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Inbreeding coefficient and average relatedness of different subpopulations of the Mangalarga breed

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Studies on the genetic diversity are important to provide data for herd genetic management. In this sense, the objective was to estimate the inbreeding coefficient (F) and the average relatedness (AR) of a subpopulation defined by the different coats of the Mangalarga breed. Data from animals born between 1919 and 2018 (n = 206,426) as the total population (TP) and those born between 2009 and 2018 (n = 20,539) as the reference population (RP) were taken from the studbook of the Brazilian Association of Mangalarga Horse Breeders (ABCCRM). The pedigree data were submitted to the software ENDOG 4.8 to estimate F, defined as the probability that an individual has two identical alleles due to ancestry, and AR, defined as the probability that a randomly chosen allele from the population in the pedigree belongs to a given animal. For that, each different coat color found in the breed was considered a subpopulation The mean F value for the TP was 1.03%, ranging from 0.21% in the buckskin coat to 2.36% in the sorrel tobiano coat. In the RP, the mean F value (3.53%) was higher than in the TP. As in the TP, the lowest F value was also found in the buckskin coat (0.92%), but the highest F in the RP was found for the sorrel coat (5.99%). The mean AR value for the TP was 1.15%, ranging from 0.18% in the buckskin coat to 2.45% in the sorrel tobiano coat, this increase in F for pampa coat may be associated with the preferences of breeders due to its greater use in judgments and awards, as well as being present in a smaller population. As observed for F, the mean AR value was also higher in the RP (3.29%) than in the TP. The lowest AR value was also found in the buckskin coat (2.24%) while the highest AR was found for the sorrel coat (4.44%). The mean F and AR values observed for the TP and RP of the Mangalarga breed were considered low. The mean F values were below the critical value of 10%, from which the effects of inbreeding depression can be observed. The low mean AR values observed is interesting as high values limit the efficacy of breeding programs as that means most individuals carry similar alleles. The buckskin coat, which had the lowest F value, in both populations studied, was more frequent in the horses used in the formation of the Mangalarga breed. At that time, the animals were registered in an open book, with no verification of genealogy. Therefore, the lack of genealogic data may have led to lower inbreeding in the animals of that coat. The highest AR values observed for the animals of tobiano coat may be associated with the formation of that coat color as the breeders who aim to obtain tobiano animals employ homozygote horses in reproduction so as to have 100% chance of tobiano foals being born. In addition, the population of tobiano animals in the Mangalarga breed is lower. It is concluded that, even with the greatest genetic contribution of the sorrel coat, the Mangalarga horses do not present high endogamic levels. However, constant monitoring is necessary for an efficient genetic management of the breed.

Key words: homozygosity, equines, coat