

Genetic diversity in native and commercial breeds of pigs in Portugal assessed by microsatellites¹

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ABSTRACT: Population structure and genetic diversity in the Portuguese native breeds of pigs Alentejano (AL), Bísaro (BI), and Malhado de Alcobça (MA) and the exotic breeds Duroc (DU), Landrace (LR), Large White (LW), and Pietrain were analyzed by typing 22 microsatellite markers in 249 individuals. In general, the markers used were greatly polymorphic, with mean total and effective number of alleles per locus of 10.68 and 4.33, respectively, and an expected heterozygosity of 0.667 across loci. The effective number of alleles per locus and expected heterozygosity were greatest in BI, LR, and AL, and least in DU. Private alleles were found in 9 of the 22 markers analyzed, mostly in AL, but also in the other breeds, with the exception of LW. The proportion of loci not in Hardy-Weinberg equilibrium in each breed analyzed ranged between 0.23 (AL) and 0.41 (BI, LW, and Pietrain), mostly because of a less than expected number of heterozygotes in those loci. With the exception of MA, all breeds showed a significant deficit in heterozygosity (F_{IS} ; $P < 0.05$), which was more pronounced in BI ($F_{IS} = 0.175$) and AL ($F_{IS} = 0.139$), suggesting that inbreeding is a major con-

cern, especially in these breeds that have gone through a genetic bottleneck in the recent past. The analysis of relationships among breeds, assessed by different methods, indicates that DU and AL are the more distanced breeds relative to the others, with the closest relationship being observed between LR and MA. The degree of differentiation between subpopulations (F_{ST}) indicates that 0.184 of the total genetic variability can be attributed to differences among breeds. The analysis of individual distances based on allele sharing indicates that animals of the same breed generally cluster together, but subdivision is observed in the BI and LR breeds. Furthermore, the analysis of population structure indicates there is very little admixture among breeds, with each one being identified with a single ancestral population. The results of this study confirm that native breeds of pigs represent a very interesting reservoir of allelic diversity, even though the current levels of inbreeding raise concerns. Therefore, appropriate conservation efforts should be undertaken, such as adopting strategies aimed at minimizing inbreeding, to avoid further losses of genetic diversity.

Key words: diversity, genetic variability, microsatellite, native breed, pig

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