Genetic Diversity among Nine Free Range Local Chicken Ecotypes in Tanzania Based on Microsatellite DNA Polymorphisms

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Abstract

The genetic diversity among nine free-range local chicken ecotypes identified in Tanzania was evaluated using 20 polymorphic microsatellites markers. The ecotypes were named Ching'wekwe, Mbeya, Morogoro-medium, Kuchi, Singamagazi, N'zenzegere, Pemba, Tanga, and Unguja. A manual microsatellite typing procedure was adopted. Of the 20 microsatellite loci, 16 were amplified by PCR and were highly polymorphic. Four to 15 alleles per locus and four to seven alleles per ecotype were detected. Gene diversity was very high (62 to 79%). The shortest genetic distance as measured by Nei's standard genetic distance (D_S) was between Kuchi and Unguja ecotypes (D_S distance = 0.0671) while the White Leghorn and Unguja ecotype (D_S distance= 0.9149) presented the longest genetic distance. A Neighbour-Joining dendogram based on D_S distance showed the local chicken ecotypes to assort into three clusters. The bootstrapping values within the dendogram ranged from 41 to 98%. These results indicate that the free-range local chicken ecotypes to exist in different genetic groups. The accurate genetic typing of this animal genetic resource is important in making rational decisions on the utilisation of the chickens for economical use without compromising the conservation of each unique ecotype adapted to a particular eco-climatic zone.

Key words: Genetic diversity, Free-range local chicken ecotypes, Microsatellites, Animal genetic resourcesIntroduction

In the developing world the term breed as it is formally defined has little meaning because of non-existence of pedigree information (Rege, 2003). However, there is a multitude of uniquely identified and named populations of animals (including chickens) that may be equated to breeds in the developed world (Sonaiya, 1990; Rege, 2003). Genetic characterisation of these named populations will be of great importance in preparing some guidelines for development, utilisation and conservation of these unique populations.

The diversity of the free-range local chickens (FRLC) has mostly been expressed in terms of phenotypic characteristics.

Variations in adult body weight, egg weight, reproduction performance

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