the critical limit. When considering the behavior of the F value of the reference population over the years, according to the genetic groups of the Girolando breed, the highest values were observed in the group of pure synthetic animals (animals produced by mating between 5/8 H:3/8 G animals) until 2018, being surpassed in that year by animals from the 3/4 H:1/4 G genetic group. The 1/2 H:1/2 G and 3/8 H:5/8 G groups had the lowest F values over the years evaluated. In general, the F values stabilized from the 1990s onwards, showing a slight upward trend over the subsequent years (more recent), with similar behavior in all genetic groups, which seems to indicate greater control over mating by breeders, directing them towards forming couples with a low degree of kinship. Based on the average inbreeding coefficients and their annual increase, it is possible to infer that the breeding strategies that have been applied to the Girolando population have preserved its genetic diversity, indicating that the matings have been adequately directed to avoid an increase in inbreeding in the animals.

Keywords: average inbreeding coefficient, genetic variability, genetic groups, reference population.