Determination of Morphological and Genetic Diversity of Wild Guppy (*Poecilia reticulata*) in Sri Lanka across the MHC Complex with Special Reference to Class IIB Region

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Abstract

Wild guppies have potential in developing various strains with attractive colour patterns, tail types and tolerance to wide range of environment conditions, resistance to disease conditions due to high immunity. Application of molecular genetic markers, are important to identify diversity among wild guppies which are economically beneficial to ornamental industry and to implement conservation of these valuable genetic resources. Major histocompatibility complex (MHC) genes are highly polymorphic gene family and exon 2 of class II B gene is functionally important in immunity and disease resistance. Hence, in the present study attempts are made to assess the genetic and morphological diversity of wild guppy of Sri Lanka with special reference to immune related MCH class II B gene. A total of 238 wild guppies were collected from 10 regions to represent different agro-ecological zones of the country. The standard length in between 13-24 mm was selected (179 fishes) to collect morphological data and genomic DNA was extracted from muscle tissue using Chelex 100 DNA extraction kit. A PCR based method was used to amplify exone 2 region of candidate gene with forward (5'GTG GAT TTC AGA GAA TAT GCA 3') and reverse (5' TGA TTT ATC CAG AGC GGT TTG 3') primers. Touch down PCR was followed to amplification in the temperature range of 47 to 45 . Selected fish sample consisted of 43.6% of male fishes and 56.4% female fishes. Significant association existed in tail types and colour patterns versus region. Highest variation of tail pattern types was recorded from Buttala region and 40.8% of guppies consisted round tail type. High variation of colour pattern is observed from Badulla region. 58.7% fishes had brownish gray colour pattern and 43% had golden upper body colour pattern. Variation of upper body colour in all regions was similar. PCR protocol was optimized. There was a morphological diversity between wild guppy fishes in different regions of Sri Lanka. Exon II in MHC class IIB region was amplified and optimized PCR protocol for further studies. Sequence variation based on Single Nucleotide Polymorphism (SNPs) and differences of immune response of wild guppy population is yet to be analyzed.

Keywords: Major histocompatibility complex, wild guppy, morphological diversity, genetic diversity, immunity