

# Ichthyodiversity exploration of river Longai of North Tripura district, India

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## ABSTRACT

Tripura, a small hilly state in Northeast India, is rich in riverine resources. The region is renowned for its ichthyodiversity and is recognized as a hotspot for various fish species. The diverse geomorphological distribution of the Northeastern states contributes significantly to the great diversity in lotic ecosystems. However, many riverine systems remain largely unexplored, including the Longai River in North Tripura district. To address this, a study was conducted to document the fish species diversity in the Longai River. During the study, a total of 38 fish species were recorded, characterized by their morphological features. The collected species belong to 18 families under 7 orders: Cypriniformes, Perciformes, Siluriformes, Osteoglossiformes, Synbranchiformes, Clupeiformes, and Beloniformes. It was found that the river Longai is predominantly enriched by species from the order Cypriniformes, though its representative families are relatively few. Orders Perciformes and Siluriformes exhibited moderate species variability and family diversity, while Osteoglossiformes, Synbranchiformes, Clupeiformes, and Beloniformes showed limited family and species variability. According to the IUCN Red List, species such as *Channa harcourtbutleri*, *Parambasis lala*, *Ailia coil*, and *Chitala chitala* are near threatened and require conservation efforts. The global distribution of these fish species underscores their availability worldwide. This study contributes to the understanding of ichthyodiversity in Tripura and emphasizes the need to explore and conserve riverine resources.

## ARTICLE HISTORY

Received on: 20-01-2024

Revised on: 22-07-2024

Accepted on: 25-07-2024

## KEYWORDS

Fish diversity, Longai river, North Tripura, IUCN Redlist, Global distribution

## 1. Introduction

Ichthyodiversity mainly relies on the diversity of fish species within the community and sometimes other living forms in the aqua regimes are also considered (Burton et al., 1992). India is fresh water mega area holding ninth position throughout the world (Mittermeier and Mittermeier, 1997). The Northeastern region of India is well known for its fish biodiversity and recognized as a hotspot for the variety of fishes (Kottelat and Whitten, 1996; Ramnujam et al., 2010). However, it was postulated that the geomorphological distribution of the Northeastern states is mainly responsible for such great diversity (Kar, 2005 a,b,c). Tripura is a state of Northeast India consisting of richness in several rivers, streams, lakes, wetlands, ponds, swamps and ditches. The average annual rain ranges between 1979.6 to 2745.9 mm which actually maintains the water supply of the river for the whole year (<http://trpenvis.nic.in>). The natural fish community of Tripura is mainly reliant on the lotic sources, whereas significant contribution is also observed by lentic ecosystems. The total length of the river along with the other basin of Tripura is roughly 10,491 km. The major riverine system of Tripura comprises Gomuti, Muhuri, Feni, Manu, Haora, Deo, Khowi, Longi, Juri and Dhalai river. Lipton (1983-84) documented a broad list of fish species of Tripura. After a long gap, Barman (2004) documented the endemic and threatened fishes of Tripura. Maximum fish species were reported from river Gomati suggesting 80 species belonging to 25 families (Barman, 1988). Studies from river Manu presented 28 fish species under 8 families, whereas 22 species under the 6 families were from river Khowai. River Feni showed 22 fish species under 8 families (Kar and Sen, 2007) whereas 19 species belonging to 11 families were reported from Deo and Juri

river (previously known as Kakri) (Nath et al., 2015). The livelihood and socio-economic status of local peoples are more or less dependent on the capturing and marketing from riverine resources. Therefore, the exploration of varieties of fishes in the riverine ecosystems has potential importance from the point of view of economic as well as ecological significance. Longai is a vital river of the North Tripura district, but a literature review showed that to date no reports on the fish diversity of this river. Therefore, a fish species exploration study was conducted on this river.

## 2. Materials and Methods

### 2.1. Study Site:

The river Longai is a trans-boundary river between Tripura and Assam, as well as Mizoram (Fig.1). The approximate length of the river is 98 km. It covers the area of basin about 342 Km<sup>2</sup>, which interms of percentage of total geographical area is 3.25. Annual flow is approximately 9166 m<sup>3</sup>, which interms of percentage to total flow is 1.16.

### 2.2. Sample Collection:

Fish samples were captured from the various sites of Longai by netting in 2018. Then, collected fish samples were brought to a suitable place for taking representative photographs. The specimens were classified into families. However, the samples which needed elaborate examination for identification were carried along with the sampling group. After identification, the remaining specimens were stored in container with proper labeling. Identification of collected specimens was done by following Talwar and Jhingran (1991), Jayaram (2010), and Vishwanath et al. (2002).



Fig. 1. The map of Tripura showing the Longai river distribution

### 3. Results and Discussion

During the study, total of 38 types of fish species were recorded (Table 1). Analysis of the collected fish species showed belonging to 18 families, which under 7 orders, named Cypriniformes, Perciformes, Siluriformes, Osteoglossiformes, Synbranchiformes, Clupeiformes, Beloniformes. Order Cypriniformes presented 2 families, named Cyprinidae and Cobitidae, where 16 fish species were recorded. But, the order Perciformes included 6 families along with 9 fish species representatives. The families under Perciformes are Channidae, Ambassidae, Nandidae, Gobiidae, Osphronemidae, and Badidae. Order Siluriformes presented 7 fish species comprising of 6 families, named as: Sisoridae, Clariidae, Heteropneustidae, Bagridae, Schilbeidae, and Olyridae. Order Osteoglossiformes and Synbranchiformes represented one family, Notopteridae and Mastacembelidae, respectively with 2 fish species in each. Order Clupeiformes and Beloniformes presented one fish species under Clupeidae's and Belonidae's respective

Table 1. Fish species of Longai River of Tripura with order, family, species authority and IUCN red list status

Sl. No.	Order	Family	Species name	Species Authority	IUCN Status		
1	Cypriniformes	Cyprinidae	<i>Aspidoparia jaya</i>	Hamilton, 1822	LC		
2			<i>Amblypharyngodon mola</i>	Hamilton, 1822	LC		
3			<i>Cirrhinus mrigala</i>	Hamilton, 1822	LC		
4			<i>Cyprinus carpio</i>	Linnaeus, 1758	VU		
5			<i>Catla catla</i>	Hamilton, 1822	LC		
6			<i>Devario aequipinnatus</i>	McClelland, 1839	LC		
7			<i>Labeo calbasu</i>	Hamilton, 1822	LC		
8			<i>Labeo bata</i>	Hamilton, 1822	LC		
9			<i>Labeo gonius</i>	Hamilton, 1822	LC		
10			<i>Labeo rohita</i>	Hamilton, 1822	LC		
11			<i>Puntius sophore</i>	Hamilton, 1822	LC		
12			<i>Pethia ticto</i>	Hamilton, 1822	LC		
13			<i>Puntius chola</i>	Hamilton, 1822	LC		
14			<i>Puntius sp.</i>	--	--		
15				Cobitidae	<i>Botia dario</i>	Hamilton, 1822	LC
16					<i>Canthophrys gongota</i>	Hamilton, 1822	LC
17	Perciformes	Channidae	<i>Channa harcourtbutleri</i>	Annandale, 1918	NT		
18			<i>Channa striata</i>	Bloch, 1793	LC		
19			<i>Channa punctata</i>	Bloch, 1793	LC		
20			Ambassidae	<i>Chanda nama</i>	Hamilton, 1822	LC	
21				<i>Parambasis lala</i>	Hamilton, 1822	NT	
22			Nandidae	<i>Nandus nandus</i>	Hamilton, 1822	LC	
23			Gobiidae	<i>Glossogobius giuris</i>	Hamilton, 1822	LC	
24			Osphronemidae	<i>Trichogaster fasciata</i>	Bloch & Schneider, 1801	LC	
25			Badidae	<i>Badis blosyrus</i>	Kullander&Britz, 2002	LC	
26		Siluriformes	Sisoridae	<i>Glyptothorax botius</i>	Hamilton, 1822	LC	
27			Clariidae	<i>Clarias batrachus</i>	Linnaeus, 1758	LC	
28			Heteropneustidae	<i>Heteropneustes fossilis</i>	Bloch, 1794	LC	
29	Bagridae		<i>Mystus cavasius</i>	Hamilton, 1822	LC		
30				<i>Mystus tengara</i>	Hamilton, 1822	LC	
31			Schilbeidae	<i>Ailia coila</i>	Hamilton, 1822	NT	
32			Olyridae	<i>Olyra kempii</i>	Chaudhuri, 1912	LC	
33	Osteoglossiformes	Notopteridae	<i>Chitala chitala</i>	Hamilton, 1822	NT		
34			<i>Notopterus notopterus</i>	Pallas, 1769	LC		
35	Synbranchiformes	Mastacembelidae	<i>Mastacembelus armatus</i>	Lacepede, 1800	LC		
36			<i>Macroglyptothorax pancalus</i>	Hamilton, 1822	LC		
37	Beloniformes	Belonidae	<i>Xenentodon cancila</i>	Hamilton, 1822	LC		
38	Clupeiformes	Clupeidae	<i>Gudusia chapra</i>	Hamilton, 1822	LC		

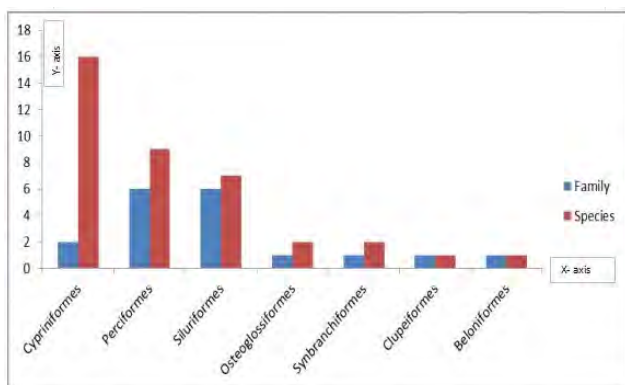
LC: Least Concerned; VU: Vulnerable; NT: Near threatened

families. Depending on the fish species collection, it may be resolved that the river Longai is enriched the order Cypriniformes, although its representative families are quite less. Order Perciformes and Siluriformes showed moderate fish species variability along with diversified families. But, Osteoglossiformes, Synbranchiformes, Clupeiformes and Beloniformes showed few in number of families as well as in species variability (Fig. 2). The evaluation of IUCN

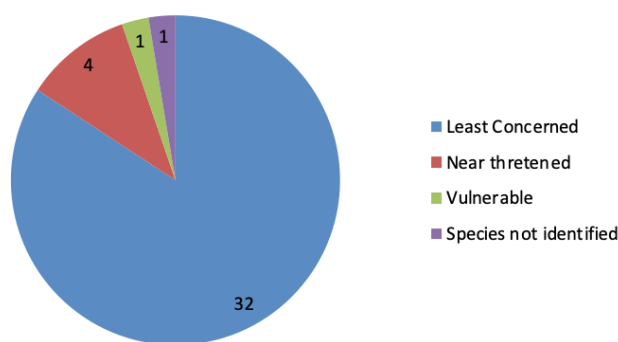
Red List status of the identified fish species showed that about 84.21% species are least concerned (LC), whereas 10.52% are near threatened (NT) and 2.63% are vulnerable (VU) (Fig. 3). The global distributions of the concerned fish species were also presented in Table 2 to the outlook the probability of the presence of the species within world. The pictorial representation of the collected fish species was also present in the study (Fig. 4A, 4B & 4C).

**Table 2.** Global distribution of observed fish species of Lomgai River (Web Search Link: <http://www.fishbase.org/>)

Sl. No.	Species name	Global Distribution
1	<i>Aspidoparia jaya</i>	Asia: India, Nepal, Bangladesh and Afghanistan.
2	<i>Amblypharyngodon mola</i>	Asia: Pakistan, India, Bangladesh, Myanmar and Afghanistan.
3	<i>Cirrhinus mrigala</i>	Asia: Pakistan, India, Nepal, Bangladesh.
4	<i>Cyprinus carpio</i>	Europe to Asia: Black, Caspian and Aral Sea basins.
5	<i>Catla catla</i>	Asia: Pakistan, India, Bangladesh, Nepal and Myanmar.
6	<i>Devario aequipinnatus</i>	Asia: India and Nepal to Indochina.
7	<i>Labeo calbasu</i>	Asia: Pakistan, India, Bangladesh, Myanmar, Nepal, Thailand and South Western China.
8	<i>Labeo bata</i>	Asia: India, Bangladesh and Pakistan.
9	<i>Labeo gonius</i>	Asia: Pakistan, India, Bangladesh, Myanmar, Afghanistan and Nepal.
10	<i>Labeo rohita</i>	Asia: Pakistan, India, Bangladesh, Myanmar and Nepal.
11	<i>Puntius sophore</i>	Asia: Pakistan, India, Nepal, Bangladesh, Myanmar, China, Bhutan and Afghanistan.
12	<i>Pethia ticto</i>	Asia: Pakistan, India, Nepal, Sri Lanka, Bangladesh, Myanmar, Thailand, Mekong, Salween, Irrawaddy, Chao Phraya basins.
13	<i>Puntius chola</i>	Asia: Pakistan, India, Nepal, Bangladesh, Sri Lanka, Myanmar and Bhutan.
14	<i>Puntius sp.</i>	--- Species not confirmed ---
15	<i>Botia dario</i>	Asia: India, Bangladesh and Bhutan.
16	<i>Canthophrys gongota</i>	Asia: India, Bangladesh and Nepal.
17	<i>Channa harcourtbutleri</i>	Asia: Myanmar.
18	<i>Channa striata</i>	Asia: Pakistan to Thailand and south China.
19	<i>Channa punctata</i>	Asia: Afghanistan, Pakistan, India, Sri Lanka, Nepal, Bangladesh, Myanmar and China.
20	<i>Chanda nama</i>	Asia: Pakistan, India, Nepal, Bangladesh, and Myanmar.
21	<i>Parambassis lala</i>	Asia: India, Bangladesh and Myanmar.
22	<i>Nandus nandus</i>	Asia: Pakistan to Thailand.
23	<i>Glossogobius giuris</i>	Africa to Oceania: Red Sea and East Africa, Madagascar to India and China.
24	<i>Trichogaster fasciata</i>	Asia: Pakistan, India, Nepal, Bangladesh and Myanmar.
25	<i>Badis blosyrus</i>	Asia: India.
26	<i>Glyptothorax botius</i>	Asia: Ganges River.
27	<i>Clarias batrachus</i>	Asia: Java, Indonesia.
28	<i>Heteropneustes fossilis</i>	Asia: Pakistan and Sri Lanka to Myanmar.
29	<i>Mystus cavasius</i>	Asia: Pakistan, Nepal, India, Sri Lanka, Myanmar and Thailand.
30	<i>Mystus tengara</i>	Asia: Pakistan, India, Nepal, Bangladesh and Afghanistan.
31	<i>Ailia coila</i>	Asia: Pakistan, India, Bangladesh and Nepal.
32	<i>Olyra kempii</i>	Asia: India and Bangladesh.
33	<i>Chitala chitala</i>	Asia: India, Thailand and Indo-China, Malaysia and Indonesia.
34	<i>Notopterus notopterus</i>	Asia: India, Irrawaddy, Salween, Mekong, Chao Phraya, Mekong, Thailand, Malaysia, Sumatra and Java.
35	<i>Mastacembelus armatus</i>	Asia: Pakistan to Vietnam and Indonesia.
36	<i>Macrogonathus pancalus</i>	Asia: Pakistan, India, Bangladesh and Nepal.
37	<i>Xenentodon cancila</i>	Asia: Sri Lanka and India eastward to the Mekong
38	<i>Gudusia chapra</i>	Asia: India, Bangladesh, Nepal and Pakistan.



**Fig. 2.** The map of Tripura showing the Longai river distribution



**Fig. 3.** The map of Tripura showing the Longai river distribution



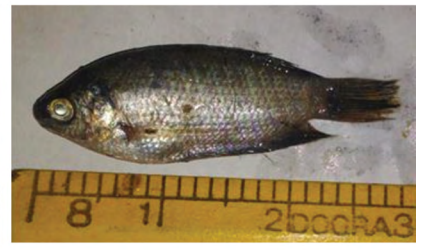
**Fig. 4A.** Fish fauna of Longai river



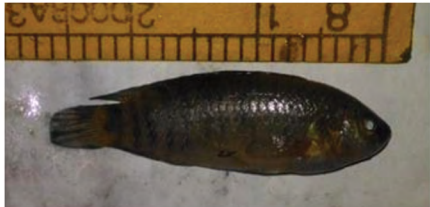
*Nandus nandus*



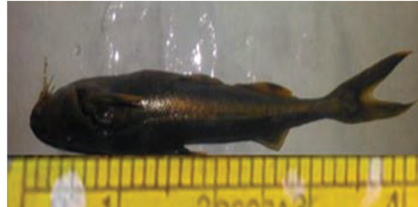
*Glossogobius giuris*



*Trichogaster fasciata*



*Badis blosyrus*



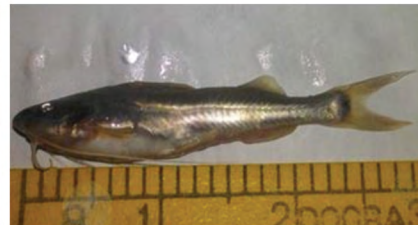
*Glyptothorax botius*



*Clarias batrachus*



*Heteropneustes fossilis*



*Mystus cavasius*



*Mystus tengara*



*Ailia coila*



*Olyra kempfi*



*Chitala chitala*



*Notopterus notopterus*



*Mastacembelus armatus*

**Fig. 4B.** Fish fauna of Longai river

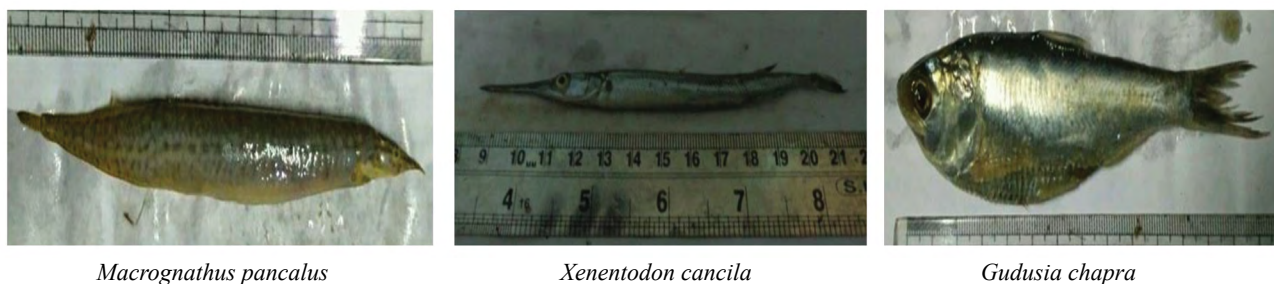


Fig. 4C. Fish fauna of Longai river

#### 4. Conclusion

From the river Longai, a total 38 species of fish species were reported in the present study, and the collected fish species belong to 18 families under 7 orders viz. Cypriniformes, Perciformes, Siluriformes, Osteoglossiformes, Synbranchiformes, Clupeiformes, Beloniformes. The IUCN Red list status depicted that

*Channa harcourtbutleri*, *Parambasis lala*, *Ailia coila*, and *Chitala chitala* remains in the near threatened category.

#### Acknowledgement

The authors are pleased to acknowledge Mr. Richard Zongte, TCS Gr-II, Block Development Officer, Damcherra RD Block, North Tripura for his kind cooperation and help during the field survey.

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