

Genetic variation and population structure of Italian native sheep breeds undergoing in situ conservation

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Abstract :

The genetic variability and presence of population substructures in 4 native Northern Italian sheep breeds, Alpagota, Brogna, Foza, and Lamon, undergoing in situ conservation, and 1 widespread Italian breed, Bergamasca, were studied by investigating 19 microsatellite markers. The breeds showed considerable genetic variability in terms of number of alleles and heterozygosity, with the exception of Alpagota, which was the least variable (0.607). Nevertheless, a significant deficit of heterozygotes was observed in each breed due to rather increased levels of inbreeding or to the presence of population substructures, probably caused by increased genetic variation in the founder populations. The analyses evidenced clear genetic differentiation ($F_{ST} = 0.085$), reduced levels of admixture, and presence of private alleles among the breeds, confirming their genetic uniqueness. In particular, according to Reynolds genetic distances, Alpagota was the most differentiated, perhaps because it had been bred mostly in a rather isolated area. Loss of any of the investigated breeds would result in a loss of genetic diversity ranging from 0.5 to 1.6% of the total observed gene diversity. Results supported the decision to safeguard these breeds as important reservoirs of genetic diversity and suggested breeding and mating practices to maintain variability and to overcome within-breed substructures.

Key Word :

genetic variability, in situ conservation, microsatellite, population structure, sheep

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