Study on Ichthyofaunal diversity of river Barak along with its tributaries Katakhal & Dhaleshwari during monsoon in Hailakandi, North-East India

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Abstract

The present study on fish diversity and conservation status of River Barak and its tributaries (Dhaleshwari and Katakhal) in Hailakandi district of Assam was conducted for a duration of six weeks onset of monsoon in the region. Altogether 30 fish species belonging to 27 genera, 18 families and 8 orders were recorded from the sampling sites. The fish diversity of river Barak and its tributaries during monsoon are mainly dominated by barbs (*Puntius chola*, *P. sophore*, *P. javanicus* etc.), carps (*Cirrhinus mrigala*, *Labeo calbasu* etc.). The largest group Cypriniformes contributed 4 families (22.22%), 8 genera (29.63%) and 10 species (33.33%). As per IUCN conservation status, 25(83.33) species were recorded as Least Concern, 3(9.99%) species under Near Threatened, 2 (6.66%) species under Vulnerable category. There was no species under Endangered and Not Evaluated category.

Keywords: Barak river, Ichthyodiversity, Conservation status

Introduction

The North-eastern region of India is marked by a complex network of rivers, which play a crucial role in its geography, ecology, and economy. Northeast India represents approximately 33% of total 2,163 freshwater fish species of India. Goswami et al. (2012) listed 422 species belonging to 133 genera and 38 families; while Vishwanath (2017) brought out a list of 318 fish species from the region. Fish plays important role in The Brahmaputra and Barak River System are two major riverine system in the region. These rivers are essential for agriculture, hydro- electric power generation and transportation etc. River Barak along with its tributaries enhance the fertility of plains, supporting extensive rice and tea cultivation.

Barak River originates from Japvo mountain of Manipur hills at an altitude of 3,015 m and flows south through mountainous terrain up to Tipaimukh near the tri-junction of the three states: Assam, Manipur and Mizoram. Here, the river takes a hairpin bend and debouches into the plains of Cachar district of Assam and forms the border of Assam and Manipur states. The river then flows through the Barak valley of Assam. From the source to the Indo-Bangladesh border, the Barak River flows for 564 km. The river enters Bangladesh as Surma and Kushiyara. Later, the river is called the Meghna and receives the combined flow of the Ganga and Brahmaputra.

The Barak valley has a geographical area of 6922.00 Sq. Km excluding 2(two) hill districts. The local rainfall run off of the valley along with that of adjacent hilly areas flows through river Barak and its various tributaries and is drained out to Bangladesh. The Katakhal, Jiri, Chiri, Modhura, Longai, Sonai, Rukni and Singla are some of the tributaries of River Barak. The tributaries are mainly rain fed and cause flood with higher precipitation during monsoon.

The River Barak is rich with its diverse ichthyofauna. Significantly endangered Gangetic dolphins (*Platanista gangetica*) were recorded in the River Barak by researchers. But increase in anthropogenic activities the dolphins (Xihu) are declining in a sharp rate. Only a few individuals can be found in the tributaries, such as the Kushiyara and Soorma, highlighting the severe decline in this region.

Different studies have been carried out in Assam for evaluation of fish diversity; *eg.,* Basistha (2006) documented 79 species from 60 genera and 22 families in the Manas-Beki river system. Hussain *et al.,* (2024) studied dammed River Subansiri and found 55 no. of species belonged to 42 genera, 24 families and 10 orders. Fish diversity acts as an environmental indicator; changes in fish populations can reflect alterations in water quality, pollution levels, and habitat conditions. Many fish species in the Barak River hold economic value, supporting local livelihoods through fishing and related industries. The present study was conducted to fulfil the following objectives.

- To record fish species diversity of River Kathakal and Dhaleshwari; the tributaries of River Barak in Hailakandi district.
- To evaluate the conservation status of ichthyofauna of the River Katakhal and Dhaleshwari.

Materials and Methods

Location and description of the study area

Hailakandi district occupies an area of 1,327 square kilometres (512 square metre), Out of this, more than 50% is reserve forest. The district has got inter-state border with Mizoram on its south having a length of 76 km besides inter district border on other sides with Karimganj district and Cachar district. Hailakandi district, is traversed mainly by three rivers. The primary rivers flowing through this district include:

Dhaleshwari River: This river originates in the hills of Mizoram and flows through the northeastern part of Hailakandi district. It passes through the town of Hailakandi.

Katakhal River: The Katakhal River flows through the central part of Hailakandi district. It originates in the hills of Mizoram, traverses the district, and merges with the Barak River in the Cachar district. The river passes close to the town of Katlicherra in Hailakandi.

Barak River: While the main Barak River does not flow directly through Hailakandi, its influence is significant due to its tributaries. The Barak River flows through the bordering areas of Cachar-Hailakandi district.

Selection of Sampling Station

The Riverine systems of Hailakandi district were surveyed and previous works were studied extensively. The entire region was demarcated with the below mentioned sampling sites:

- River Barak ($24^0$49’42” N, $92^0$38’14” E)
- River Dhaleshwari ($24^0$51’22” N, $92^0$36’13” E)
- River Katakhal ($24^0$38’57” N, $92^0$36’46” E)
- Katlicherra Bhagan Ghat ($24^0$27’42” N, $92^0$34’04” E)

Collection of Data

Primary data and information were collected from local fishermen, lessee and riparian community of the river. Data of species occurrence, type were collected twice a week during study period.

Sample collection

Fish specimens were collected from the selected sampling sites in Hailakandi district. Periodically 3 samples from each station every week was collected during the study period from 1st July to 31st July, 2024 to meet the objectives. At the sampling sites fishes were caught by using cast net (mesh size 4-10 mm) & (11-14mm) and gill net (15-20 mm, 25-35mm) set upon for 6-8 hours with the help of local fisherman. During the time of collection of fishes, the data such as location, date, no. of fishes were recorded for future references.

Identification

Fishes were identified in two ways. Some common fishes were identified at the sampling sites itself while rest unidentified specimens were brought to the Dept. of Fisheries, Hailakandi. Samples were identified following different keys of Talwar and Jhingran (1991), Nath and Dey (1997, 2000), Jayaram (2010), Das and Biswas (2008). Nomenclature was made according to Talwar and Jhingran (1991) and Jayaram (2010). Valid scientific names were taken from www.fishbase.org. Current conservation status was evaluated according to the Conservation Assessment and Management Plan (CAMP, 1998) workshop and Red Data list of International Union for Conservation of Nature and Natural Resources (IUCN, 2024).

Experimental findings

Ichthyofaunal diversity of the River Barak and its tributaries

During the present study a total of 30 species (T-4.1) belonging to 27 genera, 18 families and 8 orders recorded from the four different sampling sites. The number and percentage composition of families, genera and species under different orders are shown in F- 4.1. Among the orders, Cypriniformes formed the largest group with a contribution of 4 families (22.22%), 8 genera (29.62%) and 10 species (33.33%). The order Siluriformes also contributed a major portion to the total number and percentage composition of the recorded fish fauna of the river with 6 families (33.33%), 9 genera (33.33%) and 9 species (30.00%) followed by Perciformes with 2 families (11.11%), 3 genera (11.11%) and 4 species (13.33%) and Anabantiformes with 2 family (11.11%), 2 genera (7.41%) and 2 species (6.67 %). The order Synbranchiformes contributed with 1 family (5.56%), 2 genera (7.41%) and 2 species (6.67%). The smallest groups were formed by orders Beloniformes, Osteoglossiformes and Decapoda with 1 family (5.56%),1 genera (3.70%) and 1 species (3.33%) each.

Among the recorded families (F-4.2), Cyprinidae contributed 5 genera (18.52%) and 7 species (23.33%). Bagridae represented with 3 genera (11.11%) and 3 species (10.00%) (*i.e. Mystus tengara, Sperata seeghala* and *Rita rita*). Channidae with 1 genera (3.70%) and 1 species (3.33%). Ambassidae (*Chanda nama, Parambassis ranga* and *P. lala) with 2 genera (7.41*%) *and 3 species (10.00*%). And Mastacembelidae (*Mastacembelus armatus, Macrognathus pancalus*), Siluridae (*Ompok pabda* and *Wallago attu*) recorded with 2 genera (7.41%) and 2 species (6.67%) each. Rest of the 13 families Belonidae (Xenentodon cancila), Notopteridae (*Notopterus notopterus*), Cobitidae *(Lepidocephalicthys guntea*), Clupeidae (*Gudusia chapra*), Botiidae (*Botia rostrata*), Ailidae (*Ailia coila*), Sisoridae (*Gagata cenia*), Schilbeidae (*Eutropicthyes vacha*), Loricariidae (*Hypostomus plecostomus*), Nandidae (*Nandus nandus*), Osphronemidae (*Trichogaster lalius*), Palaemonidae (*Macrobrachium lamarrei*),Channidae (*Channa striata*) represented with 1 genera (3.70%) and 1 species (3.33%)

Conservation status of the fish fauna of the River Barak and its tributaries

The IUCN conservation status of the 30 recorded species with their number and percentage under different categories as shown in the table (T- 4.2). The highest number of 25 species were recorded under Least Concerned (LO category and contributed 83.33%). Under LC category, the major species contribution was from the family Cyprinidae with 7 species (23.33%) followed by Bagridae with 3 species (10%) and Mastacembelidae and Ambassidae with 2 species(6.66) each.

Cobitidae, Sisoridae, Belonidae Schilbeidae, Clupeidae, Nanidae, Osphronemidae, Palaemonidae, Notopteridae with 1 species contributed 3.33% each. Under Near Threatened (NT) category Siluridae, Ambassidae and Ailiidae, contributed 1 species 3.33% each. One species each from Siluridae, Botidae, family contributed 3.33% to the vulnerable (VU) category. There was no species found under Not Evaluated (NE) category of IUCN conservation status from the 4 sampling sites.

Discussion

Ichthyofaunal diversity of River Barak and its tributaries

Occurrence of diverse group of 30 species belonging to 27 genera, 18 families under 8 orders reflects the ichthyofauna richness of rivers in Hailakandi district viz., River Barak, Dhaleshwari and Katakhal during the study period (July 2024-August 2024). Cyprinidae was dominant family with 7 numbers of species followed by Ambassidae & Bagridae each with 3 species. Mastacembilidae, Siluridae with 2 species each. Belonidae, Notopteridae, Cobitidae, Clupeidae, Botiidae, Sisoridae, Ailiidae, Channidae, Schilbeidae, Loricariidae, Nanidae, Osphronemidae, Palaemonidae with 1 species each.

Table: Recorded fish fauna of River Barak and its tributaries Katakhal and Dhaleshwari with their conservation status according to IUCN (2024), CAMP (1998) and ICAR-NBFGR (2010)

S. N.	Order	Family	Species	Common Name	IUCN Conservation Status (2024)	CAMP status (1998)	ICAR-NBFGR (2010)
1.	Beloniformes	Belonidae	*Xenentodon cancila* (Hamilton 1822)	Silver needle fish	LC	LRnt	NE
2.	Osteoglossiformes	Notopteridae	*Notopterous notopterous* (Pallas 1769)	Bronze featherback	LC	LRnt	NE
3.	Synbranchiformes	Mastacembelidae	*Mastacembellus armatus* (Lacepede 1800)	Zig zag eel	LC	NE	NE
4.			*Macrognathus pancalus* (Hamilton 1822)	Barred spiny eel	LC	LRnt	NE
5.	Cypriniformes	Cyprinidae	*Puntius chola* (Hamilton 1822)	Swamp barb	LC	VU	VU
6.			*Puntius sophore* (Hamilton1822)	Pool barb	LC	LRnt	NE
7.			*Amblypharyngodon mola* (Hamilton 1822)	Mola carplet	LC	LRlc	NE
8.			*Labeo calbasu* (Hamilton 1822)	Orangefin labeo	LC	LRnt	NE
9.			*Salmostoma bacaila* (Hamilton1822)	Large razor belley minnow	LC	LRlc	NE
10			*Puntius javanicus* (Hamilton 1822)	Java barb	NE	NE	NE
11			*Cirrhinus mrigala* (Hamilton 1822)	Mrigala	LC	LRnt	NE
12		Cobitidae	*Lepidocephalicthys guntea* (Hamilton 1822)	Guntea loach	LC	NE	NE
13		Clupeidae	*Gudusia chapra* (Hamilton1822*)*	Indian River Shad	LC	LRlc	NE
14		Botiidae	*Botia rostrata (Gunther 1868)*	The Gangetic loach,Ladder loach	VU	NE	NE
15	Siluriformes	Siluridae	*Ompok pabda* (Hamilton, 1822)	Pabdah	NT	EN	VU
16			*Wallago attu* (Bloch& Schneider 1801)	Freshwater shark, Barali	VU	LRnt	NE
17		Bagridae	*Rita rita* (Hamilton 1822)	Rita	LC	LRnt	NE
18			*Mystus tengara* (Hamilton 1822)	Tengara	LC	LRnt	NE
19			*Sperata seenghala* (Sykes, 1839)	Giant river-catfish	LC	NE	NE
20		Ailiidae	*Ailia coila* (Hamilton 1822)	Gangetic ailia	NT	VU	NE
21		Sisoridae	*Gagata cenia* (Hamilton 1822)	Indian Gagata	LC	NE	NE
22		Schilbeidae	*Eutropicthyes vacha* (Hamilton, 1822)	Batchhwa vacha	LC	EN	VU
23		Loricariidae	*Hypostomus plecostomus* (Linnaeus 1758)	Suckermouth catfish	LC	NE	NE
24	Anabantiformes	Nandidae	*Nandus nandus* (Hamilton 1822)	Gangetic leaffish	LC	LRnt	NE
25		Osphronemidae	*Trichogaster lalius* (Hamilton 1822)	Dwarf gourami	LC	NE	NE
26	Decapoda	Palaemonidae	*Macrobrachium lamarrei* (H. Milne-Edwards, 1837)	Indian whisker shrimp	LC	NE	NE
27	Perciformes	Ambassidae	*Chanda nama* (Hamilton 1822)	The elongate glassy perchlet	LC	NE	NE
28			*Parambassis lala* (Hamilton 1822)	Highfin Glassy Perchlets	NT	NE	NE
29			*Parambassis ranga* (Hamilton 1822)	Indian glassyfish	LC	NE	NE
30		Channidae	*Channa striata* (Bloch 1793)	Striped snakehead	LC	LRlc	NE

[1] NT= Near Threatened, LC= Least Concern, VU= Vulnerable, EN= Endangered, NE= Not Evaluated, LRlc= Lower Risk-least concern, LRnt= Lower Risk Near threatened

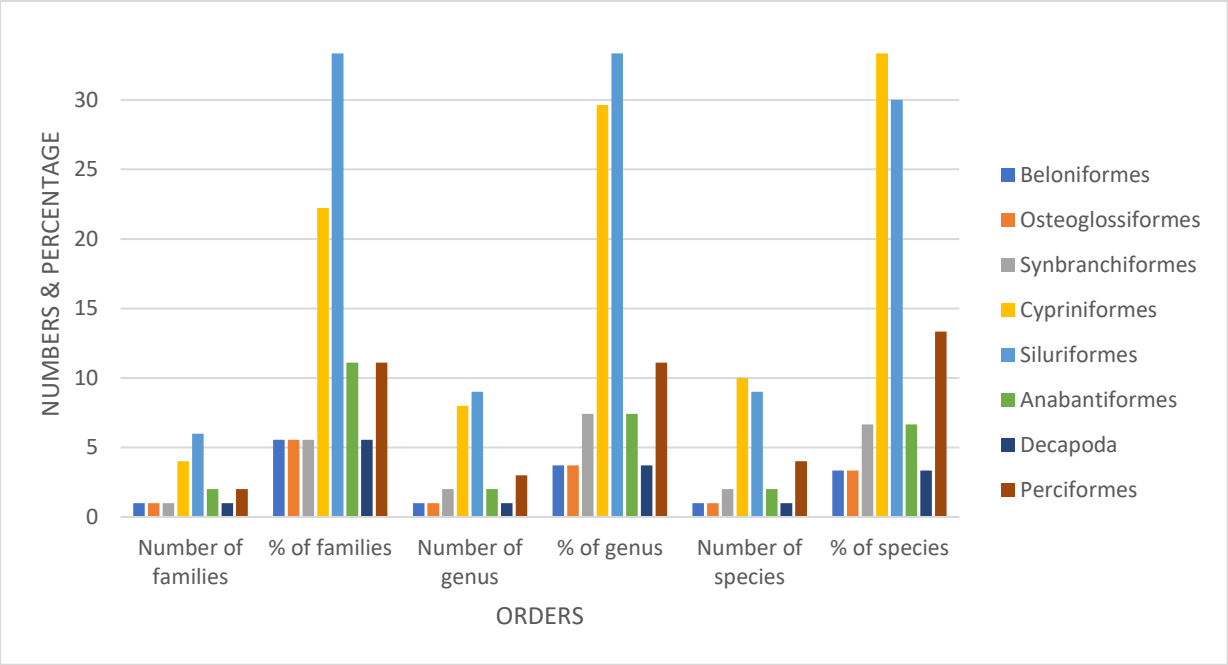

Figure 4.1: Number and percentage composition of families, genera and species under various orders.

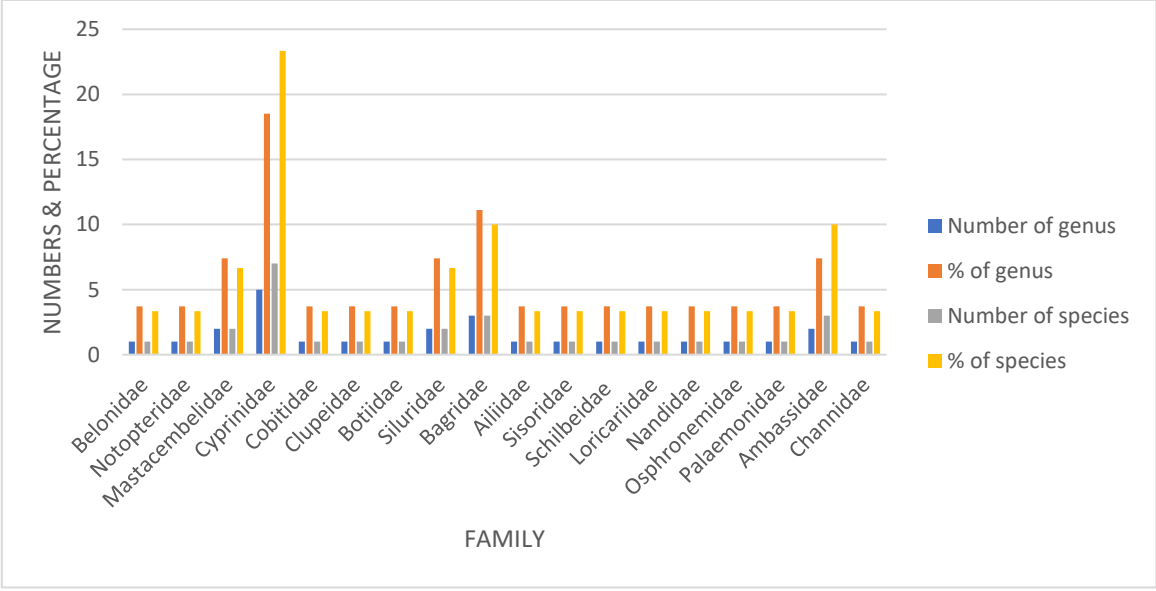

Figure 4.2: Number and percentage composition of genera and species of fishes under various families

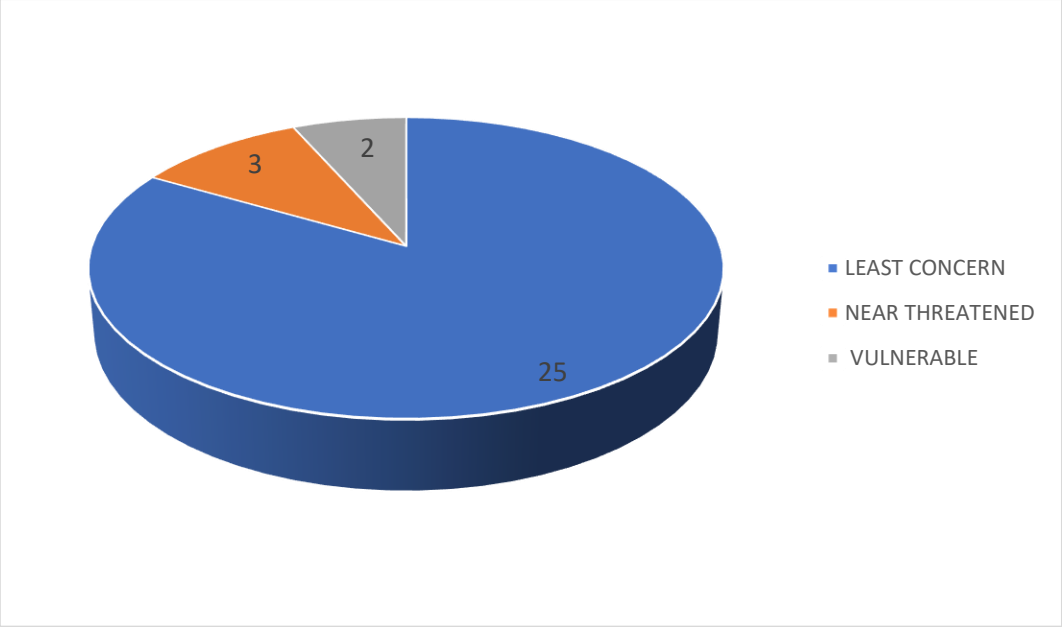

Figure 4.3: IUCN conservation status of the fish fauna expressed in number and percentage

Table 4.2 Number (percentage) of species belonged to each family under different categories of IUCN (2024) conservation status

Order	Family	NT	LC	VU	EN	NE	Total
Beloniformes	Belonidae	--	1 (3.33)	--	--	--	1 (3.33)
Osteoglossiformes	Notopteridae	--	1 (3.33)	--	--	--	1 (3.33)
Synbranchiformes	Mastacembelidae	--	2 (6.66)	--	--	--	2 (6.66)
Cypriniformes	Cyprinidae	--	7 (23.33)	--	--	--	7 (23.33)
	Cobitidae	--	1 (3.33)	--	--	--	1 (3.33)
	Clupeidae	--	1 (3.33)	--	--	--	1 (3.33)
	Botiidae	--	--	1 (3.33)	--	--	1 (3.33)
Siluriformes	Siluridae	1 (3.33)	--	1 (3.33)	--	--	2 (6.66)
	Bagridae	--	3 (10.00)	--	--	--	3 (10.00)
	Ailiidae	1 (3.33)	--	--	--	--	1 (3.33)
	Sisoridae	--	1 (3.33)	--	--	--	1 (3.33)
	Schilbeidae	--	1 (3.33)	--	--	--	1 (3.33)
	Loricariidae	--	1 (3.33)	--	--	--	1 (3.33)
Anabantiformes	Nanidae	--	1 (3.33)	--	--	--	1 (3.33)
	Osphronemidae	--	1 (3.33)	--	--	--	1 (3.33)
Decapoda	Palaemonidae	--	1 (3.33)	--	--	--	1 (3.33)
Perciformes	Ambassidae	1 (3.33)	2 (6.66)	--	--	--	3 (9.99)
	Channidae	--	1 (3.33)	--	--	--	1 (3.33)
TOTAL		3 (9.99)	25 (83.33)	2 (6.6)			30

NT= Near Threatened, LC= Least Concern, VU= Vulnerable, EN= Endangered, NE= Not Evaluated

The present study was found to be in accordance with several research work carried out in the mainstream and tributaries of River Barak. The sequence of dominance of the recorded order in the river is in the following orders Cypriniformes >Siluriformes > Perciformes > Synbranchiformes = Anabantiformes > Beloniformes = Osteoglossiformes = Decapoda.

The fisheries composition of River Barak and its tributaries (Dhaleshwari and Katakhal) barbs (*Puntius chola, P. sophore, P. javanicus* etc.), carps (*Cirrhinus mrigala, Labeo calbasu* etc.), Loaches (*Lepidocephalicthys guntea*), eels (*Mastacembellus armatus, Macrognathus pancalus*) and miscellaneous species (*Nandus nandus, Eutropicthyes vacha, Gagata cenia, Ailia coila*). Moreover invasive Suckermouth Catfish (*Hypostomus Plecostomus*) was also recorded from the sampling site. Similar findings have been reported by many previous researchers. Kar, D(2024) studied the beel fishes of Barak Valley region of Assam & found 23 nos. of fish species among which Cypriniformes was the dominant group. Goswami *et al.,* (2012) reported 442 fish species belonging to 133 genera and 38 families from North East India. Bagra & Das (2010) evaluated the hill stream fish diversity of Arunachal Pradesh and recorded 44 species belonged to 9 families. Nath and Dey (1997) reported a total of 131

species from the drainage of Arunachal Pradesh. Das and Biswas (2008) listed the ornamental fishes of river Brahmaputra covering more than 70 species. The River Barak and its tributaries are rich natural source of diverse fish species. Available small indigenous fish species hold a commendable potential for international consumer cum ornamental fish market.

Conservation status of fish species

According to conservation status (IUCN 2024), among 30 species recorded during the study period, 25 species were recorded as Least Concern, 3 species under near threatened, 2 species under vulnerable. Fishes like *Ompok pabda* , *Ailia coila* and *Parambassis lala* are under Near Threatened category and found to be very less abundant in the river. Fishes namely *Wallago attu* and *Botia rostrata* were found to be Vulnerable. Therefore, these species need special attention for conservation and further management. With the passage of time, threat to the fishes and habitat may be much higher than at present time due to intense anthropogenic and aggressive fishing activities. Therefore, strong regulation of conservation measures e.g., closures of breeding grounds, year-round vigilance and monitoring and strong enforcement of fisheries act with legal instruments are in utmost need to protect and conserve the diverse endemism of the fisheries in this river.

Conclusion

The present study conducted during monsoon season for a period of 45 days from July, 2024 to August, 2024 at four selected sampling sites to exhibit the species richness, taxonomical and conservation status of the fish fauna of the River Barak and its tributaries Katakhal and Dhaleshwari. The fish fauna of River Barak and its tributaries during monsoon comprised of 8 orders including 18 families, 27 genera and 30 fish species indicating good species richness. Cyprinidae was the dominant family with 5 genera and 7 numbers of species. The fish diversity of river Barak and its tributaries during monsoon are mainly dominated by barbs (*Puntius chola*, *P. sophore*, *P. javanicus* etc.), carps (*Cirrhinus mrigala*, *Labeo calbasu* etc.) A total of 30 species recorded during the study period, 25 species were recorded as Least Concern, 3 species under near threatened, 2 species under vulnerable. *Ompok pabda* , *Ailia coila* and *Parambassis lala* are under Near Threatened category . Fishes namely *Wallago attu* and *Botia rostrata* were found to be Vulnerable.

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