

-: PREFACE :-

The research work has been started in 2013 and documented in the dissertation entitled “**Study of Genetic Diversity in the Threatened Ornamental Fishes, *Badis badis* (Hamilton-Buchanan, 1822) and *Amblyceps mangois* (Hamilton-Buchanan, 1822) from Terai and the Dooars region of North Bengal, India.**” under the supervision of Prof. (Dr.) Soumen Bhattacharjee, Cell and Molecular Biology Laboratory, Department of Zoology, University of North Bengal.

The studied region is located in the sub-Himalayan Terai and Dooars region of North Bengal, India. The important feature of this region is rich diversity in the faunal and florant resource. The snow capped mountain peaks, the dense foothill, the luxuriant forests, the frothing rivers, the lush paddy fields, vibrant green tea gardens makes this region of North Bengal a hotbed of bio-diversity or biodiversity hotspot. This region is intersected by numerous streams, rivers and rivulets. All their sources are the Darjeeling Himalaya in the north and are mainly snow fed and rain fed. Most of the rivers drain considerable amount of water during rainy season due to their large catchment area in the hills. Over last few years, wild populations two ornamental fishes viz., *Badis badis* and *Amblyceps mangois* have declined steadily mainly due of habitat loss, overexploitation, pollution, and destructive fishing procedures; the information is confirmed by the NBFGR (National Bureau of Fish Genetic Resources), India country’s apex body for the purpose.

There exists scanty information on the status of genetic diversity of *Badis badis* and *Amblyceps mangois* in India. Absolutely no information exists from Terai-Dooars region of West Bengal, India under the Eastern Himalayan biodiversity hotspot. Therefore, to the research work has been targeted to ascertain the present status of genetic diversity of this fishes that have potential ornamental and export values in a region of India. Moreover, proper exploitation and management of such ichthyofauna with regard to sustainable aquaculture can substantially improve human livelihood and also to conserve the germplasms in the wild.

Genetic variability of an organism is of great importance for its sustenance and loss of this curtails its adaptability and increases the risk of its extinction. However, maintaining the genetic variation in a threatened species is essential for survivability and its adaptation. Molecular markers are realistic and useful tool to investigate the genetic structure of populations of different species. Three major river systems have been studied from Terai-Dooars region of West Bengal, India and total seventeen populations (for *Badis badis*) and fourteen (for *Amblyceps mangois*) were selected from different geographic locations for collection of fish samples. The catch of the fishes from each location was very low these indicate the threatened population status of this species in this region. Therefore, a non-invasive DNA isolation technique was developed and used for extraction of genomic DNA from the fishes. The genomic DNA was extracted from the minute quantities of fins without sacrificing the organisms. In the present study RAPD and ISSR techniques are used for genetic diversity study because they are easy, cost effective and fast methods, especially when other sophisticated methods are not yet developed. Moreover, mitochondrial cytochrome oxidase sub-unit 1 (mtCOI) gene is also analyzed to observe the genetic diversity and the phylogenetic relationship with other populations from geographically isolated regions; and to substantiate the findings based on RAPD and ISSR markers

A correlative study based on several anthropogenic factors causing the dwindling population genetic structure with that of the available genetic diversity in the studied species can add a newer dimension to find out the cause of this low level of genetic variability as well as a possible conservational strategy. Information on intra and inter-specific genetic variation from the present study should form a baseline on which further studies can be undertaken. As the species is commercially important and has an ornamental value; and the region being located in the sub-Himalayan hotspot region, the management and proper rehabilitation of this ichthyofauna in the wild is essential from the standpoint of livelihood of rural fishermen and their economic restoration.