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A CHECKLIST OF ICHTHYOFAUNAL RESOURCES OF THE PALLA RIVER OF ASSAM, INDIA

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ABSTRACT

Freshwater ecosystems throughout the world play very crucial role in ichthyofaunal diversity as well as fishery potential.North-east India is considered a hotspot of ichthyofaunal resources. The Palla river flows through the Baksa and Barpeta districts of Assam. It is a tributary of the Chaulkhowa river, which merges with the Brahmaputra River. In the present study, a total of 56 species of fish have been identified under 43 genera, 8 orders and 19 families from the four sampling sites of the Palla river, Assam, India (Table 1). The identified species of fish belongs to the following families: Notopteridae (2 species), Ophichtidae (1 species), Clupeidae (1 species), Cyprinidae (15 species), Botidae (2 species), Cobitidae (4 species), Nemacheilidae (2 species), Sisoridae (5 species), Siluridae (4 species), Chacidae (1 species), Clariidae (1 species), Heteropneustidae (1 species), Schilbeidae (1 species), Bagridae (5 species), Belonidae (1 species), Ambassidae (1 species), Badidae (2 species), Badidae (4 genera), Nandidae (1 species), Channidae (4 species) and Tetraodontidae (1 species) and syngnathidae (1 species).

INTRODUCTION

Ichthyofaunal diversity refers to the variety of fish species; although depending on context and scale, it may refer to alleles or genotypes within piscian populations, to species of life forms within a fish community, and to species or life forms across aquaregimes(Burton et al., 1992).Fish constitutes almost half of the total number of vertebratesin the world. They live in almost all conceivable aquatic habitats. Globally, more than 32,300 fishspecies have been reported (Froese and Pauly, 2018) and India contributes nearly 3,157 fish species out of which 892 species are purely freshwater inhabitants; 1,545 are purely marine and 17 are purely brackishwater species (NBFGR, 2020). According to a report, the Indian species represent around 8.9% of the known fish species of the world (Baker et al., 2008) and contributes about 11.72% of global fish diversity mainly from the greater Himalayan range on the northern plains, long stretches of Eastern and Western Ghats (Lakra et al., 2010). India is the third largest producer of fish in the world.

The fish diversity in any geographical region is largely determined by several factors, including the geographical position, varied aquatic ecological conditions, health of aquatic bodies, optimum exploitation of the commercial fish species, enforcement of laws, implementation of rules and regulations and fish habitat restoration programmes (Uchchariya et al., 2012). The Northeast India, consisting of eight Indian states, forms a part of two of the 34 biodiversity hotspots listed by Conservation International, the Himalayas and Indo-Burma (Roach, 2005). The mighty Brahmaputra River flows through this region of India. In India, the catchment area of this river spreads over statesof Arunachal Pradesh, Assam, West Bengal, Meghalaya, Nagaland and Sikkim covering 1,94,413 Sq. km. which is nearly 5.9 % of the total geographical area of the country (https://indiawris.gov.in). During the course through the state of Assam, the Brahmaputra River is joined by numerous tributaries on both sides. The Brahmaputra and tributaries, along with numerous lotic water bodies provide a distinctfreshwater ecosystem for the ichthyofauna to thrive. Along with the lotic water bodies, this region is also bestowed with numerous permanent lentic water bodies called the beels and marshy areas, which provide permanent breeding grounds for many fish species. This region of India is very rich in ichthyofaunal resources. Certain

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genera of fishes like Aborichthys, Akysis, Badis, Bangana, Chaca, Conta, Erethistoides,Erethistis, Exostoma, Myerglanis, Olyra, Parachiloglanis, Pareuchiloglanis, Pseudecheneis and Pseudolaguvia are endemic to the north east region of India (Goswami et. al, 2012). Goswami et al. reported422 freshwater fish species from north east India, belonging to 133 genera and 38 families (Goswami et. al, 2012). A total of 229 species have been reported in the Brahmaputra drainage alone (Viswanath 2017).

The Palla River (Fig.1) flows through two administrative districts of Assam, Baksa and Barpeta. It originates in the Baksa district, at the foothills of the lower Himalayas, and traverses approximately 50 kilometers through the Baksa and Barpeta districts to merge with the Beki River near the town of Barpeta. The confluence of Palla and Beki forms theChaulkhowa river. The Chaulkhowa river is a tributary to the mighty Brahmaputra River. Other rivers flowing through these two districts of Assam are Pohumara, Manas, and Kaldia. (Hussain et al., 2014).

Although the Palla River houses a rich ichthyofaunal diversity, its assessment remains very poor. Hussain et al. 2014 conducted a preliminary investigation on the water quality parameters of the Palla river and also reported a few species of fish from the river. Other than this study, to the best of the knowledge of the authors, no report on the ichthyofaunal resource of the Palla River is available in existing literature. The present study was conducted in 2022-23 to prepare a checklist of fish species in the river, based on primary data.

MATERIALS AND METHODS

The extensive study was carried out from January 2022 to January 2023. Fish samples were collected by the random sampling method from four different sampling zones (Table 1). Samples were collected three times in a month from January 2022 to January 2023. Fishes were caught by using different types of Gill nets, cast nets, drag nets, scop nets, bamboo traps with the aid of local fishermen. In addition, nearby fishermen's communities have been interviewed. GPS (Garmin e-Trex Legend) was used to record the geographical coordinates of the landing sites (Table 1). Mesh sizes of the gill nets used by fishermen include: 2½ inch, 3inch, 3½, 4inch and 4½ and 5½ inch. Cast nets of mesh size 7 x 7 mm and sweep nets mesh size 5x5 mm were used to collect the samples.Some fish samples were also collected from local fish markets of the studied area to ascertain the fish species composition as far as possible. The samples were photographed, immediately prior to preservation using formalin solution

Table 1. Co-ordinates of the sample collection sites

Sample collection site	N	E
Kalpani	26.59660	91.02990
Majgaon	26.48035	91.00743
Helonapam	26.43240	90.99653
Dangarkuchi	26.34929	91.01646

Preservation and Identification

The fish samples so collected were identified according to Jayaram (1999), Das and Biswas (2008) and Talwar and Jhingran (1991) with the help of the photo illustrations and the descriptions provided.Identifiedspecimens were preserved in 7-10% aqueous formaldehyde solution in separate jars. The Nomenclature of the identified species was doneaccording to the Fishbase database. The conservation status (threat criteria) of the fish species was recorded from IUCN 3.1.

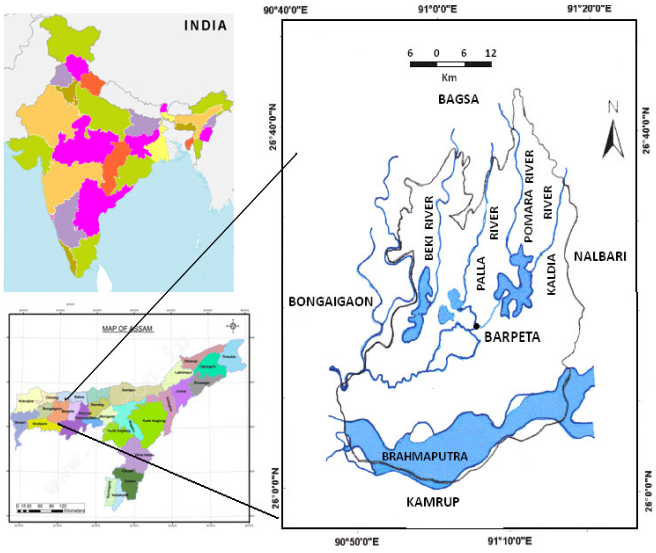

Fig 1. Location of the Palla river (modified from Baruah et al., 2015)

RESULT AND DISCUSSION

In the present study, a total of 56 species of fish have been identified under 43 genera, 8 orders and 19 families from the four sampling sites of the Palla river, Assam, India (Table 1). The identified species of fish belongs to the following families: Notopteridae (2 species), Ophichtidae (1 species), Clupeidae (1 species), Cyprinidae (15 species), Botidae (2 species), Cobitidae (4 species), Nemacheilidae (2 species), Sisoridae (5 species), Siluridae (4 species), Chacidae (1 species), Clariidae (1 species), Heteropneustidae (1 species), Schilbeidae (1 species), Bagridae (5 species), Belonidae (1 species), Ambassidae (1 species), Badidae (2 species), Badidae (4 genera), Nandidae (1 genus), Channidae (4 genera) and Tetraodontidae (1 genus) and syngnathidae (1 genus) (Fig 2). Out of the 56 species, *Clarius magur,* found in the river has been catagorised as endangered in IUCN red list of threatened taxa 3.1. Six Near threated species of fish, *Chitala chitala* (Hamilton, 1822), *Ompok bimaculatus* (Bloch 1794) *Ompak pabda* (Hamilton 1822) *Ompok pabo* (Hamilton 1822), *Alia colia* (Hamilton 1822) and *Microphis deocata* (Hamilton 1822) have been found in the river. Notably, *M deocata* is the only freshwater species belonging to the family Syngnathidae. Commonly termed as the Indian Royal Green Pipefish or Rainbow Belly Pipefish, *M deocata*is endemic to the streams and rivers draining the Brahmaputra River drainage in Northeast India and Bangladesh (Froese & Pauly, 2018; Pollom, 2017). It is also a classified ornamental fish. 43 species are least concern (LC) species wheras 3 species namely *Devario assamensis* (Barman 1984) *Botia rostrata* (Chaudhuri 1912) and *Bagarius bagarius* (Hamilton 1822) belong to the vulnerable category of IUCN 3.1 (Fig 2).

The maximum number of species was found to of the genus Channa (Channidae) in all sampling sites. Almost all the species of this family were found to be distributed in all sampling sites

with variably in high number. Interestingly, *M deocata*, which is endemic to the North Eastern region of India was found in significantly high number in all the sampling sites. Shallow, slow and clear water in parts of the river and river bed with submerged aquatic vegetation like Vallisneria sp. form an ideal habitat for *M deocata* in the Palla river. Notably, though the Palla River is connected to the Beki River, there is no record of the presence of M deocata in the Beki River (Kalita G.J., Sarma P.K. 2015; Goswami P, Singha S. 2023)

Table 2. Checklist of fish species of the Palla River (NB: LC-Least Concern, EN-Endangered, VU-Vulnerable, DD-Data Deficient,NT- Near Threatened.)

Sl. no	Order	Family	Name of the species	IUCN
1	Osteoglossiformes	Notopteridae	*Chitala chitala* (Hamilton, 1822	NT
2			*Notopeterus notopterus* (Pallas 1769)	LC
3	Anguliformes	Ophichitidae	*Pisodonophis boro* (Hamilton 1822)	LC
4	Clupeiformes	Clupeidae	*Gudusia Chapra* (Hamilton 1822)	LC
5	Cypriniformes	Cyprinidae	*Amblypharyngodon mola* (Hamilton 1822)	LC
6			*Barilius bendelists* (Hamilton 1807)	LC
7			*Cabido morar* (Hamilton 1807)	LC
8			*Chagunuis changunio* (Hamilton 1822)	LC
9			*Cirrhinus mrigala* (Hamilton 1822)	LC
10			*Cirrhinus reba* (Hamilton 1822)	LC
11			*Cyprinus carpio* (Linnaeus 1758)	LC
12			*Devario assamensis* (Barman 1984)	VU
13			*Hypopthalamicthyes nobilis* (Richardson 1847)	DD
14			*Labeo bata* (Hamilton 1822)	LC
15			*Labeo calbasu* (Hamilton 1822)	LC
16			*Labeo rohita* (Hamilton 1822)	LC
17			*Puntius chola* (Hamilton 1822)	LC
18			*Opsarius barna* (Hamilton 1822)	LC
19			*Laubuca laubuca* (Hamilton 1822)	LC
20		Botidae	*Botia Dario (Hamilton 1822)*	LC
21			*Botia rostrata* (Chaudhuri 1912)	VU
22		Cobitidae	*Canthophrys gongota* (Hamilton 1822)	LC
23			*Lepidocephalicthyys guntea* (Hamilton 1822)	LC
24			*Lepidocephalichthyes goalparensis* (Pillai and Yazdani 1976)	LC
25			*Pangio pangia* (Hamilton 1822)	LC
26		Nemacheilidae	*Schistora corica* (Hamilton 1822)	LC
27			*Paracanthocobitis botia* (Hamilton 1822)	LC
28	Siloriformes	Sisoridae	*Bagarius bagarius* (Hamilton 1822)	VU
29			*Hara hara* (Haamilton 1822)	LC
30			*Nangra assamensis* (Sen and Biswas 1994)	LC
31			*Sisor chennuah* (Ng and Lahkar 2003)	DD
32			*Sisor rabdophorus* (Hamilton 1822)	LC
33		Siluridae	*Ompok bimaculatus* (Bloch 1794)	NT
34			*Ompak pabda* (Hamilton 1822)	NT
35			*Ompok pabo* (Hamilton 1822)	NT
36			*Wallago attu* (Hamilton Schneider 1822)	LC
37		Chacidae	*Chaka chaka* (Hamilton 1822)	LC
38		Clariidae	*Clarias magur* (Hamilton 1822)	EN
39		Heteropneustidae	*Heteropneustes fossilis* (Muller, 1840)	LC
40		Schilbeidae	*Alia colia* (Hamilton 1822)	NT

41		Bagridae	*Batasio batasio* (Hemilton 1822)	LC
42			*Batasio tengana* (Hamilton 1822)	LC
43			*Mystus tengara* (Hamilton 1822)	LC
44			*Rita rita* (Hamilton 1822)	LC
45			*Mystus cavasius* (Hamilton 1822)	LC
46	Beloniformes	Belonidae	*Xenontodon cancila* (Hamilton 1822)	LC
47	Perciformes	Ambassidae	*Chanda nama* (Hamilton 1822)	LC
48		Badidae	*Badis badis* (Hamilton 1822)	LC
49			*Badis assamensis* (Ahl 1937)	DD
50		Nandidae	*Nandus nandus* (Hamilton 1822)	LC
51		Channidae	*Channa gachua* (Hamilton 1822)	LC
52			*Channa marulius* (Hamilton 1822)	LC
53			*Channa punctata* (Bloch 1973)	LC
54			*Channa striata* (Bloch 1973)	LC
55		Tetradontidae	*Leidon cutcutia* (Hamilton 1822)	LC

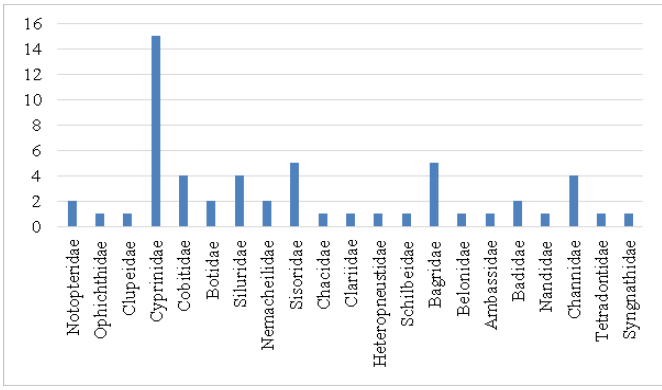

Fig. 2. Family-wise distribution of fish species of the Palla river

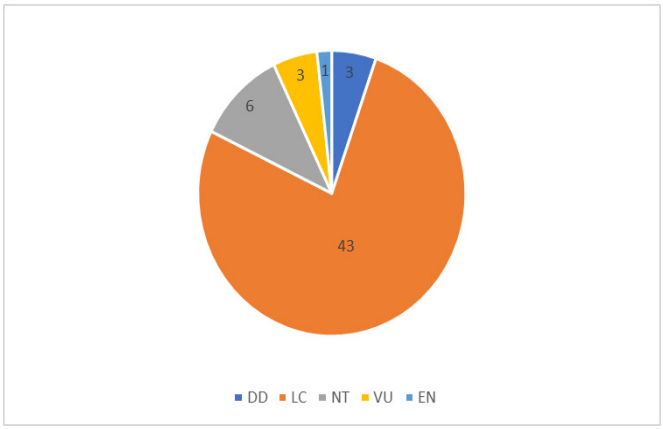

Fig. 3. Current conservation status of the fish species of the Palla River

Clarius magur is a species of food fish found in the Palla River. Along with other food fishes in the river, it is fished widely by the local community, imposing a threat of local extinction. As this species has been catagorised as endangered by IUCN 3.1, it deserves special conservative attention from the concerned authority as well as the local community. Species like *Leidon cutcutia*, *Chanda nama,Xenontodon cancila*, *Chaka chaka*etc. are widely recognized as ornamental fishes.

CONCLUSION

Freshwater ecosystems are the most endangered ecosystems throughout the world. They are not only essential for human sustenance, but also for sustaining biodiversity. The Palla River of Assam, though a small river, is very rich in ichthyofaunal resources. It provides a home to one endangered and six near-threatened species of fish. Further study is required to explore the ichthyofaunal diversity and fishery potential of this river.

Statements and Declarations

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