



Contents lists available at ScienceDirect

Small Ruminant Research

journal homepage: www.elsevier.com/locate/smallrumres

Genetic relationships between two homologous goat breeds from Portugal and Brazil assessed by microsatellite markers

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ARTICLE INFO

Article history:

Received 1 February 2010

Received in revised form 28 April 2010

Accepted 4 May 2010

Available online 8 June 2010

Keywords:

Genetic diversity

Genetic distance

Goats

Population structure

ABSTRACT

Twenty microsatellite markers were used to investigate genetic diversity and relationships in the Portuguese Serpentina (SERP) and the Brazilian Moxotó (MOX) goat breeds, which present a striking resemblance and are believed to have a common origin. A total of 46 animals of the SERP breed were sampled in southern Portugal, and 233 MOX goats were sampled in five different regions of Northeast Brazil. Genetic diversity was high, with a mean number of alleles of nearly 8.7 in both breeds, but expected heterozygosity and allelic richness were higher in SERP. The genetic distance between the two breeds resulted in a global F_{ST} of 0.16, and a strong deficit in within-breed heterozygosity was observed in MOX, mostly because of population substructuring. The estimated inbreeding was about 0.05 in SERP and ranged from 0.02 to 0.08 in the different MOX subpopulations. These subpopulations showed considerable genetic differentiation from each other, and those sampled in Paraíba and Rio Grande do Norte are the ones with a closer relationship with SERP. The analysis with STRUCTURE confirmed that some MOX subpopulations may share a common, but distant, ancestry with SERP, both having contributions from the same potential ancestral population. Other MOX subpopulations, however, are identified with ancestral populations distinct from SERP. These analyses further confirmed that, with the exception of goats from Rio Grande do Norte, the other MOX subpopulations show very little evidence of admixture among them, which may reflect the typical goat raising system in Northeast Brazil, where herds are usually kept closed and isolated, with little opportunity for gene flow among subpopulations. Our results indicate that SERP is likely a distant ancestor of MOX, but founder effects, genetic drift, selection for different environmental constraints and the possible influence of other breeds in the more recent past, probably lead to a differentiation of MOX subpopulations from their distant ancestor, as well as from each other.

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