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RESEARCH ARTICLE

Fish Biodiversity of Narmada River in Some Selected Stations of Madhya Pradesh, India

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Abstract

The river Narmada is one of the important river of India, with the total length of 1312 km. starting from Amarkantak to Baruch. The river is gifted with varied biodiversity. In the present study the fish biodiversity of Narmada river was conducted at three different districts, these are Maheshwar, Khalghat and Barwani. The study was conducted in monsoon, post monsoon, winter and summer seasons in the year 2010-2011. The fishes were collected with the help of local fishermen and tribal people using cast nets and gill nets of different mesh size 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 mm at various locations. The present study showed 59 fish species, 34 genera, 17 families and 7 orders were recorded in the stations Maheshwar, Khalghat and Barwani. Total fifty nine fish species were recorded in the station - I (Maheshwar). Fifty eight fish species were recorded in the station - II (Khalghat). Fifty one fish species were recorded in the station - III (Barwani). Among the total 59 fish species recorded over the complete stretch 49.15% carp group, cat fishes and miscellaneous group 20.34%, perches 8.47% and clupeids 1.69%. The members of Order Cypriniformes were dominated by 21 species followed by Siluriformes 8 species, Perciformes 6 species, Osteoglossiforms and Synbranchiformes with 2 species each and Mugiliformes and Beloniformes with one species each. The aim of this study is to prepare a list of species and to provide measures for their conservation.

Introduction

The river Narmada, hemmed between Vindya and Satpuda ranges, extends over an area of 98,796 Square kilometer and lies between eastern (longitudes 72 degrees 32' to 81 degrees 45') and northern (latitudes 21 degrees 20' to 23 degrees 45') extremity of the Deccan Plateau. The basin covers large area of the state in Madhya Pradesh (approximately 86%), Gujarat (approximately 12%) and a comparatively smaller area (nearly 2%) in Maharashtra. There are forty one tributaries, out of which twenty two tributaries belong to Satpuda range and the rest of the tributaries are on the right bank of Vindhya range. The river Narmada is considered one of the important rivers of the country. Since independence rapid economic, agricultural and industrial development have taken place in all parts of Narmada basin. The river Narmada is also gifted with the varied biodiversity of living organisms.

Fish diversity depends on geographical position, varied aquatic ecological conditions, health of aquatic bodies, optimum exploitation of the commercial fish species, enforcement of laws, rules and regulations, and their implementation and fish habitat restoration programs. Rich biodiversity of any ecosystem is absolutely essential in order to maintain their stability for proper functioning of their food chains. Fish constitute almost half of the total number of vertebrates in the world nearly 21,723 living species of fish out of 39,900 species of vertebrates are so for recorded (Jayaram 1999).

Material and Methods

In the present study the fish biodiversity of Narmada river was conducted at three different districts, these are Maheshwar, Khalghat and Barwani. The latitude and the longitude of the first station is 22 10' 60" N and 75 34' 60" E and second station is 22 10' 0" N and 75 27' 0" E and for the third station is 22 1' 60" N and 74 54' 0" E. The present study covered three districts are Khargone, Dhar and Barwani. The study was conducted in monsoon, post monsoon, winter and summer seasons in the year 2010-2011.

The fishes were collected with the help of local fishermen and tribal people using cast nets and gill nets of different mesh size 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 mm at various locations. The collected fishes were identified using the standard keys of Berg (1940), Day (1958), Jhingran (1982), Qureshi (1983) and Shrivastava (1998).

Result and Discussion

The present study showed 59 fish species, 34 genera, 17 families and 7 orders were recorded in the three stations respective Viz. Maheshwar, Khalghat and Barwani.

List of fish species of Narmada river in the present study

Order	Family	Species	Station I	Station II	Station III
Clupeiformes	Clupeidae	Hilsa ilisha	*	*	*
	Notopteridae	Notopterus notopterus	*	*	*
Cypriniformes	Cyprinidae	Cyprinus carpio	*	*	*
		Oxygaster bacaila	*	*	-
		Catla catla	*	*	*
		Cirrhinus cirrhosa	*	*	*
		Cirrhinus fulungee	*	*	*
		Cirrhinus mrigala	*	*	*
		Cirrhinus reba	*	*	*
		Crossocheilus latius	*	*	*
		Garra mullya	*	*	*
		Garra gotyala	*	*	*
		Labeo bata	*	*	*
		Labeo calbasu	*	*	*
		Labeo gonius	*	*	-
		Labeo rohita	*	*	*
		Labeo dyocheilus	*	*	*
		Labeo fimbriatus	*	*	*
		Osteobrama cotio	*	*	-
		Puntius conchonius	*	*	*
		Puntius sarana	*	*	*
		Puntius sophore	*	*	*
		Puntius ticto	*	*	*
		Puntius guganio	*	*	*

		Puntius dorsalis	*	*	*
		Tor tor	*	*	*
		Barilius barila	*	*	*
		Barilius bendelisis	*	*	*
		Danio devario	*	*	-
		Rasbora daniconius	*	*	*
		Hypopthalmichthys molitrix	*	*	-
	Cobitidae	Lepidocephalichthys guntea	*	*	*
		Nemacheilus botia	*	*	*
	Siluridae	Ompok bimaculatus	*	*	*
		Ompak pobda	*	*	*
		Wallago attu	*	*	*
	Bagridae	Mystus bleekari	*	*	*
		Mystus seenghala	*	*	*
		Mystus vittatus	*	-	-
		Mystus cavasius	*	*	*
		Mystus tengara	*	*	-
		Rita rita	*	*	*
	Schilbeidae	Clupisoma garua	*	*	*
	Saccobran-chidae	Heteropneustes fossilis	*	*	*
	Clariidae	Clarius batrachus	*	*	*
Anguilliformes	Anguillidae	Anguilla bengalensis	*	*	*
Beloniformes	Belonidae	Xenentodon cancila	*	*	*
Ophiocepha-liformes	Ophiocepha-lidae	Channa gachua	*	*	-
		Channa marulius	*	*	*
		Channa punctatus	*	*	*
		Channa striatus	*	*	*
Perciformes	Centropomidae	Chanda nama	*	*	*
		Chanda ranga	*	*	*
	Nandidae	Nandus nandus	*	*	*
	Anabantidae	Anabas testudineus	*	*	*
		Colisa fasciatus	*	*	*
	Gobiidae	Glossogobius giuris	*	*	*
Mastacembe-leformes	Mastacembe-lidae	Mastacembelus armatus	*	*	*
		Mastacembelus pancalus	*	*	*

* Shows the presence of species, - Shows the absence of species

Total fifty nine fish species were recorded in the station - I (Maheshwar). The most abundant family was Cyprinidae 49.15% followed by the families of Bagridae 10.17%, Ophiocephalidae 6.78%, Siluridae 5.08%, Cobitidae, Centropomidae, Anabantidae and Mastacembelidae constituting 3.39% each and other families Clupeidae, Notopteridae, Schilbeidae, Saccobranchidae, Claridae, Anguillidae, Belonidae,

Nandidae, and Gobiidae constituting 1.69% each in order of abundance (Diagram 1).

Fifty eight fish species were recorded in the station - II (Khalghat). The most abundant family was Cyprinidae 49.15% followed by the families of Bagridae 8.47%, Ophiocephalidae 6.78%, Siluridae 5.08%, Cobitidae, Centropomidae, Anabantidae and Mastacembelidae constituting 3.39% each and other famillies Clupeidae, Notopteridae, Schilbeidae, Saccobranchidae, Claridae, Anguillidae, Belonidae, Nandidae and Gobiidae constituting 1.69% each in order of abundance (Diagram 2).

Fifty one fish species were recorded in the station - III (Barwani). The most abundant family was Cyprinidae 40.68% followed by the families of Bagridae 6.78% and Siluridae and Ophiocephalidae constituting 5.08% each and Cobitidae, Centropomidae, Anabantidae and Mastacembelidae 3.39% each and Clupeidae, Notopteridae, Schilbeidae, Saccobranchidae, Claridae, Anguillidae, Belonidae, Nandidae and Gobiidae constituting 1.69% each in order of abundance (Diagram 3).

Among the total 59 fish species recorded over the complete stretch 49.15% carp group, cat and miscellaneous group 20.34%, perches 8.47% and clupeids 1.69%.

The total fifty nine species recorded at station-I (Maheshwar), fifty eight species recorded at station-II (Khalghat) and fifty one species recorded at station-III (Barwani) belong to following groups (Diagram 4).

Group	Station I	Station II	Station III
Carp	49.15%	50%	46.15%
Catfish	20.34%	18.97%	19.23%
Miscellaneous	20.34%	20.69%	21.15%
Perches	8.47%	8.62%	9.62%
Clupeids	1.69%	1.72%	1.92%

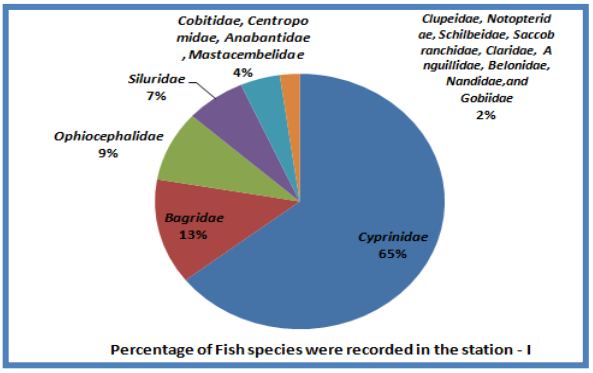

Fig. 1 Percentage of fish species were recorded in the station - I

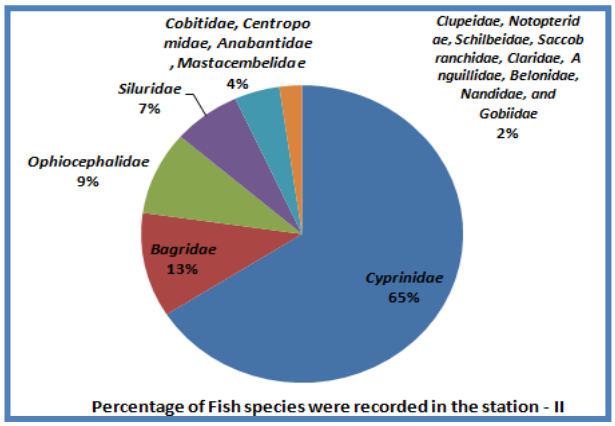

Fig. 2 Percentage of fish species were recorded in the station - II

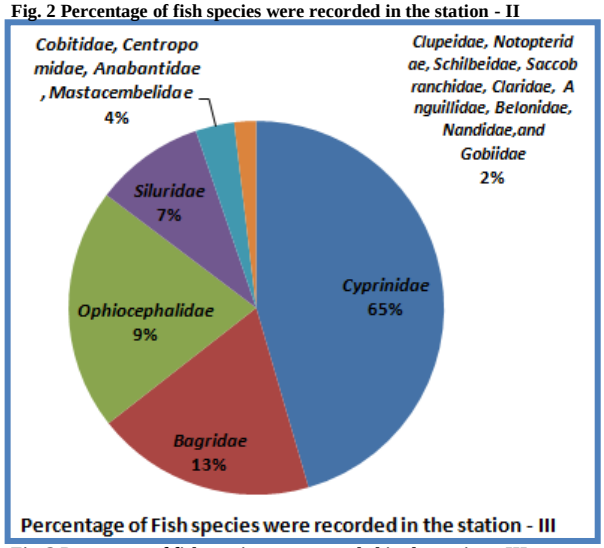

Fig. 3 Percentage of fish species were recorded in the station - III

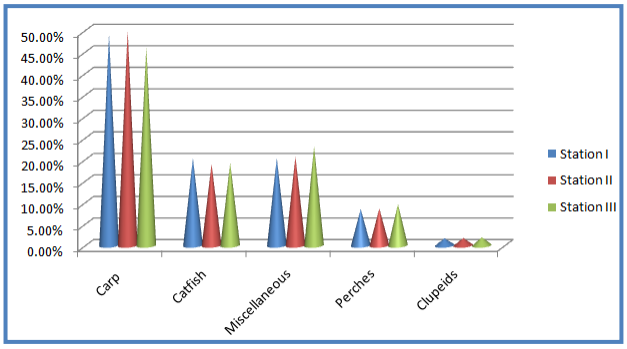

Fig. 4 Percentage of fish species were recorded in groups

Various studies have been done on fish biodiversity and its conservation issues in river systems. The study was executed by the Department of Fisheries, Govt. of M. P. in the year 1967-71 of the river Narmada which covers the stretch from Jabalpur to Khalghat reporting 46 species belonging to 27 genera, 14 families and 7 orders in the stretch (Anon, 1971).

Rao et. al. (1991) have undertaken pre impoundment survey at Punasa (Khandwa district), Omkareshwar (Khandwa district), Mandleshwar (Khargone district), Maheshwar (Khargone district) and Barwani (Barwani district) pertaining to the river and have enlisted 84 fish species belonging to 45 genera, 20 families and 6 orders, however the ten new species of the fishes (*Cyprinus carpio, Cirrhinus cirrhosa, Cirrhinus Fulungee, Puntius sophore, Hypopthalmichthys molitrix, Ompak pobda, Mystus seenghala, Clupisoma garua, Anguilla bengalensis, Channa striatus*) have been reported in present investigation. Similarly, the occurrence of thirty five species (*Chitala chitala, Oxygaster laubuca, Oxygaster clupeoides, Barilius radiolatus, Barilius evezardi, Danio (Danio) aequipinnatus, Danio (Brachydanio) rerio, Esomus danricus, Amblypharyngodon microlepis, Garra lamta, Labeo Boggut, Parapsilorhynchus tentaculatus, Puntius amphibious, Puntius chrysopoma, Puntius pinnauratus, Puntius titius, Oreichthys cosuatis, Tor khudree, Tor putitara, Noemocheilus dayi, Noemocheilus evezardi, Noemocheilus denisonii, Aorichthys aor, Aorichthys seenghala, Rita pavimentata, Clupisoma bastari, Eutropiichthys vacha, Silonia silonia, Glyptothorax lanah, Glyptothorax rebeiroi, Badis badis, Rhinomugil corsula, Gonialosa manmina, Amblyceps mangois, Dariychthys cuncalus*) in survey carried out of the total of 84 species has not been reported in recent studies.

Another survey of fish fauna on river Narmada was carried out and reported 21 fish species belonging 16 genera, 6 families and 4 orders (Balapure 2001), however the latest investigation was forty one new species of the fishes (*Hilsa ilisha, Cirrhinus cirrhosa, Cirrhinus Fulungee, Cirrhinus mrigala, Cirrhinus reba, Crossocheilus latius, Garra mullaya, Garra gotyala, Labeo bata, Labeo gonius, Labeo dyocheilus, Labeo fimbriatus, Osteobrama cotio, Puntius conchonius, Puntius sophore, Puntius ticto, Puntius guganio, Puntius dorsalius, Barilius barila, Barilius bendelisis, Danio davario, Lepidocephalichthys guntea, Nemachelius botia, Ompak bimaculatus, Wallago attu, Mystus vittatus, Mystus cavasius, Mystus tangara, Rita rita, Clupisoma garua, Heteropneustes fossilis, Clarius batrachus, Anguilla bengalensis, Channa gachua, Channa marulius, Channa punctatus, Channa striatus, Anabas testudineus, Colisa fasciatus,Glossogobius giuris, Mastacembelus pancalus*) have been reported in the present investigation. Similarly, the occurrence of two species (*Chela laubuca, Oxygaster gora*) in survey carried out of the total of 21 species has not been reported in recent studies.

The comparative account of the present investigation with the earlier investigation thirty five species (*Hilsa ilisha, Cirrhinus mrigala, Cirrhinus reba, Crossocheilus latius, Garra mullaya, Garra gotyala, Labeo bata, Labeo gonius, Labeo dyocheilus, Labeo fimbriatus, Osteobrama cotio, Puntius conchonius, Puntius ticto, Puntius guganio, Puntius dorsalius, Barilius barila, Barilius bendelisis, Danio davario, Lepidocephalichthys guntea, Nemachelius botia, Ompak bimaculatus, Wallago attu, Mystus vittatus, Mystus cavasius, Mystus tangara, Rita rita, Heteropneustes fossilis, Clarius batrachus, Channa gachua, Channa marulius, Channa punctatus, Anabas testudineus, Colisa fasciatus, Glossogobius giuris, Mastacembelus pancalus*) was not carried out by (Balpure 2001), while in the earlier investigation by (Rao. et. al. 1991) were recorded.

In India, there are about 2,500 species of fishes, of which 930 freshwater and 1,570 marine, are estimated Kar (2003). The members of Order Cypriniformes were dominated by 21 species followed by Siluriformes 8 species, Perciformes 6 species, Osteoglossiforms and Synbranchiformes with 2 species each and Mugiliformes and Beloniformes with one species each.

In the present investigation however six species (Cirrhinus cirrhosa, Cirrhinus Fulungee, Puntius sophore, Clupisoma garua, Anguilla bengalensis, Channa striatus) out of the total 59 species have been documented for the first time in this area, which has not been recorded in earlier survey by (Rao. et. al. 1991) and (Balpure 2001). The natural population of river is fast depleting due to industrial and mining pollution. Therefore, it is suggested that research on biodiversity of fishes need to be strengthened to know the current range of distribution and abundance. To generate current information on the fish biodiversity, intensive survey are required so that better management plans are implemented for conservation of native fishes.

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