

Assessment of Genetic Diversity and Population Structure of Goldstripe Sardinella, *Sardinella gibbosa* in the Transboundary Area of Kenya and Tanzania Using mtDNA and msDNA Markers

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Abstract : Goldstripe Sardinella, *Sardinella gibbosa*, (Bleeker, 1849) is a commercially and ecologically important small pelagic fish common in the Western Indian Ocean region. The present study aimed to assess genetic diversity and population structure of the species in the Kenya-Tanzania transboundary area using mtDNA and msDNA markers. Some 630 bp sequence in the mitochondrial DNA (mtDNA) Cytochrome C Oxidase I (COI) and five polymorphic microsatellite DNA loci were analyzed. Fin clips of 309 individuals from eight locations within the transboundary area were collected between July and December 2018. The *S. gibbosa* individuals from the different locations were distinguishable from one another based on the mtDNA variation, as demonstrated with a neighbor-joining tree and minimum spanning network analysis. None of the identified 22 haplotypes were shared between Kenya and Tanzania. Gene diversity per locus was relatively high (0.271-0.751), highest F_{is} was 0.391. The structure analysis, discriminant analysis of Principal component (DAPC) and the pair-wise ($F_{ST} = 0.136$ $P < 0.001$) values after Bonferroni correction using five microsatellite loci provided clear inference on genetic differentiation and thus evidence of population structure of *S. gibbosa* along the Kenya-Tanzania coast. This study shows a high level of genetic diversity and the presence of population structure ($\Phi_{st} = 0.078$ $P < 0.001$) resulting to the existence of four populations giving a clear indication of minimum gene flow among the population. This information has application in the designing of marine protected areas, an important tool for marine conservation.

Keywords : marine connectivity, microsatellites, population genetics, transboundary

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