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The present status of ichthyofaunal diversity of river gGanga India: Synthesis of present v/s past

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ABSTRACT

In India, large rivers are experiencing serious threat to aquatic biodiversity, and therefore flagship projects are being executed on freshwater biodiversity conservation using various methods and strategies. Ganga River is the largest and longest river of India supporting rich structural and functional fisheries for decades. Periodical and systematic assessment of fish biodiversity of the large river ecosystem are important for effective conservation planning. Although over the years, the ichthyofaunal diversity of the river has been assessed under different programmes, however, regular assessment of fish diversity across different zones are not adequately studied and reported. In the present study systematic re-explorations were carried out and changing pattern of fish diversity and distribution during the period 2016–19 was recorded. We described a total of 190 fish species (182 indigenous species and 8 exotic) belonging to 135 genera, 62 families and 23 orders from upper Ganga (Haridwar) to the river mouth of Hooghly estuary (Ferozganj). The assessment of native species revealed about 10% and 14.21% of the total species are listed under threatened status of IUCN Red List (version 2020) and CAMP (1990) threatened category respectively. Among the exotics, common carp (*Cyprinus carpio*) and tilapia (*Oreochromis niloticus*) was found dominated in upper, middle and part of lower stretch. The study showed considerable dominance of major and minor carps followed by small indigenous fishes. The evaluation of species richness through biodiversity indices revealed the lower stretch to be the richest zone having a strong cluster relationship (>0.71) among all the stations. The analysis of similarity percentage (SIMPER) of all the stations revealed an average similarity of 5.69% between all the stations. Shift in distribution pattern of few fish species was also recorded in certain sections of the river. The study indicated drastic decline of commercially important major carps and catfish in comparison to previous records. The present paper also discussed about the potential threats and important guidelines concerning sustainable fisheries of River Ganga. The comprehensive information presented in this paper on fish diversity, distribution, abundance, production trend of major fish group of the river in different zones have highlighted relative change as compared to previous studies that will be useful for monitoring biodiversity and fish conservation planning of the river basin.

1. Introduction

Aquatic ecosystem constitutes a valuable natural resource comprising number of living organisms like plants, insects, fish, invertebrates and microorganisms. Freshwater fishes in particular, often act as a bioindicator susceptible to major alterations of the habitat [1]. Thus, in this recent challenging environment of fish diversity [2] water bodies particularly rivers require periodical study to generate adequate information on biodiversity. India is a global biodiversity hotspot [3] contributing a substantial percentage of important ecological services to

the society. The river Ganga possesses an important attachment to the cultural, heritage and economic values of India [4]. The river traverses a long course of 2525 km from Gompa to Gangaasagar and is designated to be the fifth largest river in the world by discharge and the longest river in the country. Besides, being attached spiritually and emotionally, it is a major source of navigation and communication since ancient times. The river supports a large number of fish species on which thousands of people depend for livelihood. It is considered as the mainstay of riverine fisheries of India. The River Ganga originates from the western Himalayas draining effectively eight states of India covering

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