

COMPARATIVE STUDY OF FISH BIODIVERSITY IN TWO SELECTED STATIONS OF NARMADA RIVER AT BARWANI (MADHYA PRADESH) INDIA

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Abstract: India has a vast aquatic region like ocean, river, stream, lakes and ponds. Narmada river is the fifth major and the largest graceful river of Indian peninsula. It is also known as the “life line” of Madhya Pradesh. Madhya Pradesh has a subtropical climate and unique aquatic biodiversity hotspots of the country having bestowed with a large number of water bodies. Biodiversity is the term used to describe the existence of a wide variety of species in particular area or during a specific period of time. In the present study the fish biodiversity to Narmada river was conducted at two stations, there are Bhilkheda and Pendra in Barwani district. The study was conducted in the year 2011-12. The present study showed total 53 were species recorded in two stations where 49 species in Bhilkheda and 48 Pendra stations.

Keywords: Narmada river, fish fauna and selected stations

Introduction

Water, is an essential factor for life, is an enormous gift of God. Water is necessary for the survival of living organisms. India has a vast aquatic region like ocean, river, stream, lakes and ponds. The Narmada is one the most important river in central India and fifth largest river in Indian subcontinent. The state Madhya Pradesh is one of the unique aquatic biodiversity hotspot of country. The fish diversity is a branch of aquatic diversity. It depends on geographical position, varied aquatic ecological conditions, health of aquatic bodies, and fish habitat restoration programs. The fishes are one of the most diverse groups of vertebrates provided rich protein sources for human being. It is highly nutritious, easily digestible and much sought after food, constitute a valuable commodity for human consumption. The nutritional and medicinal values of fishes has already for human consumption been recognized by many research workers (Hora and Pillay 1962; Jhingran 1982) as well as fishes are played an important role in the economy of many countries and provide a great employment opportunity of their people.

Ichthyofaunal diversity and Fishery potential of Narmada Basin has been documented by various workers. Arya et al., (2001) studied biodiversity and fishery potential of Narmada basin with special reference to fish conservation and divided fish species of Narmada into five categories. India there are 2,500 species of fishes of which 930 live in fresh water and 1,570 are marine. Maheshwari (2004) has reported 4 species of cat fish groups. According to CAFF (2006); 2 species are endangered and 6 species are vulnerable where as 11 species fall under risk near threatened, 3 species fall under lower risk lest concern category while 1 species was not evaluated and 1 species data deficient. Dubey (2007) reviewed the fish fauna of Madhya Pradesh and reported 191 species. Verma and Kanhere (2007) studied by threatened Ichthyofauna of the river Narmada in western zone. Nilesh (2009) studies of two river of North-Eastern Godavari basin. Sarwade & Khillare (2010) reported the variety and abundance of fresh water fish from Indapur District Pune (Maharashtra). In this Investigation the occurrence of 60 fish species belonging to 6 order, 15 families and 36 genera was noted. Vyas et al., (2013) observed fish diversity in two Tributaries of River Narmada and asked most abundance group of fish was the Cypriniformes and dominant species *Rosbora daniconius* consisted 30.08% of the population. Bakawale and Kanhere (2013) fish diversity of river Narmada were studied during construction of Dam. Pawara et al (2014) searched Review on fresh water fish diversity of Maharashtra. According to Pathak (2014) the main aimed to generate information on the ichthyofauna of western region of the river Narmada and indicates necessary of conservation and management of fish germplasm. Azad and Shukla (2015) have studied that biodiversity is essential for stabilization of ecosystem. Present study aim to documentation and compares of the fresh water fish fauna in Narmada river in different stations.

Material and Methods :-

About study area: - Barwani is the important district of Madhya Pradesh. The district lies in the South Western corner of Madhya Pradesh. The district extends between the parallels of latitude 21° 22' and 22° 22' North and the meridian of longitude 74° 27' and 75° 30' East. It has an average elevation of 178 meters (583 feet). It is also known as Siddh Nagar is a city and a municipality in Barwani district in the state of Madhya Pradesh, India. The place is also famous for Chool Giri, Jain pilgrimage centre of Bawangaja.

The great Narmada river flows forms its Northern boundary (Just 5 km from city). The Narmada is a Sanskrit word which means “The Doner of Pressure” also called Rewa. The Narmada river is the only river in India that flows in Central India between North and South parts. Narmada river is the fifth major and the largest graceful river of Indian peninsula. The river travels a huge

distance of 1312 km, before Joins the Arabian sea (situated at 21° 43'N, 72° 57'E) at gulf of Cambay in Gujarat, out of which 1077 km is in the state of Madhya Pradesh

Sampling station

Station-I (Bhilkheda): Bhilkheda is a small village in Barwani tehsil and District of Madhya Pradesh (India). It is located 5 Km from head quarter of Barwani and 3 km from Narmada river.

Station-II (Pendra): Pendra is also comes under in Barwani tehsil and District of Madhya Pradesh (India). It is located 4 Km towards West from District head quarters Barwani and 5 Km from Narmada river towards North part of District head quarters.

Methods for Morphometry & Identification of Fishes:

The present work carried out on the Narmada river year 2011-12. The fishes were collected with the help of local skilled fisherman and tribal people using monofilamentous gill net of 10-50 mm mesh size and we also used cast nets (Ghagara Jal) of 10-25 mm size, Drag net, Basket nets, Triangular nets, Traps, Line Hooks with the help of local fishermen. Collected fish were preserved in 10 % formalin in laboratory and these collected fishes were identified using the standard keys of Berg (1940), Day (2007), Jhingran (1991), Qureshi (1983); Shrivastava (1998) and Jayram (2010), listed 314 species of teleosts utilized for aquaculture throughout the world.

All the fishes were collected from the different research sites are listed according to their taxonomic status in this paper. Weekly surveys of fish market of selected villages were did collect the yield data to estimated fish productivity.

Result

The present study showed total 53 fish species, 34 Genera, 16 families, 8 orders were recorded in year 2011-12 at two stations i.e. I and II (table - 1). Forty nine species were recorded in station – I. In which Major carp – 3, Minor carp – 21, Cat fishes – 22 and Exotic fish – 3 were recorded (table 2 and figure 1). The abundant family Cyprinidae was represented by 24 species and total 48.9% was recorded followed by the families of Bagridae 7 fish species and total 14.28%, family Siluridae and Ophiocephalidae 3 species and 6.12%, family Notopteridae Channidae, Mastacembelidae constituting 2 fish species and 4.08% each and Other families Schielbeidae, Pangasidae, Heteropneustidae, Belonidae, Nandidae, Gobioidae, Anabantidae, Mugilidae constituting 1 fish species and 2.04% each in abundance (table – 2, 3 and figure 2).

In station – II 48 species were recorded. In which Major carp – 3, Minor carp – 20, Cat fishes – 22 and Exotic fish – 3 were recorded (table 2 and figure 1). The abundant family Cyprinidae was represented by 20 species and total 41.66% was recorded followed by the families of Bagridae 6 fish species and total 12.5%, Family Siluridae and Ophiocephalidae 3 species and 6.25%, family Notopteridae, Channidae, Mastacembelidae constituting 2 fish species and 4.16% each and other families Schielbeidae, Pangasidae, Heteropneustidae, Clupeidae, Belonidae, Nandidae, Gobioidae, Anabantidae, Mugilidae constituting 1 fish species and 2.08% each in abundance (table – 4 and figure 3).

A lot of work has been done on the fisheries of river Narmada. Vyas et al., (2009) studied on fish fauna of Narmada in submerged area and its tributaries and recorded 52 species belonging to 28 genera and 13 families and 7 orders. Chouhan et al. (2013) studied 59 fish species, 34 genera, 17 families and 7 orders were recorded in the three stations i.e. Maheshwar, Khalghat and Barwani. Siddhiqui et al., (2014) observed biodiversity of Ichthyofauna of Narmada river of Mandleshwar region and total 48 species of fishes, 30 genera, 17 families and seven orders were recorded. Balkhande et al., (2015) showed the ichthyofaunal diversity of Godavari river and search a total 18 species of primary fresh water fishes belonging to 05 orders, 08 families and 14 genera were recorded from the study sites.

It has been observed that population of cat fishes increasing significantly. It shows that the increasing planktons and ecological condition of the study area is changing and turns the ichthyofauna. Number of fish species decreasing and in the same way the species diversity decreasing. Fish populations are highly depended upon the character of the aquatic habitat which supports all their biological factions.

Table: 1. List of fish species recorded in River Narmada during 2011-12

S. No.	Order	Family	Total Identify Fish Genera	Local name	Ornamental / Food Fish	Station I	Station II
1	Cypriniformes	Cyprinidae	<i>Catla catla</i>	Catla	Food Fish	+	+
2			<i>Cirrihinus mrigala</i>	Naren/Nalan	Food Fish	+	+
3			<i>Labeo rohita</i>	Rohu	Food Fish	+	+
4			<i>Aspidoparia jaya</i>	Jaya	Food/ ornamental	+	+
5			<i>Cirrihinus cirrihosa</i>	Naren	Food Fish	+	+
6			<i>Cirrihinus reba</i>	Naren	Food Fish	+	+
7			<i>Discognathus lamta</i>	Patherchatta	Food Fish	+	+
8			<i>Labeo calbasu</i>	Kalvat	Food Fish	+	+
9			<i>Labeo fimbriatus</i>	Dumer	Food Fish	+	+
10			<i>Labeo bata</i>	Bata/Mowadi	Food Fish	+	-
11			<i>Nemacheilus botia</i>	Gurguch	Food/ ornamental	-	-
12			<i>Puntius chola</i>	Chola	Ornamental fish	+	+
13			<i>Puntius sarana</i>	Sarana	Food fish	+	+
14			<i>Puntius sopharae</i>	Sunari	Ornamental fish	+	+
15			<i>Tor putitora</i>	Badas	Food fish	+	-
16			<i>Tor tor</i>	Badas/ Mahasher	Food fish	+	+
17			<i>Osteobrama cotio</i>	Cotia	Food fish	+	-
18			<i>Rasbora rasbora</i>		Ornamental fish	+	+
19			<i>Rasbora daniconinus</i>	Dendua	Ornamental fish	+	+
20			<i>Hypothlmiichthys molitrix</i>	Silver Carp	Food fish	+	+
21			<i>Ctenopharygdon idella</i>	Grass Carp	Food fish	+	+
22			<i>Cyprinus carpio</i>	Common Carp	Food fish/ Ornamental	+	+
23			<i>Puntius ticto</i>	Ticto	Ornamental	+	+
24			<i>Clarius batrachus</i>	Magur	Food fish/ Ornamental	+	+
25			<i>Oxygaster bacaila</i>	Chalar	Food fish	+	+
26	Siluriformes	Siluridae	<i>Ompak bimaculatus</i>	Patola	Food fish/ Ornamental	+	+
27			<i>Ompak pabo</i>	Patola	Food fish	+	+
28			<i>Wallago attu</i>	Padan	Food fish	+	+
29		Bagridae	<i>Mystus bleekeri</i>	Bekadi/Kateda	Ornamental fish	+	+
30			<i>Mystus cavasius</i>	Kateda	Food fish	+	+
31			<i>Mystus vittatus</i>	Kateda	Ornamental fish	+	+
32			<i>Mystus seenghala</i>	Singharh	Food fish	+	+
33			<i>Mystus tengra</i>	Singharh	Food fish	+	-

34			<i>Rita rita</i>	Gegare	Food fish	+	+
35			<i>Rita pavementata</i>	Gegare	Food fish	+	+
36		Schielbeidae	<i>Clupisoma garua</i>		Food fish	-	+
37		Pangasidae	<i>Pungasius pangasius</i>		Ornamental fish	+	+
38		Heteropneustidae	<i>Heteropneustes fossilis</i>	Singee	Ornamental/ Food Fish	+	+
39	Clupiformes	Clupeidae	<i>Gudusia chopra</i>	Suhia	Food fish	-	+
40		Notopteridae	<i>Notopterus notopterus</i>	Pamplate	Food fish	+	+
41			<i>Notopterus chitala</i>	Pamplate/ Chital	Ornamental/ Food Fish	+	+
42	Beloniformes	Belonidae	<i>Xenthodon cancila</i>	Sua/Sawal	Ornamental fish	+	+
43	Ophiocephaliformes	Ophiocephalidae	<i>Channa morulius</i>	Doke	Food Fish	+	+
44			<i>Channa punctatus</i>	Doke	Food Fish	+	+
45			<i>Channa striatus</i>	Doke	Food Fish	+	+
46	Perciformes	Chandidae	<i>Chanda nama</i>	Kagsi	Ornamental Fish	+	+
47			<i>Chanda ranga</i>	Kagsi	Ornamental Fish	+	+
48		Nandidae	<i>Nandus nandus</i>	Suar	Ornamental Fish	+	+
49		Gobioidae	<i>Glassogobius giuris</i>	Malaya	Ornamental/ Food Fish	-	+
50		Anabantidae	<i>Colisa faciatus</i>	Khosti	Ornamental fish	+	+
51	Mastacembaleformes	Mastacembelidae	<i>Mastacebelus armatus</i>	Bam	Ornamental/ Food Fish	+	+
52			<i>Mastacebelus puncalus</i>	Bam	Food Fish	+	+
53	Mugiliformes	Mugilidae	<i>Rhinomugil corsula</i>	Kansul/ Upari Dola	Food Fish	+	+
Total = 53						49	48

Table: 2. Percentage of fish species were recorded during 2011-12 in the River Narmada

Group	Total Identified fishes	Station-I	Station-II
Major Carp	03	03	03
Minor Carp	24	21	20
Cat fishes	23	22	22
Exotic fishes	03	03	03
Total	53	49	48

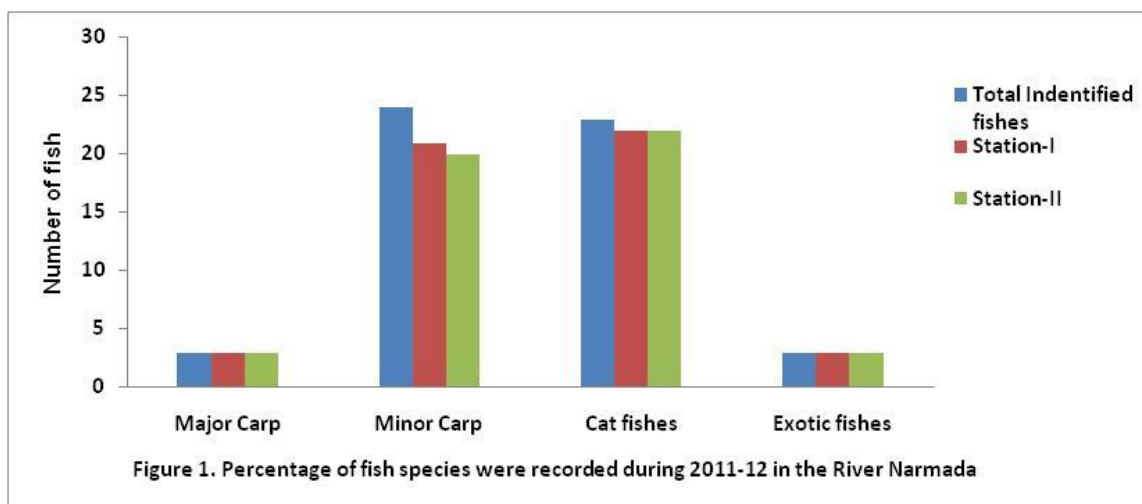


Table: 3. Family Wise Fish Species Composition Station- I (Bhilkheda)

S. No.	Family	No. of fish species	Species composition (%)
1	Cyprinidae	24	48.97%
2	Bagridae	7	14.28%
3	Siluridae	3	6.12%
4	Pangasidae	1	2.04%
5	Heteropneustidae	1	2.04%
6	Clupeidae	NIL	NIL
7	Notopteridae	2	4.08%
8	Belonidae	1	2.04%
9	Ophiocephalidae	3	6.12%
10	Chandidae	2	4.08%
11	Nandidae	1	2.04%
12	Gobioidae	Nil	NIL
13	Anabantidae	1	2.04%
14	Mastacembelidae	2	4.08%
15	Mugilidae	1	2.04%

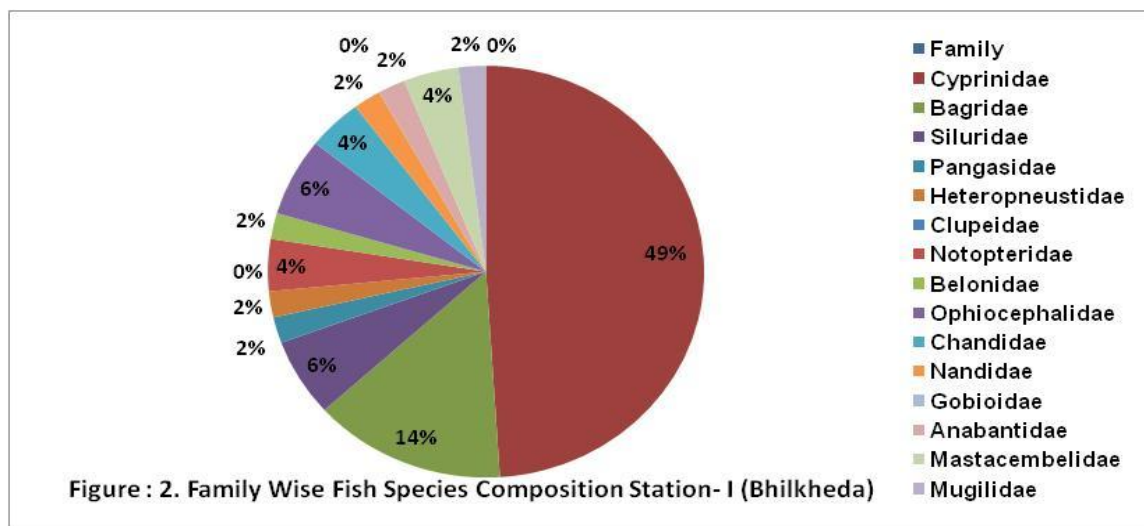


Figure : 2. Family Wise Fish Species Composition Station- I (Bhilkheda)

Table: 4. Family Wise Fish Species Composition in Station - II (Pendra)

S. No.	Family	No. of fish species	Species composition (%)
1	Cyprinidae	21	43,75%
2	Bagridae	6	12.50%
3	Siluridae	3	6.25%
4	Schielbeidae	1	2.08%
4	Pangasidae	1	2.08%
5	Heteropneustidae	1	2.08%
6	Clupeidae	1	2.08%
7	Notopteridae	2	4.08%
8	Belonidae	1	2.08%
9	Ophiocephalidae	3	6.12%
10	Chandidae	2	4.08%
11	Nandidae	1	2.04%
12	Gobioidae	1	2.08%
13	Anabantidae	1	2.08%
14	Mastacembelidae	2	4.08%
15	Mugilidae	1	2.08%

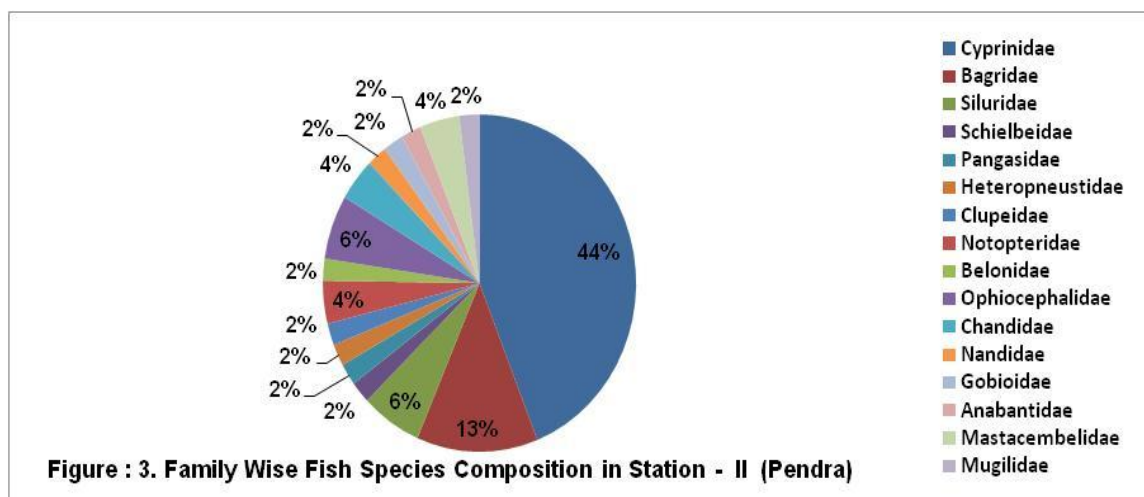


Figure : 3. Family Wise Fish Species Composition in Station - II (Pendra)

References:-

1. Arya, S.C.; Rao, K.S. and Shrivastava, S. (2001). Biodiversity and fishery potential of Narmada basin western zone (M.P. India) with special reference to fish conservation. *Environmental and Agriculture: Agriculture and pollution in south Asia*.108-112.
2. Azad, Z. and Shukla, A. (2015). Ichthyofaunal Diversity, Habitat, Ecology and Their conservation issue of river Narmada in Jabalpur region (M.P.). *International journal of current research*.7 (12): 24044 - 24047.
3. Bakawale, Sunita and Kanhere, R. (2013). Study on Fish Species Diversity of River Narmada in Western Zone. *Research Journal of Animal Veterinary and Fishery Science*. 1 (6): 18-20.
4. Balkhande, J.V. and Kulkarni, A. N. (2015). Studies of Ichthyofaunal Diversity. *International Journal of Animal Biology*. 1 (5): 187-189.
5. Berg, L. S. (1940). Classification of Fishes both recent and fossil. *Tray. Inst Zool. Acad. Sci. U.S.S.R.*, 5 (2): 517 (Russian and English texts Also reprint, Ann Arbor, Michigan, 1947).
6. CAFF (2006). Fresh water fish diversity of Central India (Ed. By Lakra, W.S. and Sarkar, U.K.). Workshop Proceeding. Organized by NBFGR at ICAR Bhopal, M.P. and India 1-183.
7. Chouhan, M; Siddiqui, A. Sharma, S. (2013). Fish Biodiversity of Narmada river in some selected stations of Madhya Pradesh India. *International Journal of Advance Research*. 1(3): 20-25.
8. Day, Francis (2007). The fishes of India Jagmander Book Agency, New Delhi.
9. Dubey, G.P. (2007). Fish fauna of Madhya Pradesh (1956-2001) and its present status. *Fishing Chimes*.26:83-88.
10. Jayram, K.C. (1981).The Freshwater fishes of India, Pakistan, Bangladesh Burma and Sri Lanka, A Hand book of Edited by zoological, Survey of India Calcutta-12.
11. Jhingran, V.G. (1991). Fish and fisheries of India, Hindustan publication. Corporation. New Delhi : 727.
12. Jayram. K.C. (2010). The freshwater fishes of Indian region. Second edition. Narendra Publishing House, New Delhi: 616.
13. Maheshwari,U.K. (2004). Ichthyo biodiversity, Decline pattern, Management and conservation of Natural seed of Mahaseer Tor tor in middle stretch of river Narmada. *Natural conservation*. 8:111-117.
14. Nilesh, KH. (2009). Fish diversity studies of two rivers of the Northern Eastern Godawari basin, India. *Journal of Threatened Taxa*. 1 (10):514-518.

15. Pawara, Ravindra H; Patel, Nisar G. and Patel, Yusuf E. (2014). Review on fresh water fish diversity of Maharashtra (India). *Journal of Entomology and Zoology Studies*. 2 (5) : 358-364.
16. Pathak Triguna, Borana K. and Zafar T. (2014). Ichthyofauna of western Region of Narmada River, Madhya Pradesh. *International Journal of Research. In Applied, Natural and Social Science*. 2: 25-28.
17. Qureshi, T.A. and Qureshi, N.A. (1983). Indian fishes publisher, Brij Brother, Sultania Road Bhopal (M.P.). 5-209.
18. Sarwade, J.P.; Khillar, Y.K. (2010). Fish diversity of Ujani Wetland, Maharashtra, India. *The Bioscan an International Quart Journal of Life Science*. 1:173-179.
19. Siddhiqui et al. (2014). Biodiversity of Ichthyofauna of Narmada river of Manleshwar Region, Madhya Pradesh, India. *Science. Secure Journal of Environmental Biology*. 1 : 21-25.
20. Shrivastava, G. (1998). Fishes of U.P. and Bihar, Seventh edition, Vishwavidhalaya Prakashan, Chock Varanasi India.
21. Verma, D. and Kanhere, R.R. (2007). Threatened Ichthyofauna of the River Narmada in western zone. *Life Science Bulletin*. 4 (1 & 2) : 17-20.
22. Vyas, V. Damde D. and Parasher V. (2009). Fish diversity of Narmada in Submergence area of Indra Sagar Reservoir. *Journal of Inland fish society, India*. 41 (2):18-25.
23. Vyas, V. and Vishwakarma K.S. (2013). Species diversity and assemblage of fish Fauna of Sip River. A tributary of Narmada River. *Journal of Research in Biology*. 3 (5):1003-1008.

