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Fish diversity studies of River Narmada, Jabalpur Region (M.P)

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Abstract

The current study intends to provide an overview of fish diversity of river Narmada at Jabalpur region. The fish diversity is correlated with biological and various physico-chemical parameters that regulate the productivity and distribution of different species of fishes. The fish population is abundant and majority of fishes are exploited for human consumption. In current studies, attempts have been made to collect, classify and identify fish of river Narmada in Lamhetaghat and Bhedaghat sites. The survey indicated that 29 species of fishes were recorded in these sampling stations. The major fish abundance was noticed viz. major carps, minor carps and cat fishes. The several species of fish belonging to order Cypriniformes, Belontiiformes, Ophiocephaliformes, Perciformes and Siluriformes are recorded too. Out of these Cypriniformes is the most dominant group with recorded 22 species of fishes. Some species of fishes like *Cirrhinus cirrhosa*, *Labeo bata* showed a declining trend in the stretch. Diversity was observed to be lowest in March (2011) and was highest in November (2010). The main reason behind the declining species diversity is introduction of exotic species, habitat destruction and over-fishing. A nearly Gelatin factor i.e. (Erstwhile shaw Wallace Gelatins Ltd) also add up to the contribution to an extent.

Keywords: fish diversity, Jabalpur region, Lamhetaghat, Bhedaghat, Narmada River.

Introduction

The Narmada is the fifth largest river in India and longest west flowing river of Indian peninsula originating from Maikal ranges at Amarkantak in Madhya Pradesh at an elevation of 900 meters. It flows over a length of 1312 km before draining into Gulf of cambay, 50 km west of Bharuch. Jabalpur is the main city of central India and traditionally known as Mahakoushal. It is situated almost in the centre of India (between coordinates of 23⁰10' latitude and 79⁰57'E longitude and with a general elevation of about 393 meters above MSL). The fresh water resources are very precious for the life on our planet. The aquatic ecosystem is important and it has a large number of economically important animals especially fish, which is an important source of food. Arjun Shukla and Sunita Sharma (2017) ^[1] have studied fish diversity of river Narmada during post monsoon season to spring season. They recorded 25 species of fishes and observed the abundance of major carp and cat fishes. Cypriniformes was the most dominating throughout their investigation. Zubair Azad and Arjun Shukla (2015) ^[2] have studied that biodiversity is essential for stabilization of ecosystem. They studied the ecology of river Narmada for the duration of six months in 2015 and observed 23 species of fishes belonging to 10 families. Their study revealed that *Cyprinidae* was the most dominating family among all. Fish diversity of river essentially represents the fish diversity and their abundance. River conserves a rich variety of species, which supports the commercial fisheries (Shukla and Singh, 2013) ^[3]. India occupies the ninth position in having largest and richest biodiversity, about 450 families of fresh water fishes are present globally and roughly 40 are present in India. The main aim of the conducted study is to document ichthyofauna of river Narmada and provide measures for its conservation and also to report the factors affecting fish diversity.

Materials and methods

For the present study two sampling stations (Ghats) were selected at the bank of river Narmada i.e; Lamhetaghat and Bhedaghat, which are 16 km and 21 km away from the city headquarters respectively. The period of investigation was one year from October 2010 to September 2011.

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Fish species were collected with the help of local fishermen and the tribal people at various locations. The specimens were presented at 5% formalin and identification was done with the help of literature (Day F. (1878) [4] and Jayaram K.C. (1981) [5]. Species diversity was measured by the following methods:-

$$\text{Number of species} = \frac{\text{Number of species}}{\sqrt{\text{Total Number of Individuals}}} \times 100$$

Results and Discussion

Data collected from the above mentioned sampling sites was utilized to estimate the fish diversity in the river Narmada. 29 species of fish belonging to 5 orders were recorded. Cypriniformes was observed to be the most dominating order with recorded 22 species (Table 1) while Ophiocephaliformes was the second leading order with 3 species and rest other were Beloniformes, Perciformes and Siluriformes with 1, 2 and 1 species respectively. Similar data was recorded by Sunita Bakaware, et.al.,(2013)[6]. They observed 51 species of fishes belonging to 7 orders and included 15 families, alongwith higher diversity level in winters and lower in summers. Dominance of *Cypriniformes* in Narmada river was

also recorded by Vipin Vyas et.al., (2013)[7]. In the research duration of one year i.e, from October 2010 to September 2011, maximum fish diversity is recorded in November (1.1). Whereas minimum in March (0.51)(Table 2). Low diversity in summer months is due to extreme reduction of depth which ultimately results in increase of salinity, free CO₂ and hardness of water, decrease of dissolve oxygen, transparency and pH of water leading to the reduction in fish diversity whereas its vice versa in winters. Due to this, large scale degradation of physico – chemical parameters and very poor catchment of fishes is recorded in summers thus reflecting low diversity level. Some external factors also adds up to this situation such as introduction of exotic species, simple habitat destruction resulting from human withdrawals for human acts like agriculture, irrigation etc and direct exploitation such as impoundments, migration of species etc. (V. Vyas et. al., (2006) [8]. As per comparing the data with the literature of Rao K.S et. al., (1991) [9] it is quiet clear that around 31 species were at the threat of decline and can be considered as endangered species. The threatened Ichthyofauna of river Narmada in western zone were studied by Verma D. and Kanhere R.R (2007) [10].

Pictures of few fishes recorded in Narmada River



Catla catla



Labeo rohita



Labeo calbasu



Cirrhinus mrigala



Cyprinus carpio



Labeo fimbriatus



Cirrhinus reba



Labeo bata



Mystus seenghala



Wallago attu



Ompok bimaculatus



Heteropneustes fossilis



Clarias batrachus



Channa punctatus



Anabas testudineus



Notopterus chitala



Notopterus notopterus



Mastacembalus armatus

Table 1: List of fishes recorded in river Narmada during Oct. 2010 to Sept.2011.

Order	Family	Genera
Cypriniformes	Cyprinidae	<i>Catla catla (Ham)</i>
		<i>Cirrhinus mrigala</i>
		<i>Labeo rohita</i>
		<i>Labeo calbasu</i>
		<i>Cyprinus carpio</i>
		<i>Puntius sarana</i>
		<i>Labeo fimbriatus</i>
		<i>Cirrhinus cirritosa</i>
		<i>Cirrhinus reba</i>
		<i>Labeo bata</i>
		<i>Puntius choca</i>
		<i>Tor tor</i>
		<i>Mystus seenghala</i>

		<i>Tor putilora</i>
	Siluridae	<i>Ompak bimaculatus</i>
		<i>Wallago attu</i>
		<i>Ompak pabo</i>
	Bagridae	<i>Mystus bleoperi</i>
		<i>Ompok pabo</i>
		<i>Rita rita</i>
	Schielbediae	<i>Heterpheulstes fossils</i>
Beloniformes		<i>Clupisoma garua</i>
	Belonidas	<i>Xenthadon cancila</i>
Ophiocephaliformes	Ophio Cephalidae	<i>Channa marulius</i>
		<i>Channa punetatus</i>
		<i>Channa striatus</i>
Perciformes	Centro pomidae	<i>Chanda nama</i>
	Nandidae	<i>Nandus nandus</i>
Siluriformes	Pangasiidae	<i>Pungasius pangasius</i>

Table 2: Species diversity of fishes in river Narmada (2010-11).

Month	Species Diversity
October	0.94
November	1.1 (High diversity)
December	0.88
January	0.57
February	0.87
March	0.51 (Low diversity)
April	0.89
May	0.74
June	0.68
July	0.53
August	0.59
September	0.66

Conclusion

The results indicated that decline in the overall abundance of fish fauna in river Narmada as compared to references is a complete indication of habitat destruction, which seems to be caused by nearby Gelatin factory, ritual performances by nearby villagers and by poisoning of the fish fauna using plant herbs extraction and pesticides in the nearby fields too. So, I conclude and sum-up my research work by saying that there is an urgent need to study the life history traits and demography of the most important endangered species of this Holy River. As lack of studies in this field may lead to threatening of certain edible fishes and may reduce the abundance quality level of fish fauna of river Narmada.

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