

Impact of Environmental Change on Fish and Fisheries in Lendi River, District Nanded, Maharashtra, India

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Abstract: Lendi River is one of the tributary of river Manar, originates at Malkapur dist. Latur and joins to river Manar at Degloor, dist Nanded. Water of this Semi-perennial river is used to perform various activities such as industrial, irrigation, fisheries and human activities. The present fish diversity belonged to 3 orders, 6 families, 13 genera and 21 species. In Lendi riverine ecosystems and fishing activity in the basin is increasingly influenced by anthropogenic activities. The major environmental impacts on fisheries are due to change in transformation in river flow regime, riparian habitat loss, invasion of exotic species, over fishing and agricultural expansion.

Keywords: Fish diversity, Fisheries, Environment impacts, Lendi, River, Nanded

1. Introduction

The river Godavari is the third largest rivers in India. It flows across the Deccan plateau from Western Ghats toward Eastern side through the states of Maharashtra and Andhra Pradesh before joining the Bay of Bengal. On the river weirs, barrages and reservoirs are constructed for irrigation, industrial and domestic purposes. River Godavari also plays important role in reservoir and riverine fisheries of Maharashtra. River Manjara and Manar are the important tributaries of river Godavari in Nanded district. Lendi river is one of the tributaries of river Manjara and which play an important role in Nanded district. A major interstate irrigation Lendi project is under construction. Lendi river flows in two districts of Marathwada i.e. Latur and Nanded and originates at Udgir of Latur district and joins (drain) to river Manjara at Sawargaon in Degloor taluka of district Nanded. Total length of Lendi river from its origin to drain in Marathwada is 125 km. In Nanded district it enters at village Bamni in Mukhed. Total length of Lendi in Nanded is about 65 km. It flows in two talukas i.e. Mukhed (25 km) and Degloor (45 km).

The study of riverine fisheries provides a special significance. Large number of studies has been carried out in India to know the various aspects of riverine fisheries. **Srinivasan and Sreenivasan (1976)** highlighted on fishery of the Cauvery river system in Tamil Nadu. The river Cauvery has a rich indigenous fishery of *Cirrhinus cirrhosa*, *Labeo kontius*, *L. fimbriatus*, *Puntius carnaticus*, *C. reba*, *Pangasius pangasius*, *Mystus dor*, *Silonia silondia*, *Wallago attu*, etc. **Singh (1987)** reported on prospects of riverine fisheries in Manipur with special reference to Imphal river. This river system provides the rich fresh water fauna, ranging from game fish like *Mahsser* and torrential fishes of hill stream to high yielding varieties of Indian major carps and other fishes, some of great commercial value. **Roy (1995)** has made observation on the seasonal distribution and species composition of fishes in Kallada river. **Nair (1986)** studied the fish fauna of Kallada and Neyyar river. **Arun and Kingston (1991)** made observations of fish communities in Kallar Vamanapuram river system. **Sahib (1992)**

studied the fish fauna of Kallada river. **Varghese (1994)** studied the fish fauna of Achenkovil river. **Mohan et al., (1998)** studied the fish fauna of the Chalyar river.

Sharma and Nayak (2001) made observations on fish fauna from rivers Gundlakamma, Muri and Paleru. A list of 40 species recorded belongs to five orders and 13 families. Fishes of the genus *Puntius* showed high diversity, represented by nine species. **Sushama et al., (2004)** studied distribution of fishes in the Nila river. Sixty one species of fishes belonging to 11 orders, 30 families and 50 genera are recorded. **Srikanth et al., (2009)** studied fish diversity of Rammappa lake. 31 species belonging to 6 orders, 23 genera of 14 families were recorded. **Mohite and Samant (2013)** studied impact of environmental changes on fish and fisheries in Warna river basin, Western Ghats, India. The present fish diversity belonged to 4 orders, 10 families, 30 genera and 42 species.

2. Material & Methods

Study Area: For the study of molluscan diversity in river Lendi three sampling stations (S-I Mukramabad, S-II Gonegaon & S-III Bahegaon road) were selected on the right bank of river Lendi, out of them two stations are in Mukhed taluka and one station is in Degloor taluka, district Nanded. Station-I: Mukramabad: This station is located at the height of 394 meter above M.S.L. in between the latitude 18° 28' & 44.33"N and longitude 77° 21' & 58.20"E. Depth was 2 to 15 feet and width was 110 meter. Station-II: Gonegaon: This station is located at the height of 384 meter above M.S.L. in between latitude 18° 31' & 13.63"N and longitude 77° 25' & 5.38"E. The depth ranges from 2 to 9 feet and width is about 60 meter. Station is 6 to 7 km away from station-I. Station-III: Bahegaon Road (Degloor): This station is located at the height of 363 meter above M.S.L. in between latitude 18° 32' & 41.32"N and longitude 77° 33' & 28.07"E. The depth ranges from 5 to 20 feet and width is 160 meter. It is 10 km away from station-II.

Collection, Preservation and Identification: Monthly collections of fishes were made from three sampling stations of Lendi river for a period of two years from July

2010 to June 2012. The collection method includes netting with gill nets, cast net, fish traps and hand picking methods. All the collected fishes were photographed alive so as to present the natural colour. These fishes stored in 10% formalin and brought to the laboratory for identification. Collected Fishes were identified with the help of Day (1958), Talwar & Jhingran (1991), Jhingran (1997), Karmarakar et.al., (2012) Fauna of Maharashtra, FAO species identification sheets for fishery purposes.

3. Results & Discussion

The taxonomic composition of the fish fauna in Lendi river includes a total 21 species under 13 genera, 6 families belonging to 3 orders. Detailed systematic including order, family, genus and species of all collected fishes were presented in the Table No.1 (Plate No. I). The abundance of fish at each station is presented in Table No. 2 & 3.

The major orders of fishes represented were, Cypriniformes (2 family and 15 species), Siliuriformes (2 family and 3 species) and Perciformes (2 family and 3 species).

Order Cypriniformes was represented by two families, namely Balitoridae and Cyprinidae. *Nemacheilus Savona* was the one species of the family, Balitoridae. The following fourteen species belonged to the family Cyprinidae, *Rohtee cotio*, *Puntius ticto*, *Puntius jerdoni*, *Puntius chola*, *Labeo calbasu*, *Labeo boga*, *Labeo rohita*, *Chela utrachi*, *Salmostoma novacula*, *Salmostoma phula*, *Chela fasciata*, *Discognathus modestus*, *Cirrhinus mrigala* and *Barilius gatensis*.

Order Siliuriformes was represented by 2 families namely Bagridae and Siliuridae. The family Bagridae was represented by *Mystus cavaasius* and *Mystus bleekeri* and the family Siliuridae was represented by one species, *Wallago attu*.

Order Perciformes was represented by two families namely Channidae & Mastacembelidae. The family Channidae was represented by two species, *Channa orientalis* and *Channa punctatus* and the family Mastacembelidae represented by one species, *Mastacembelus armatus*.

However, the commercially important species have very less occurrence in the collected samples in the fishermen's catches and because of this contribution to the commercial fisheries is less. Occurrence of *Macrobrachium resenbergi* at Mukramabad and Bahegaon road (Degloor) is also an important fact because these stations are far away from the breeding grounds. The presence of these species indicates the intervention of man not only by altering the habitat, but also by introducing species which are not native to the river. The limited flow and the discontinuous nature of the water and the dead stretches do prevent the migration and spread of these species to some extent. However, during monsoon, when the river floods and overflows, such species could establish throughout the river and the adjoining water bodies. Generally both

density and species richness of river increased with increasing stream size (Paul & Karr, 1983). In station-III fishes were abundant because of a large pool zone. According Paul & Karr (1983) fishes show greatest densities in large pool region. The present study showed that there was an increase in the fishes during dry season because water flow rate was decreased.

Factors affecting Species diversity: Interview with local fishermen have revealed the fact that most of the species are disappearing from their habitats and fish populations has been dwindling in the Lendi river. Following are the reasons for the decline of the fresh water resources of the Lendi river, because of the anthropogenic activities such as:

Habitat destruction: Removal of sand from rivers has resulted in the destruction of benthic habitat and shallow flowing waters into deep stagnant waters. Fishes which were hiding in sandy bottom are disappearing from the habitat.

Drying of river during summer: Deforestation resulted in drying up of the upper reaches of the river during summer leading to the elimination of all the fishes living there.

Anthropogenic activities: Anthropogenic activities have brought about major changes of riverine ecosystem and consequently there have been a steady deterioration in qualitative as well as quantitative abundance of inland fishery wealth.

4. Conclusion

Most of the fishes harvested from these stations were low priced and uneconomical being small, mainly minnows. No commercially important catch was observed except *Labeo rohita* (3-4 kg) and *Wallago attu* (1-2 kg). The fishes collected during the study belonged to 3 different orders, 6 families, 13 genera and 21 species. The numerically rich order was Cypriniformes with 2 families. Family Cyprinidae had 9 genera with the *Puntius ticto* dominating the distribution with 3 species. *Puntius ticto* were the dominant species with higher number of catches at Mukramabad. According to the information collected from fishermen 100 species of freshwater fishes were harvested before 25 years ago. Out of them only 21 species are observed during the study.

There is considerable depletion in species diversity when compared to the data available. Moreover, the present investigation was carried out only at specific stations and was not a holistic study of the entire stretch of the river. However, the commercially important species have very limited presence in the samples collected as well as the fishermen's catches. This shows that the river's contribution to commercial fisheries is average.

Acknowledgement

The authors are thankful to Principal, N.E.S. Science College, Nanded for providing laboratory & library facilities. The first author is thankful to UGC for financial

support and encouragement through awarding Maulana Azad National Fellowship for Minority Candidates (2009).

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PLATE - I



Puntius ticto



Barilius gatensis



Channa orientalis



Channa punctatus



Chela fasciata



Chela utrachi



Cirrhinus mrigala



Discognathus modestus



Mastacembelus armatus



Labeo boga



Labeo calbasu



Labeo rohita



Mystus bleekeri



Mystus cavasius



Nemacheilus savona



Puntius chola



Puntius jerdoni



Rohtee cotio



Salmostoma novacula



Salmostoma phulo



Wallago attu

Table 1: List of Fishes identified at various stations of Lendi River

Sr. No.	Order/Family/Genus-Species	Station-I	Station-II	Station-III
I	Cypriniformes			
A	Cyprinidae			
1	<i>Rohtee cotio</i>	+	+	-
2	<i>Puntius ticto</i>	+	+	-
3	<i>Puntius chola</i>	+	-	-
4	<i>Puntius jerdoni</i>	+	-	-
5	<i>Labeo calbasu</i>	+	-	+
6	<i>Labeo boga</i>	+	-	+
7	<i>Labeo rohita</i>	+	-	+
8	<i>Cirrihinus mrigala</i>	+	-	+
9	<i>Chela utrachi</i>	+	-	+
10	<i>Chela fasciata</i>	+	-	+
11	<i>Salmostoma novacula</i>	-	-	+
12	<i>Salmostoma phulo</i>	-	-	+
13	<i>Barilius gatensis</i>	+	-	-
14	<i>Discognathus modestus</i>	+	-	-
B	Balitaridae			
15	<i>Nemacheilus savona</i>	-	+	-
II	Siluriformes			
C	Bagride			
16	<i>Mystus cavasius</i>	+	-	+
17	<i>Mystus bleekeri</i>	+	-	+
D	Siluridae			
18	<i>Wallago attu</i>	+	-	+
III	Perciformes			
E	Channidae			
19	<i>Channa orientalis</i>	+	-	+
20	<i>Channa punctatus</i>	+	-	+
F	Mastacembelidae			
21	<i>Mastacembelus armatus</i>	+	-	+

Table 2: Fish abundance at various sites of River Lendi in 2010-2011

Sampling stations	Fish species	Sampling Seasons		
		I	II	III
Station-I	<i>Rohtee cotio</i>	-	4	-
	<i>Puntius ticto</i>	23	56	37
	<i>Puntius chola</i>	6	53	213
	<i>Puntius jerdoni</i>	36	19	44
	<i>Labeo calbasu</i>	3	-	7
	<i>Labeo boga</i>	4	32	14
	<i>Labeo rohita</i>	9	61	47
	<i>Cirrihinus mrigala</i>	-	13	29
	<i>Chela utrachi</i>	7	28	16
	<i>Chela fasciata</i>	5	17	9
	<i>Barilius gatensis</i>	12	52	34
	<i>Discognathus modestus</i>	2	-	-
	<i>Mystus cavasius</i>	1	21	8
	<i>Mystus bleekeri</i>	8	38	1
	<i>Wallago attu</i>	-	4	2
	<i>Channa orientalis</i>	-	9	17
	<i>Channa punctatus</i>	-	13	32
<i>Mastacembelus armatus</i>	1	-	-	
Station-II	<i>Rohtee cotio</i>	-	3	-
	<i>Puntius ticto</i>	7	16	-
	<i>Nemacheilus Savona</i>	6	9	-

Table 2 (Contd.): Fish abundance at various sites of River Lendi in 2010-2011

Sampling Stations	Fish Species	Sampling Seasons		
		I	II	III
Station-III	<i>Labeo calbasu</i>	-	-	2
	<i>Labeo boga</i>	9	24	41
	<i>Labeo rohita</i>	5	21	11
	<i>Cirrihinus mrigala</i>	-	-	18
	<i>Chela utrachi</i>	4	24	13
	<i>Chela fasciata</i>	2	32	19
	<i>Salmostoma novacula</i>	17	37	29
	<i>Salmostoma phulo</i>	28	23	6
	<i>Mystus cavasius</i>	9	27	-
	<i>Mystus bleekeri</i>	26	13	1
	<i>Wallago attu</i>	2	11	3
	<i>Channa orientalis</i>	-	39	72
	<i>Channa punctatus</i>	16	12	41
	<i>Mastacembelus armatus</i>	3	-	-

Sampling season-I – June-September

Sampling season-II – October-January

Sampling season-III – February-May

Table N3: Fish abundance at various sites of River Lendi in 2011-2012

Sampling stations	Fish species	Sampling Seasons		
		I	II	III
Station-I	<i>Rohtee cotio</i>	9	1	-
	<i>Puntius ticto</i>	11	41	26
	<i>Puntius chola</i>	27	62	169
	<i>Puntius jerdoni</i>	20	17	56
	<i>Labeo calbasu</i>	8	-	10
	<i>Labeo boga</i>	9	40	24
	<i>Labeo rohita</i>	7	49	67
	<i>Cirrihinus mrigala</i>	-	34	21
	<i>Chela utrachi</i>	12	37	5
	<i>Chela fasciata</i>	18	31	4
	<i>Barilius gatensis</i>	16	49	60
	<i>Discognathus modestus</i>	-	2	1
	<i>Mystus cavasius</i>	13	35	10
	<i>Mystus bleekeri</i>	27	14	6
	<i>Wallago attu</i>	7	1	-
	<i>Channa orientalis</i>	5	20	36
	<i>Channa punctatus</i>	7	23	44
<i>Mastacembelus armatus</i>	-	3	-	
Station-II	<i>Rohtee cotio</i>	9	5	-
	<i>Puntius ticto</i>	6	5	-
	<i>Nemacheilus Savona</i>	3	7	-

Table 3 (Contd.): Fish abundance at various sites of River Lendi in 2011-2012

Sampling Stations	Fish Species	Sampling Seasons		
		I	II	III
Station-III	<i>Labeo calbasu</i>	-	8	1
	<i>Labeo boga</i>	19	14	52
	<i>Labeo rohita</i>	11	46	23
	<i>Cirrihinus mrigala</i>	2	10	31
	<i>Chela utrachi</i>	16	8	7
	<i>Chela fasciata</i>	27	20	10
	<i>Salmostoma novacula</i>	14	53	19
	<i>Salmostoma phulo</i>	32	47	11
	<i>Mystus cavasius</i>	17	23	7
	<i>Mystus bleekeri</i>	31	24	-
	<i>Wallago attu</i>	-	5	9
	<i>Channa orientalis</i>	-	48	62
	<i>Channa punctatus</i>	7	27	52
	<i>Mastacembelus armatus</i>	-	2	-

Sampling season-I – June-September

Sampling season-II – October-January

Sampling season-III – February-May

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