

Original Research

Species diversity and assemblage of fish fauna of Sip River: A tributary of Narmada River

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ABSTRACT:

The Sip River is a tributary of the River Narmada, joining Narmada right bank just upstream of Indira Sagar Reservoir. A systematic study of fish diversity in River Sip has been neglected and the information on this aspects is scanty, either very old or not been updated for decades. Keeping this in view, the present study was conducted. The aim of this study is to document ichthyofauna and to provide measures for their conservation. The present work was done from the period of May 2011 to April 2012. A total of 29 species belonging to 17 genera, eight families and three orders were recorded. A total of 427 individuals were caught from eight stations. The most abundant group of fish was Cyprinidae. Out of all these, *Rasbora daniconius* has the maximum number of individuals (116) recorded from all sites and contributes 27.16% of the total population.

Keywords:

Biodiversity, Sip River, Narmada River, Conservation, Ecosystem

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INTRODUCTION

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 in concern of fish community by Hora and Nair (1941), Karamchandani *et al.*, (1967), Vyas *et al.*, (2007). Most of these studies were confined to the main river but tributaries have not been studied yet.

Some recent works on various aspects of fish diversity were also confined to central part of the river Narmada (Vyas *et al.*, 2007). Very first record of fish diversity of Narmada was on the hill stream of Satpura ranges (Hora and Nair 1941). Later Tawa and Barna tributaries were dammed to form reservoirs 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. No record of fish fauna of Sip River is available in the present literature.

Therefore, our objective in this study is to document the fish diversity and species composition in Sip River. The information from this investigation will serve as a baseline data for carrying out further study on ecology, conservation, sustainability and management of fisheries resources of this tributary of Narmada in light of the changing habitat conditions due to dam formation.

STUDY AREA:

The Narmada River is one of the three major rivers in peninsular India. It flows over a length of 1312km before draining through the Gulf of Cambay into the Arabian Sea. Narmada receives 41 principal tributaries. Out of which 22 tributaries join from the left bank and 19 from the right bank. The river under the study is a right bank tributary of river Narmada namely Sip river. The Sip river originates near Ramdasi village of Ichhawar Tehsil in Sehore district of Madhya Pradesh, (Longitude 77° 11' E and Latitude 22° 34' N) at an elevation of above 432 M msl and joins river Narmada near village Satdev of Narsurlaganj Tehsil in Sehore

district, (Longitude 76° 56' E and Latitude 22° 54' N) at an elevation of above 292 M msl. Total length of Sip River is about 68 km. The catchment area of Sip river basin is shown in Map – 01.

Fish sampling was conducted at eight pre-selected locations in the river Sip namely Kaliyadev, Ambha Kadim, Jhirniya, Chhapri, Pandagaon, Confluence Point of Sip River, Up Stream Sip – Narmada River Confluence and Down Stream Sip – Narmada River Confluence.

MATERIALS AND METHODS:

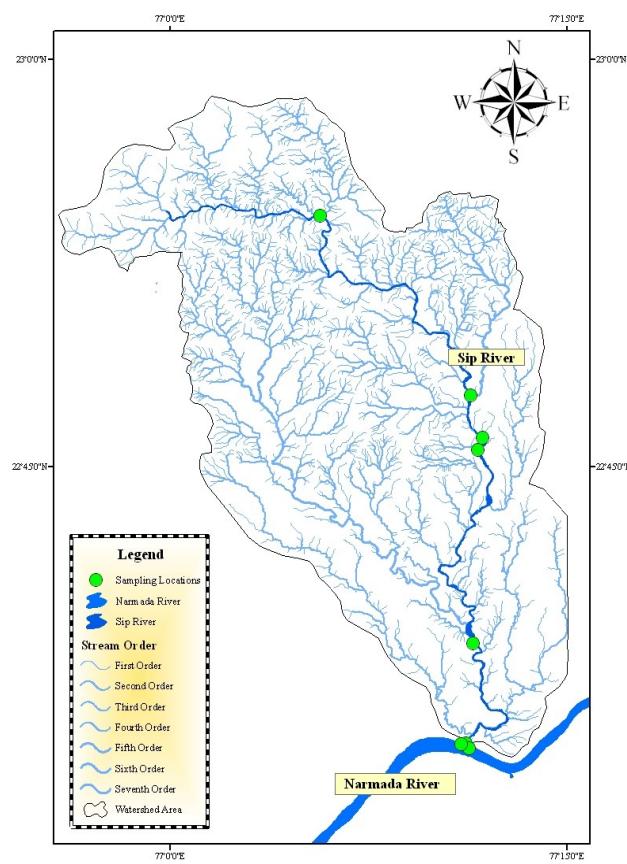
Sampling and Analysis:

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 Winkle'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 size. We also used cast nets of 10-25 mm mesh size for collecting fish in shallow areas. Fish specimens were also collected from different fish landing sites. All specimens were preserved in 4% formaldehyde solution at the field.



Map – 01: Map showing Sip river and its catchment area in Narmada basin

Laboratory Procedures:

Fishes brought to laboratory were preserved in 10% formaldehyde solution in separate specimen jar according to the size of specimen. The fishes were identified using standard keys of Jayaram (1981), Qureshi and 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).

RESULTS AND DISCUSSION:

At the period of this study, the two seasons were: dry (October- June) and wet (July – September), pH (7.0-8.9), air temperature (27°C - 36°C), water temperature (22°C -31°C), transparency (09cm - 90cm), conductivity (270 µ/cm - 618µ/cm), free CO₂ (22 mg/l – 50 mg/l), total

alkalinity (182 mg/l – 504 mg/l), Dissolved oxygen (6.4 mg/l -13.6 mg/L), chloride (7.94 mg/l - 69.5 mg/l), total hardness (90 mg/l – 190 mg/l), calcium hardness (46.2 mg/l – 102 mg/l), magnesium hardness (43.8 mg/l – 88 mg/l), and Turbidity (1.05 NTU -15.4 NTU). The river serves as a source of water for irrigation.

During the present study of fish biodiversity of Sip River, a total of 29 species belonging to eight families and 17 different genera and three orders were recorded. The species were collected at different sampling sites during May 2011 to April 2012. The members of family Cyprinidae were dominated with 19 species, followed by Cobitidae three species, Ophiocephalidae two species, Gobiidae one species, Heteropneustidae one species, Siluridae one species, Ambassidae one species, Bagridae one species. Family Cyprinidae was represented by the *Oxygaster bacaila*, *Oxygaster gora*, *Rasbora daniconius*, *Garra gotyla*, *Puntius sophore*, *Puntius dorsalis*, *Puntius conchonius*, *Puntius sarana*, *Puntius chola*, *Puntius chrysopterus*, *Puntius ticto*, *Amblypharyngodon mola*, *Danio devario*, *Labeo bata*, *Labeo boga*, *Labeo pangusia*, *Labeo calbasu*, *Aspidoparia jaya* and *Tor tor*. Family Cobitidae by *Lepidocephalichthys guntea*, *Nemacheilus botia* and *Nemacheilus duwi*, Bagridae by *Mystus bleekeri*, Heteropneustidae by *Heteropneustes fossilis*, Siluridae by *Ompok bimaculatus*, Gobiidae by *Glossogobius giuris*, Ambassidae by *Chanda ranga*, Ophiocephalidae by *Channa gachua* and *Channa striatus*. From all the stations, Cyprinidae formed the largest dominant family contributing the 19 species (62.06%); Cobitidae formed the subdominant family contributing three species (10.32%) and rest of the family followed the order of abundance.

During the studies 427 fish individuals were collected from eight sites, belonging to three orders, eight families, 17 genera and 29 species (Table -1). Out of all these, *Rasbora daniconius* has the maximum number of individuals found from all the sites. The

Table - 1: Systematic Position of fish fauna of Sip River

S.No	Order	Family	Species
1	Cypriniformes	Cobitidae	<i>Lepidocephalichthys guntea</i>
2			<i>Nemacheilus botia</i>
3			<i>Nemacheilus duyi</i>
4		Cyprinidae	<i>Oxygaster bacaila</i>
5			<i>Oxygaster gora</i>
6			<i>Rasbora daniconius</i>
7			<i>Garra gotyla</i>
8			<i>Puntius sophore</i>
9			<i>Puntius dorsalis</i>
10			<i>Puntius conchonius</i>
11			<i>Puntius sarana</i>
12			<i>Puntius chola</i>
13			<i>Puntius chrysopterus</i>
14			<i>Puntius ticto</i>
15			<i>Amblypharyngodon mola</i>
16			<i>Danio devario</i>
17			<i>Labeo pangusia</i>
18			<i>Labeo bata</i>
19			<i>Labeo boga</i>
20			<i>Labeo calbasu</i>
21			<i>Tor tor</i>
22			<i>Aspidoparia jaya</i>
23		Bagridae	<i>Mystus bleekeri</i>
24		Heteropneustidae	<i>Heteropneustes fossilis</i>
25		Siluridae	<i>Ompok bimaculatus</i>
26	Perciformes	Gobiidae	<i>Glossogobius giuris</i>
27		Ambassidae	<i>Chanda ranga</i>
28	Ophiocephaliformes	Ophiocephalidae	<i>Channa gachua</i>
29			<i>Channa striatus</i>

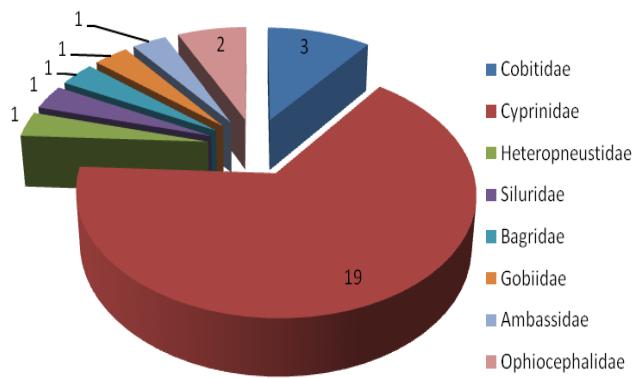
dominant species, *Rasbora daniconius* has total 116 individuals (27.16%) followed by *Danio devario* with 59 individuals (13.81%) and *Puntius conchonius* with 47 individuals (11%) respectively. The least abundant fish was *Lepidocephalichthys guntea* with one individual (0.23%).

Among all these families Cyprinidae was the most dominant family constituting (88.75%) which is followed by Cobitidae (5.38%), Bagridae (2.81%) and Heteropneustidae and Ophiocephalidae (0.93%) and

Siluridae and Ambassidae (0.46%) and Gobiidae (0.23%) respectively (Figure-1). Vyas *et al.*, (2006- 07) reported, a total of 47 species of fishes belonging to 29 genera, 15 families and six orders in the Hoshangabad stretch of River Narmada.

Vyas *et al.*, (2012) worked on fish biodiversity of

Betwa River, a total of 60 fish species belonging to 18 families and 36 genera were recorded. Verma and Kanhere (2007) revealed that at least 39 species in Narmada River are declined and considered as threatened

**Figure 1. Family wise fish species of Sip River**

species or endangered species.

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.

Hora and Nair (1941) Very first recorded 41 species of fish from River Narmada on the hill stream of Satpura ranges. Vyas *et al.*, (2009) studied on fish fauna some tributaries of River Narmada and recorded 52 species belonging to 28 genera, 13 families and seven orders. Bose *et al.*, (2013) have reported 57 species, belonging to 35 genera, 13 families and six orders from middle stretch of river Tawa.

CONCLUSION

In conclusion, increased fishing pressure exerted from overfishing activity of the artisanal fishermen that operating in this water body and farming activities around the river as factors that were probably responsible for low fish composition and diversity in Sip River. This study could serve as baseline data in assisting relevant

bodies in the management and conservation of fisheries resources of this river where there are dearth of information related to its fish and fisheries. Moreover formation of reservoirs on the main river course and on its tributaries may result in the change in fish faunas in due course of time.

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