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RESEARCH ARTICLE

Assessment of Fish assemblage and distribution in Barna Stream Network in Narmada basin (Central India)

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Abstract

The present study deals with the fish diversity of Barna River and its tributary in Raisen district, Madhya Pradesh, Central India. Fish studies were undertaken during Oct. 2011 to Nov. 2012. The aim of the study was to explore the fish fauna of Barna River. The sampling stations were conducted in Barna and its tributary streams. Fishes were collected directly from sampling stations two times in a period of investigation. The results of present investigation reveal the occurrence of 33 fish species belonging to 5 orders, 9 families and 21 genera. The order Cypriniformes was found dominant (24 species) followed by Perciformes and Ophiocephaliformes (3 species) both, Mastacembeliformes (2 species) and Beloniformes (1 species). The species diversity was analyzed using the following diversity indices: Simpson dominance index (D); Simpson index of diversity (1-D); Shannon-Weiner index (H); Evenness index and Margalef index with the help of software PAST (Pale ontological Statistics Software Package for Education and Data Analysis). The most abundant family was Cyprinidae, having 250 individuals (75%) followed by Cobitidae with 32 individuals (10%). Simpson index of diversity (1-D), Shannon-Weiner index (H) and Margalef index showed higher values at sampling site – V (Chamarsil). Some endangered and rare fish fauna are also reported in the present investigation.

Introduction

The state of Madhya Pradesh is one of the important aquatic biodiversity hotspots of the country, having bestowed with a large number of water bodies both lotic and lentic, the state boasts of a rich fish biodiversity. The richness of fish species has attracted the attention of eminent researchers and the state has a good contribution in enriching the data bank on the aquatic biodiversity of the nation. Some of the earliest studies on the aquatic biodiversity of the state were carried out by Hora and Nair (1941). Hora (1949) reported 42 species of fishes in Rihand River of state. Motwani and David (1957) reported 95 species of fishes belonging to 20 families from the Son drainage. Dubey and Mehra (1962) recorded 70 fish species in River Chambal. Dubey and Verma (1965) studied the fish fauna of Madhya Pradesh with the representative of east coast system (River Mahanadi), Gangetic system (Chambal and Betwa) and of West Coast (Narmada) system. In their study of fish fauna of Madhya Pradesh they have reported 104 species belonging to 22 families. Karamchandani et al., (1967) also surveyed the fish and fisheries of Tapti River and reported 52 species belonging 14 families. Sharma (2007) examined the freshwater fish fauna of Madhya Pradesh in detail taxonomy regarding their latest scientific names, latest reference, fin formula and diagnostic characters. The fish fauna included 172 species belonging to 68 genera, 27 families and 10 orders. Dubey (2007) reviewed the fish fauna of Madhya Pradesh (1956-2001) and reported 191 species. Vyas et al., (2010) recently studied the aquatic biodiversity of ponds and Rivers of Madhya Pradesh and reported the presence of 86 fish species in different River basin of Madhya Pradesh. Vyas et al., (2012) reported the 48 fish species at sacred Ghats on River Betwa.

River Narmada is by far the most significant water resources of the state of Madhya Pradesh. The River is the most important ecological hub for aquatic biodiversity in central India and has therefore been the epicenter of the biodiversity studies. Some of the earlier studies on fish biodiversity of the state have been recorded in River

Narmada. Hora and Nair (1941) attempted to study fish fauna of river Narmada and surveyed only hill stream, which flow into Narmada in Satpura range and identified 40 species. Karamchandani et al., (1967) carried out biological investigations on the fish and fisheries of River Narmada and revealed the status of fish diversity, production and location of spawning grounds. A total 77 species were recorded. The study of fish fauna of Narmada River was made by fisheries department of Madhya Pradesh during 1967-1971 (Anon, 1971) and 46 species belonging to 14 families were recorded. Rao et al., (1991) undertook pre impoundment survey at Punasa, Omkareshwar, Mandleshwar and Barwani pertaining to the Narmada River and enlisted 84 fish species. Unni (1996) studied ecology of Narmada River, which showed various environmental aspects of the River. Nath and Shrivastava (1999) reported declining trend of carp fisheries of Narmada River in the context of construction of dam on the river and tributaries. Arya et al., (2001) studied biodiversity and fisheries potential of Narmada basin with special reference to fish conservation and divided fish species of Narmada into five categories of which four categories containing 17 species might be adversely affected by dam whereas one category containing of fishes comprising 25 species were likely to be increased in the reservoir. Dubey (2006) studied the fish biodiversity of River Narmada in relation to its physical, chemical and economic aspects. Vyas et al., (2006) reported 47 fish species. Dutta and Kundu (2007) observed the alarming declining of mahaseer (*Tor tor*) population in Narmada River in around Hoshangabad (M.P.). Vyas et al., (2007) reported the use of different fishing gears in River Narmada. 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. Vyas and Vishwakarma (2013) more recently worked on Sip a tributary, which joins Narmada River near the backwaters of Indira Sagar reservoir.

MATERIALS AND METHODS:

Study area:

Narmada River is one of the major westwardly flowing rivers in India. Barna, Dudhi, Tawa, Ganjal, Kolar, Sip and Jamner are the major tributaries of Narmada. The Barna River is one of the most important tributary of Narmada River. The present study was conducted on its Barna sub-basin, located between the $22^0$50' - $23^0$50'N and $77^0$50'-$78^0$20'E. Fish sampling was conducted at six selected locations in the river Barna and its tributary namely Barna, Satdhar, Jamner, Palakmati, Chamarsil and Narheri. These streams join an irrigation reservoir built across the barna stream called as Barna Reservoir. 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.

Data collection:

Collection of fishes: The fishes were collected using monofilamentaous 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 (1994),) and Shrivastava (1998). Fish Base website was also referred for various aspects of fish fauna (www.fishbase.org).

Data analysis:

To quantify the diversity of the assemblage and for the statistical comparison of the diversity at six different stations of the study area following diversity index; Simpson dominance index (D), Simpson index of diversity (1-D); Shannon-Weiner index (H); Evenness index and Margalef index with the help of software PAST, version 2.15 were used.

Simpson's dominance index (Harper, 1999) is often used to quantify the biodiversity of habitat which taken into account the number of species, as well as the abundance of each species (Vijaylaxmi et al., 2010). Formula used for calculation is:

$D = \Sigma\ ni(ni-1)/\ N(N-1)$

Where, ni is the total number of individuals of a particular species and N is the total number of individuals of all species. Simpson index of diversity is measured by subtracting the value of D from 1.

Shannon Weiner diversity index (Shannon, 1949; Ramos et al., 2006) considers both the number of species and the distribution of individuals among species. The Shannon Weiner diversity was calculated by using the following formula:

$H' = \Sigma Pi \times \log Pi$,

Where, $Pi = ni/N$

Where ni is the number of individuals of each species in the sample, N is the total number of individuals of all species in the sample.

Evenness (Harper, 1999) is a measure of the relative abundance of the different species making up the richness of an area, which is measured by using the following formula:

$E = e^{H'/S}$

Margalef index (d) (Margalef, 1968) was used to measure species richness by the following formula:

$d = (S-1/Ln\ N)$

where, S is the number of species and N is the number of individuals in the sample.

RESULTS AND DISCUSSION:

Species assemblages and distribution:

During the study of fish biodiversity of Barna River, a total of 33 fish species were recorded fewer than five orders, nine families and 21 genera from all sites. 24 species of Cypriniformes, three species of Ophiocephaliformes and Perciformes both, two species of Mastacembeliformes and one species of Beloniformes have been recorded. The Cyprinidae family is dominant and sub dominant family is Ophiocephalidae. The members of family Cyprinidae were dominated by 18 species, followed by Ophiocephalidae three species, Cobitidae, Siluridae, Bagridae, Mastacembelidae and Ambassidae two species each,Belonidae and Gobiidae one species both family. Family Cyprinidae was represented by the *Oxygaster bacaila, Rasbora daniconius, Garra gotyla, Puntius sophore, Puntius conchonius, Puntius sarana, Puntius chola, Puntius ticto, Puntius titius, Amblypharyngodon mola, Cirrhinus mrigala, Crossocheilus latius, Danio devario, Labeo bata, Labeo boggut, Osteobrama cotio, Oseobrama vigarsii and Aspidoparia morar* was represented Families Cobitidae by *Lepido*cephalichthys *guntea* and *Nemacheilus botia*, Bagridae by *Mystus seenghala,* and *Mystus bleekeri*, Siluridae by *Wallogo attu* and *Ompok bimaculatus*, Belonidae by *Xenentodon cancila,* Mastacembelidae by *Mastacembelus armatus,* and Gobiidae by *Glossogobius giuris,* Ambassidae by *Chanda ranga* and *Chanda nama,* Ophiocephalidae by *Channa punctatus*, *Channa marulius and Channa gachua*. From all the stations, Cyprinidae formed the largest dominant family contributing the 18 species (54.54%); Ophiocephalidae formed the subdominant family contributing three species (09.09%) and rest of the family followed the order of abundance. During the studies 332 fish individuals were collected from Six sites. There were from five Orders, nine families, 21 genera and 33 species (Table-1). Out of all these, *Rasbora daniconius* has the maximum number of individuals and found from all sites. The dominant species, *Rasbora daniconius* has total 56 individuals (16.86%), *Puntius ticto* 33 individuals (09.93%) and *Garra gotyla 29* individuals (08.73%) respectively. The least abundant fish was *Puntius chola, Cirrhinu mrigala, Crossocheilus latius,Osteobrama cotio, Aspidoparia morar, Mystus seenghala, Mastacembelus armatus, Channa punctatus* and *Channa gachua* with one individual each (0.30%).

Overall thirty three species recorded in present study (Table-2) out of which twelve fish species were recorded in the site – I (Barna). The most abundant species was *Rasbora deniconius* (30%) followed by the species of *Garra gotyla(17%), Puntius sarana(12%), Puntius ticto(9%), Puntius titius(7%), Lepidocephalichthys guntea(6%), Oxygaster bacaila* and *Ompok bimaculatus(5%), Puntius sophore(4%), Nemacheilus botia* and *Labeo boggut(2%)* and *Puntius chola (1%)* in order of abundance.

Twelve species were recorded in site-II (Satdhar). Out of these, most abundant species was *Oxygaster bacaila* (36%), followed by the species *Chanda nama* (12%), *Puntius ticto (10%), Puntius titius (9%), Puntius sarana (7%), Garra gotyla (6%), Nemacheilus botia (5%), Rasbora daniconius and Mystus bleekeri (4%),Ompok bimaculatus (3%), Mystus seenghala and Channa punctatus (2%)* in order of abundance.

Eight species were recorded on the site – III (Jamner). Out of these, most abundant was *Lepidocephalichthys guntea* (34%) followed by *Puntius ticto (27%), Puntius sarana* and *Labeo boggut* (12%), *Puntius sophore(6%), Wallago attu,Channa marulius* and *Channa gachua* (3%) each in order of abundance.

Fourteen species were recorded on the site – IV (Palakmati). Out of these, most abundant was *Rasbora daniconius* (25%), followed by the species *Puntius sophore* (13%), *Nemacheilus botia (10%), Lepidocephalichthys guntea* and *Garra gotyla* (8%), *Puntius conchonius, Puntius ticto, Puntius titius* and *Channa marulius* (6%), *Labeo boggut* (4%), *Danio devario, Aspidoparia morar, Wallago attu* and *Mastacembelus armatus* (2%) each in order of abundance.

Sixteen species were recorded on the site – V (Chamarsil). Out of these most abundant were *Puntius sophore, Puntius sarana* and *Amblypharyngodon mola* (11%) each, followed by the species *Garra gotyla, Puntius ticto* and *Puntius titius* (9%) each, *Danio devario, Osteobrama vigorsii, Ompok bimaculatus, Glossogobius giuris* and *Chanda ranga* (6%) each, *Rasbora daniconius, Cirrhinus mrigala, Crossocheilus latius,Labeo bata* and *Chanda mana (2%)* each in order of abundance.

Fifteen species were recorded on the site – VI (Narheri). Out of these most abundant was *Rasbora daniconius* (28%), followed by the species *Oxygaster bacaila* (12%), *Amblypharyngodon mola* (10%), *Chanda nama* (8%), *Garra gotyla, Xenentodon cancila* and *Mastacembelus panculas* (6%) each, *Nemacheilus botia, Puntius ticto, Puntius titius* and *Glossogobius giurius* (4%) each, *Puntius sarana, Labeo bata, Osteobrama cotio* and *Chanda ranga* (2%) each in order of abundance.

Among all these families Cyprinidae was most dominant family constituting (75%) individuals, which is followed by Cobitidae (10%), Ambassidae (5%), Siliuridae (3%), Gobiidae and Ophiocephalidae (2%) both, Bagridae, Belonidae and Mastacembelidae (1%) each, respectively (Table-3 and Fig. No -1).

Conservation status of fishes of Barna River:

International Union for Conservation of Nature and Natural resources (IUCN) is the global agency involved with the conservation of the flora and fauna and it has published red data book enlisting species of fishes, amphibians, reptiles, birds and mammals which are globally endangered, threatened or rare.

According to CAFF (2006) status, two species are Endangered which are *Nemacheilus botia* and *Ompok bimaculatus*, eight species are Vulnerable, these are *Garra gotyla, Puntius sarana, Puntius chola, Cirrhinus mrigala, Mystus bleekeri, Mastacembelus armatus, Chanda ranga* and *Channa marulius* are given in (Table -1). Whereas 12 species fall under risk near threatened, viz., *Puntius sophore, Puntius conchonius, Puntius ticto, Danio devario, Labeo bata, Labeo boggut, Osteobrama cotio, Aspidoparia morar, Wallago attu, Xenentodon cancila, Glossogobius giuris* and *Channa punctatus,* Three species fall under Lower risk lest concern category viz., *Lepidocephalichthys guntea, Rasbora daniconius, Amblypharyngodon mola* and *Chanda nama*, while two species are Data deficient which are *Crossocheilus latius* and *Osteobrama vigorsii.*

Statistical estimation of species diversity:

The diversity indexes of fish species indicated low fish species diversity in river Barna. The diversity indexes as estimated from the tributaries of Barna were D = 0.15, 0.17, 0.22, 0.12, 0.07 and 0.12; H = 2.13, 2.08, 1.72, 2.35, 2.63 and 2.37; and E= 0.70, 0.66, 0.69, 0.74, 0.86 and 0.71 respectively. The Simpson's index of diversity and reciprocal index were 0.84, 0.82, 0.77, 0.87, 0.82 and 0.87; and 6.45, 5.61, 4.52, 8.19, 12.82 and 7.81, respectively in the tributaries (Table- 4).

A biodiversity index is used to describe the diversity of a sample or community by a number (Magurran, 1988). The concept of the "species diversity" involves two components: the number of species or richness and the distribution of individuals among species (Chowdhury et al., 2010). Highest Shannon diversity index was found in station – V (Chamarsil), where lowest was observed at station – III (Jamner). To the present study shows a significant increase in H' values due to higher number of species. In each case, high Shannon diversity index is involved with low number of individuals. Both values of Simpson's dominance index and diversity index were highest in station – V and lowest value were observed in station – III, which indicates that the dominance was shared by more species in station – V. The Margalef richness value where is used as an indicator to compare the sites, generally shows deviation depending on the species number (Vyas et al., 2012). With the highest species number, station- V (Chamarsil) shows the maximum Margalef richness value where minimum value was observed at station – III (Jamner) with lowest number of species. Vyas et al., (2012) reported Margalef index in the Betwa River in Madhya Pradesh of India ranging from 3.71 to 6.70. In our study, the Margalef ranging from 2.00 to 3.89 values were significantly lower than these due to the presence of low number of individuals. There is positive correlation between Simpson's Dominance index and Evenness index and a negative relation between Shannon-Weiner and Evenness index was observes in this study due to the absence of even distribution of the species which is similar to the report of Vyas et al., (2012) as their study showed same relationship of fish species diversity in the Betwa River

in Madhya of India. Alam et al., (2013) reported the Simpson index of diversity (1-D), Shannon-Weiner index (H) and Margalef index showed higher value at site S_3.

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 Hora and Nair (1941) attempted to study fish fauna of river Narmada and surveyed only hill stream, which flow into Narmada in Satpura range and identified 40 species. Karamchandani et al., (1967) carried out biological investigations on the fish and fisheries of River Narmada and revealed the status of fish diversity, production and location of spawning grounds. A total 77 fish species belonging to 41 Genera, 19 Families and seven Orders were recorded. 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. Unni (1996) studied ecology of Narmada River, which showed various environmental aspects of the River. Nath and Shrivastava (1999) reported declining trend of carp fisheries of Narmada River in the context of construction of dam on the river and tributaries. Arya et al., (2001) studied biodiversity and fisheries potential of Narmada basin with special reference to fish conservation and divided fish species of Narmada into five categories of which four categories containing 17 species might be adversely affected by dam whereas one category of fishes comprising 25 species were likely to be increased in the reservoir. Dubey (2006) studied the fish biodiversity of River Narmada in relation to its physical, chemical and economic aspects. Vyas et al., (2006) reported 47 fish species belonging to 29 genera, 15 families and six orders in River Narmada.

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. Vyas and Vishwakarma (2013) more recently worked on Sip tributary of river Narmada which Joins Narmada River near the backwaters of Indira Sagar reservoir and have been recorded 29 fish species belonging to 17 Genera, eight Families and three Orders. Bose et al., (2013) have reported 57 species, belonging to 35 Genera, 13 Families and six Orders from Middle Stretch of River Tawa.

Table-1: Systematic Position of fish fauna of Barna River.

S.No.	Order	Family	Species Name	CAFF
1	Cypriniformes	Cobitidae	*Lepidocephalichthys guntea*	LR-lc
2			*Nemacheilus botia*	EN
3		Cyprinidae	*Oxygaster bacaila*	
4			*Rasbora daniconius*	LR-lc
5			*Garra gotyla*	VU
6			*Puntius sophore*	LRnt
7			*Puntius conchonius*	LRnt
8			*Puntius sarana*	VU
9			*Puntius chola*	VU
10			*Puntius ticto*	LRnt
11			*Puntius titius*	
12			*Amblypharyngodon mola*	LR-lc
13			*Cirrhinus mrigala*	VU
14			*Crossocheilus latius*	DD
15			*Danio devario*	LR-nt
16			*Labeo bata*	LRnt
17			*Labeo boggut*	LRnt
18			*Osteobrama cotio*	LR-nt
19			*Osteobrama vigorsii*	DD
20			*Aspidoparia morar*	LRnt

21		Bagridae	*Mystus seenghala*	
22			*Mystus bleekeri*	VU
23		Siluridae	*Wallago attu*	LRnt
24			*Ompok bimaculatus*	EN
25	Beloniformes	Belonidae	*Xenentodon cancila*	LRnt
26	Mastacembeliformes	Mastacembelidae	*Mastacembelus armatus*	VU
27			*Mastacembelus panculas*	
28	Perciformes	Gobiidae	*Glossogobius giuris*	LRnt
29		Ambassidae	*Chanda ranga*	VU
30			*Chanda nama*	LR-lc
31	Ophiocephaliformes	Ophiocephalidae	*Channa punctatus*	LR-nt
32			*Channa marulius*	VU
33			*Channa gachua*	

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

Table-2: Site wise present and absent Position on fish fauna of Jamner River.

S.No.	Species Name	**Barna**	**Satdhar**	**Jamner**	**Palakmati**	**Chamarsil**	**Narheri**
1	*Lepidocephalichthys guntea*	+	-	+	+	-	-
2	*Nemacheilus botia*	+	+	-	+	-	+
3	*Oxygaster bacaila*	+	+	-	-	-	+
4	*Rasbora daniconius*	+	+	-	+	+	+
5	*Garra gotyla*	+	+	-	+	+	+
6	*Puntius sophore*	+	-	+	+	+	-
7	*Puntius conchonius*	-	-	-	+	-	-
8	*Puntius sarana*	+	+	+	-	+	+
9	*Puntius chola*	+	-	-	-	-	-
10	*Puntius ticto*	+	+	+	+	+	+
11	*Puntius titius*	+	+	-	+	+	+
12	*Amblypharyngodon mola*	-	-	-	-	+	+
13	*Cirrhinus mrigala*	-	-	-	-	+	-
14	*Crossocheilus latius*	-	-	-	-	+	-
15	*Danio devario*	-	-	-	+	+	-
16	*Labeo bata*	-	-	-	-	+	+
17	*Labeo boggut*	+	-	+	+	-	-
18	*Osteobrama cotio*	-	-	-	-	-	+
19	*Osteobrama vigorsii*	-	-	-	-	+	-
20	*Aspidoparia morar*	-	-	-	+	-	-
21	*Mystus seenghala*	-	+	-	-	-	-
22	*Mystus bleekeri*	-	+	-	-	-	-

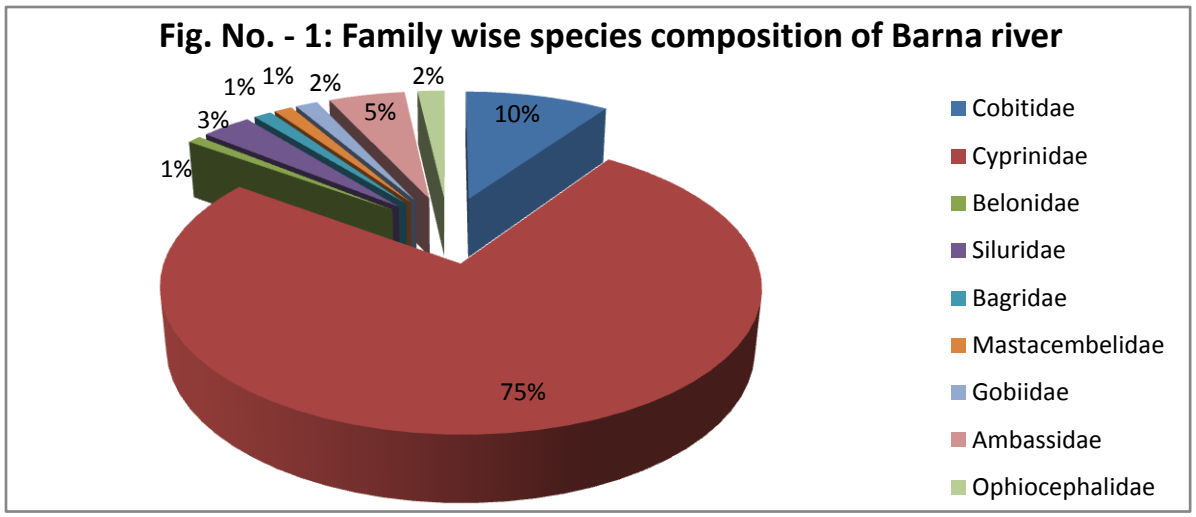
23	*Wallago attu*	-	-	+	+	-	-
24	*Ompok bimaculatus*	+	+	-	-	+	-
25	*Xenentodon cancila*	-	-	-	-	-	+
26	*Mastacembelus armatus*	-	-	-	+	-	-
27	*Mastacembelus panculas*	-	-	-	-	-	+
28	*Glossogobius giuris*	-	-	-	-	+	+
29	*Chanda ranga*	-	-	-	-	+	+
30	*Chanda nama*	-	+	-	-	+	+
31	*Channa punctatus*	-	+	-	-	-	-
32	*Channa marulius*	-	-	+	+	-	-
33	*Channa gachua*	-	-	+	-	-	-

Table-3: Family wise Fish Individuals and Percen of Barna River.

S.No	Family	individuals	Percent (%)
1.	Cobitidae	32	10%
2.	Cyprinidae	250	75%
3.	Belonidae	3	1%
4.	Siluridae	11	3%
5.	Bagridae	4	1%
6.	Mastacembelidae	4	1%
7.	Gobiidae	5	2%
8.	Ambassidae	17	5%
9.	Ophiocephalidae	6	2%
	Total Individuals	**332**	**100%**

Table 4: Diversity indexes of fish species in the tributaries of river Barna.

S.No	Diversity Index	Barna	Satdhar	Jamner	Palakmati	Chamarsil	Narheri
1.	Number of Species	12	12	8	14	16	15
2.	Number of Individuals	84	67	33	51	47	50
3.	Simpson_D	0.15	0.17	0.22	0.12	0.07	0.12
4.	Simpson_1-D	0.84	0.82	0.77	0.87	0.92	0.87
5.	Simpson_1/d	6.45	5.61	4.52	8.19	12.8	7.81
6.	Shannon-Weiner index (H)	2.13	2.08	1.72	2.35	2.63	2.37
7.	Evenness (E)	0.70	0.66	0.69	0.74	0.83	0.71
8.	Margalef	2.48	2.61	2.00	3.30	3.89	3.57



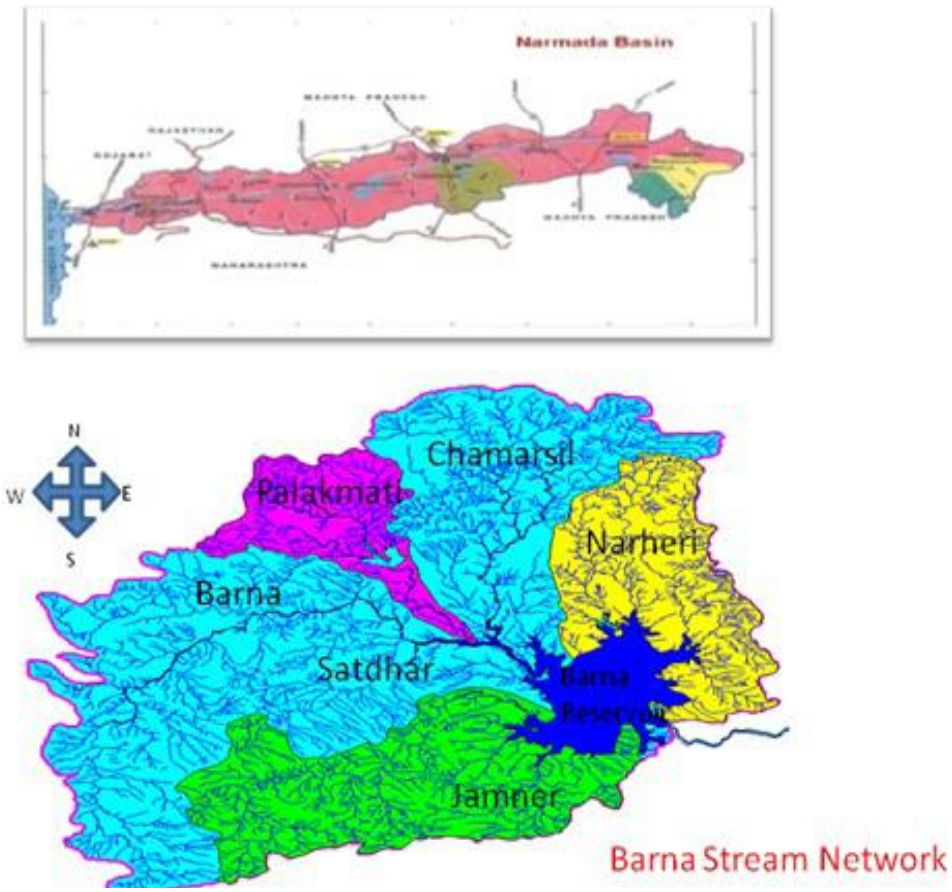


Fig. No. – 2: Map showing study area at Barna sub-basin or Narmada basin.

CONCLUSION

Documentation of biodiversity has become very much important aspect to understand different ecosystem and influences on them. The present study mainly focuses on fish assemblage and distribution in Barna River. Total number of species recorded during this study period has show a good indication of rich biodiversity. The Barna stream network support many unique ecosystems and a wide array of globally threatened species. In terms of species number, Barna River can be considered as an ecological hotspot since it has a biodiversity close to or greater than

that of many other rivers in Madhya Pradesh. So, formulation of sustainable strategies to save fish population of this river system as a whole is required. Destruction of ecosystem and environmental degradation seriously affect the fish species. Conservation of fish diversity is an important issue under changing situation of gradual habitat destruction (Vijaylaxmi et al., 2010). Data on available resources and identification of faunal biological characteristics is the key for resource conservation and maintenance. This study will provide future strategies for development and fish conservation.

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