



Study on Ichthyofaunal Diversity of Jammer River: A Tributary of Narmada River

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ABSTRACT: The present study was carried out on the Jammer River, a tributary of the River Narmada, joining at right bank just upstream of Indira Sagar Reservoir. Narmada River has been studied for its conservation and ichthyofaunal diversity but its tributaries have not been studied for its aquatic diversity. Observance in this view, the diversity of fish fauna of the Jammer River in Dewas District, Madhya Pradesh, Central India has been studied from the period May 2011 to March 2013. This river is the lifeline of the people resides in nearby villages mostly for various domestic activities. Fishing for livelihood and food is a common practice of the local community. The fish diversity of the river is still unexplored and not documented. The aim of the study was to explore the fish fauna of Jammer River. In the course of investigation, four sampling spots were selected viz. Harangaon, Jeeyagaon, Sindalpur Bridge and confluence point of Narmada River. The total 27 fish species were recorded under four orders, nine families and 16 genera. 21 species of Cypriniformes, three species of Ophiocephaliformes, two species of Perciformes and one species of Mastacembeliformes have been recorded. The Cyprinidae family is dominant and sub dominant family is Ophiocephalidae. The over fishing and pollution are the major threat for fish diversity of the Jammer River. The present study has categorized the endangered and threatened fish species of Jammer River.

Key Words: Fish Diversity, Fresh Water Fishes, Jammer River, Naramda River, Conservation.

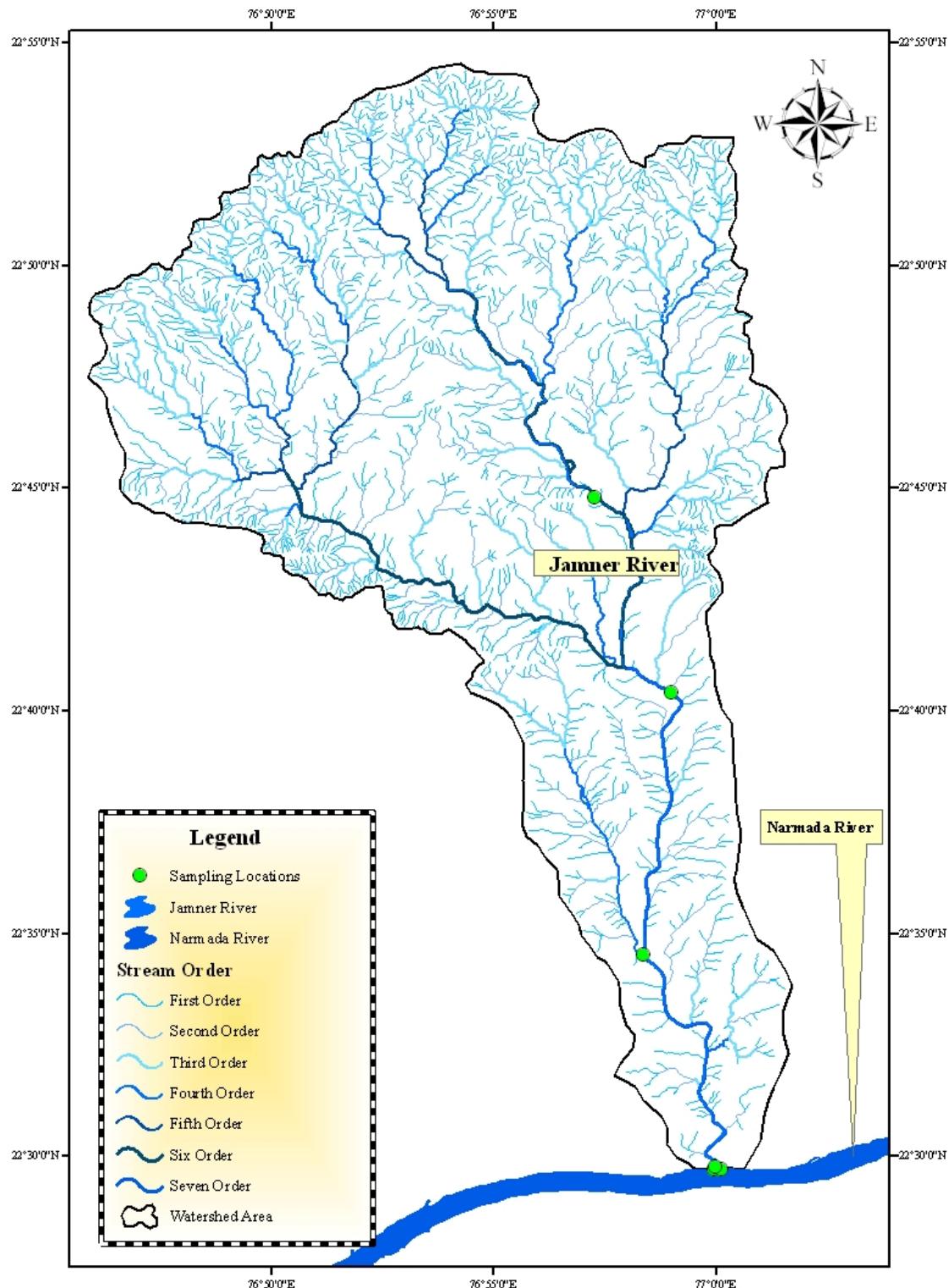
I. INTRODUCTION

The Term biodiversity includes the entire living organism (plants and animals) with their genetic material & ecosystem. The fish diversity is a branch of aquatic diversity. Fish constitutes half of the total number of vertebrates in the world. They live in almost all conceivable aquatic habitats; 21,723 living species of fish have been recorded out of 39,900 species of vertebrates out of these 8,411 are freshwater species and 11,650 in marine. India is one of the mega biodiversity countries in the world and occupies the ninth position in terms of freshwater mega biodiversity. India there are 2,500 species of fishes of which 930 live in freshwater and 1,570 are marine (Kar *et al.*, 2003). Madhya Pradesh has 180 fish species which contributes 29% of fish fauna of the country.

The Narmada River is a west flowing river of central India which has been extensively studied for its ecological aspects. Ichthyofaunal diversity of Narmada has been documented by various workers (Hora and Nair 1941), (Karamchandani *et al.*, 1967), (Rao *et al.*, 1991). Most of these studies were confined to the main river but tributaries have not been studied.

A few recent works on different aspects of fish diversity were also confined main stream in central part of Narmada (Vyas *et al.*, 2006-07). Very first record of fish diversity of Narmada was on hill stream of Satpura ranges (Hora & Nair 1941). Later Tawa and Barna tributaries were dammed to form reservoir and studies were done on these reservoirs. Vyas *et al.*, (2009) worked on Ganjal River which joins Narmada River near the backwaters of Indira Sagar.

There is practically not much information available in the literature regarding the recent fish fauna of the Jammer River. Further no attempt seems to have been made so far to study the fish diversity of this river. The Jammer River is one of the most important tributary of Narmada River. The river flows from Daulatpur Village (origin point) of Sehore District and joins Narmada River at Nemawar Village, Dewas District Madhya Pradesh. The river is the lifeline of the people resides in nearby villages mostly for various domestic activities. Fishing for livelihood and food is a common practice of the local community. The fish diversity of the river is still unexplored and not documented.



Map 01: Map showing Jamner river and its catchment area in Narmada basin.

II. MATERIALS AND METHODS

Sampling and Analysis:

Physicochemical Analysis: During the study, water samples were collected at seasonal interval during May 2011 and April 2012, using clean 1L-polyethylene bottle for analysis of water variables in the laboratory from preselected station of the river. The water quality parameters such as air and water temperature, pH, Secchi Disc transparency, alkalinity (carbonate and bicarbonate) and dissolved oxygen were measured on in the field itself. The air and water temperature was recorded with the help of mercury thermometer, pH, conductivity and turbidity were recorded through digital equipment and dissolved oxygen was analyzed use Modified Winkler's Method. The methodology adopted for the analysis of physicochemical properties was followed from American Public Health Association (APHA, 1998) and Adoni et al., (1985).

Collection of fish: The fishes were collected using monofilamentous gill nets of 10-50 mm mesh sizes. We also used cast nets of 10-25 mm mesh sizes for collecting fish in shallow areas. Fish specimens were also collected from different fish landing sites. All the specimens were preserved in 4% formaldehyde solution at the field.

Laboratory Procedures: Fishes brought to laboratory were preserved in 10% formalin solution in separate specimen jar according to the size of specimen. The fishes were identified using standard keys of Jayaram (1981), Qureshi & Qureshi (1983), Jhingran (1991), Day Francis (1994), and Shrivastava (1998). Fish Base website was also referred for various aspects of fish fauna (www.fishbase.org).

III. RESULTS AND DISCUSSION

The study was conducted in two seasons namely: dry (October- June) and wet (July – September). The value of physico-chemical parameters are as follow: pH (7.0-8.9), air temperature (19°C - 41°C), water temperature (20°C - 33°C), transparency (08cm - 144cm), conductivity (210 $\mu\text{/cm}$ - 670 $\mu\text{/cm}$), free CO_2 (04 mg/l - 62mg/l), total alkalinity (128 mg/l - 252mg/l), Dissolved oxygen (6.8 mg/l -13.6mg/L), chloride (6.99 mg/l - 420.57mg/l), total hardness (26 mg/l - 318mg/l), calcium hardness (21 mg/l - 144.9mg/l), magnesium hardness (1.21 mg/l - 42.06mg/l), and turbidity (4.8 NTU -10.3 NTU). The river serves as a source of water for irrigation.

During the study of fish biodiversity of Jamner River, a total of 27 fish species were recorded belonging to four orders, nine families and 16 genera from all sites. 21 species of Cypriniformes, three species of Ophiocephaliformes, two species of Perciformes and one species of Mastacembeliformes have been

recorded. The Cyprinidae family is dominant and sub dominant family is Ophiocephalidae. The members of family Cyprinidae were dominated by 17 species (62.96%), followed by Ophiocephalidae three species (11.11%), Cobitidae, Heteropneustidae, Siluridae, Bagridae, Mastacembelidae, Gobiidae, Ambassidae one species each family. Family Cyprinidae was represented by the *Chela labuca*, *Rasbora daniconius*, *Garra gotyla*, *Puntius sophore*, *Puntius conchonius*, *Puntius sarana*, *Puntius filamentosus*, *Puntius chola*, *Puntius chrysopterus*, *Puntius ticto*, *Amblypharyngodon mola*, *Amblypharyngodon microlepis*, *Danio devario*, *Labeo bata*, *Labeo boga*, *Labeo Calbasu* and *Aspidoparia jaya* was represented families Cobitidae by *Nemacheilus botia*, Heteropneustidae by *Heteropnenstes fassilis*, Siluridae by *Ompok bimaculatus*, Bagridae by *Mystus cavasius*, Mastacembelidae by *Mastacembelus armatus*, Gobiidae by *Glossogobius giuris*, Ambassidae by *Chanda ranga*, Ophiocephalidae by *Channa punctatus*, *Channa gachua* and *Channa striatus* (Table 1). During the studies 309 fish individuals were collected from four sites. Among these Cyprinidae was most dominant family constituting (88.67%), individuals which is followed by Ophiocephalidae (4.85%), Heteropneustidae and Ambassidae (1.94%), Gobiidae (0.97%), Siliuridae (0.64%), Cobitidae, Bagridae and Mastacembelidae (0.32%), respectively (Table 2). Out of all these, *Puntius sophore* has the maximum number of individuals and found from all sites. The dominant species, *Puntius sophore* has total 108 individuals (34.95%) *Labeo bata* 25 individuals (8.09%) and *Puntius conchonius* 21 individuals (6.79%) respectively. The least abundant fish was *Nemacheilus botia*, *Puntius chola*, *Puntius chrysopterus*, *Amblypharyngodon microlepis*, *Mystus Cavasius*, *Mastacembelus armatus*, *Channa punctatus* with one individual each (0.32%).

Vyas et al., (2007) reported, a total of 47 species of fishes belonging to 29 genera, 15 families, and six orders were recorded in the Hoshangabad stretch of Narmada.

Various workers have done work on main river whereas very little is known about the tributaries of Narmada river. First detailed work on Narmada was done by Karamchandani et al., (1967) which recorded 77 fish species belonging to 41 genera, 19 families and seven orders. In a stretch from Jabalpur to Khalghat, Anon (1971) reported 46 species belonging to 27 genera, 14 families and seven orders. Rao et al., (1991) have undertaken pre impoundment survey at Punasa, Omkareshwar, Mandleswar, Maheshwar and Barwani pertaining to the river and have enlisted 84 fish species belonging to 45 genera, 20 families and six orders.

Very first record of fish diversity of Narmada was on hill stream of Satpura ranges (Hora & Nair 1941) reported 41 species. Vyas *et al.*, (2009) studied on fish fauna of tributaries and recorded 52 species belonging to 28 genera, 13 families and 7 orders. Bose *et al.*, (2013) have reported 57 species, belonging to 35 genera, 13 families and six orders from Middle Stretch of River Tawa.

Conservation status:

According to CAFF (2006) status, two species are Endangered which are *Nemacheilus botia* and *Ompok bimaculatus*, six species are Vulnerable, these are *Garra gotyla*, *Puntius sarana*, *Puntius chola*,

Heteropneustes fossilis, *Mastacembelus armatus* and *Chanda ranga* are given in (Table 1). Whereas 11 species fall under risk near threatened, viz., *Puntius sophore*, *Puntius conchonius*, *Puntius ticto*, *Danio devario*, *Labeo bata*, *Labeo boga*, *Labeo calbasu*, *Mystus cavasius*, *Glossogobius giuris*, *Channa punctatus* and *Channa striatus*. Three species fall under Lower risk least concern category viz., *Chela labuca*, *Rasbora daniconius* and *Amblypharyngodon mola*, while one species was Not evaluated which is *Puntius chrysopterus* and one species is Data deficient which is *Amblypharyngodon microlepis*.

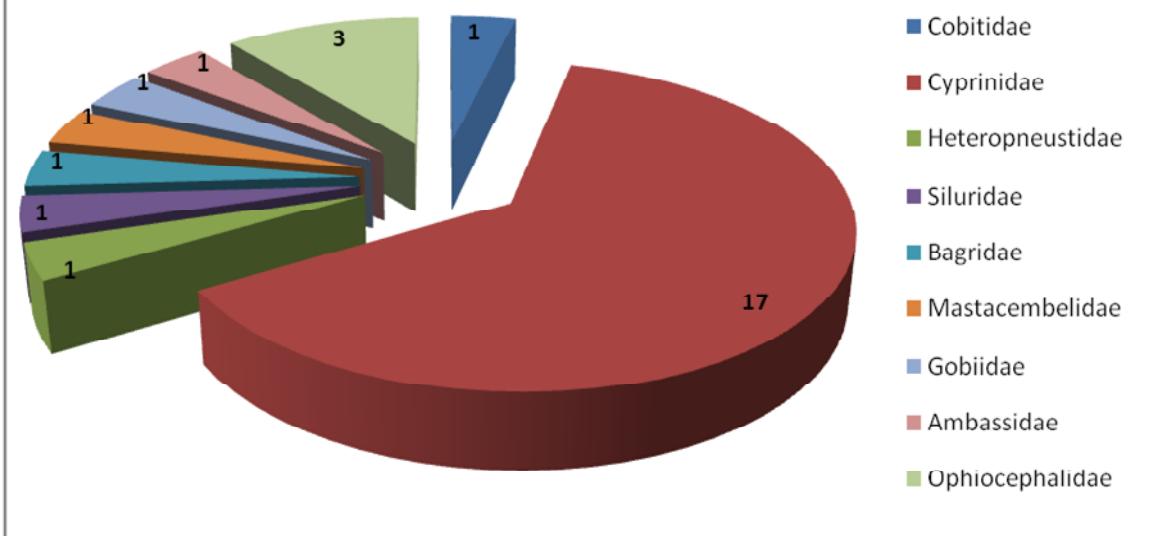
Table 1: Systematic Position of fish fauna of Jamner River.

S.No.	Order	Family	Species Name	CAFF 2006
1	Cypriniformes	Cobitidae	<i>Nemacheilus botia</i>	EN
2		Cyprinidae	<i>Chela labuca</i>	LR-lc
3			<i>Rasbora daniconius</i>	LR-lc
4			<i>Garra gotyla</i>	VU
5			<i>Puntius sophore</i>	LRnt
6			<i>Puntius conchonius</i>	LRnt
7			<i>Puntius sarana</i>	VU
8			<i>Puntius filamentosus</i>	
9			<i>Puntius chola</i>	VU
10			<i>Puntius chrysopterus</i>	NE
11			<i>Puntius ticto</i>	LRnt
12			<i>Amblypharyngodon mola</i>	LR-lc
13			<i>Amblypharyngodon microlepis</i>	DD
14			<i>Danio devario</i>	LR-nt
15			<i>Labeo bata</i>	LRnt
16			<i>Labeo boga</i>	LRnt
17			<i>Labeo calbasu</i>	LRnt
18			<i>Aspidoparia jaya</i>	
19		Heteropneustidae	<i>Heteropneustes fossilis</i>	VU
20		Siluridae	<i>Ompok bimaculatus</i>	EN
21		Bagridae	<i>Mystus cavasius</i>	LRnt
22	Mastacembeliformes	Mastacembelidae	<i>Mastacembelus armatus</i>	VU
23	Perciformes	Gobiidae	<i>Glossogobius giuris</i>	LRnt
24		Ambassidae	<i>Chanda ranga</i>	VU
25	Ophiocephaliformes	Ophiocephalidae	<i>Channa punctatus</i>	LR-nt
26			<i>Channa gachua</i>	
27			<i>Channa striatus</i>	LR-nt

EN = Endangered; Vu = Vulnerable; LRnt = Lower risk near threatened; LR-lc = Lower risk least concern; NE = Not evaluated; DD = Data deficient.

Table 2: Family wise Fish Individuals and Percent of Jamner River.

Family	individuals	Percent (%)
Cobitidae	1	0.32%
Cyprinidae	274	88.67%
Heteropneustidae	6	1.94%
Siluridae	2	0.64%
Bagridae	1	0.32%
Mastacembelidae	1	0.32%
Gobiidae	3	0.97%
Ambassidae	6	1.94%
Ophiocephalidae	15	4.85%
Total Individuals	309	100%

Fig. No.-1 Family wise species composition of Jamner river

CONCLUSION

Documentation of biodiversity has become very much important aspect to understand different ecosystem and influences on them. The result of the present study reveals that Jamner River harbours a rich and diversified fish fauna although it showed a record distribution as the cyprinidae contribute 88.67% of the total population. Due to some anthropogenic activities fish diversity of the river is in declining mode. To conserve this inherent treasure, a long term management plan should be adopted. Effective implementation of the regulations on mesh size and fishing gears is much needed to prevent over

exploitation. Strict management measures with large scale public awareness would be essential to save the fish fauna of this river.

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