

Diversity and Present Status of Fish Species in Three Floodplain Wetlands of Central Assam, India

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Abstract: The present study deals with the documentation of fish diversity and fishing gears used from the wetlands of Central Assam. The study was carried out in three important wetlands of Kamrup Rural district and Kamrup Metro District, viz. Sol beel, Etila beel and Duani beel. Sol beel is situated in the Kamrup Rural district and connected to the Kulsi River, during monsoon season. Etila beel and Duani beel is situated in Kamrup Metro district and connected to Kolong and Digaru River tributary respectively. These three wetlands are perennial in nature that remains covered by water along with its aquatic flora and fauna almost throughout the year. Different types of fishes are available in these three wetlands. During the present study of Sol Beel a total number of 29 species belonging to 18 families and 7 orders have been reported. And in Etila Beel, it was recorded 38 fish species belonging to 21 families and 8 orders. In Duani Beel it was recorded 38 fish species belonging to 18 families and 8 orders. Dominant species of these three beels are *Channa punctatus*, *Anabas testudineus*, *Colisa fasciata*, *Amblypharyngodon mola*, *Puntius sophore*, *Heteropneustes fossilis* and less dominant species is *Notopterus chitala*, *Notopterus notopterus*, *Nandus nandus*, *Xenentodon cancila*. The study plays a great role because indiscriminate killing of brood and juvenile fishes of local and commercial species and over extraction of these fishes during breeding season greatly decreasing the fish diversity of the study area.

Keywords: Wetland, fish diversity, Present Status, Indiscriminate killing, Central Assam

I. Introduction

Wetlands sustain all life and perform useful functions in the maintenance of ecological balance. Wetlands are unique ecosystems having rich nutrient status and carrying capacity with immense production potential hence considered as food and fodder resources for human and its related allies. Ecologically wetlands are of great significance for an area as they support different food chains, food webs, regulate hydrological cycle, recharge ground water, trapping of energy and shelter to large numbers of flora and fauna having great ecological and economical value. [1,2]

Fishes are cool blooded aquatic vertebrates, which breathe by means of pharyngeal gills, propelling and balancing themselves by means of fins. Fishes are the important element in the economy of many nations as they have been a staple item in the diet of many people.

The diversity of fishes mainly depends upon the biotic and abiotic factors and type of the ecosystem, age of the water body, mean depth, water level fluctuations, morphometric features and bottom have great implications. The hydro-biological features of the collection centers also play an effective role in fisheries output to a great extent. (Murugan et al., 2012)

Fish diversity of river essentially represents the fish faunal diversity and their abundance. River conserves a rich variety of fish species which support to the commercial fisheries (Shukla & Singh., 2013)

The success of the fishing techniques depends on various factors like selection of site, time, efficiency of materials used and availability of fish etc. For successful fishing some attractant as a lure is popularly employed in some parts of the country. Chemical poisoning, dynamiting, electro fishing etc. become very popular but destructive for aquatic ecosystem including fishes against traditional method (Islam et al., 2013).

Among habitat attributes, dissolved oxygen and P^H are key habitat features and correlated with fish diversity and found as the most important variables in shaping fish distribution (Shukla & Singh., 2013)

Fishes are the keystone species which determine the distribution and abundance of other organisms in the ecosystem they represent and are good indicators of water quality and health of the ecosystem (Moyle & Leidy, 1992). India occupies 9th position in the world in provisions of freshwater larger biodiversity. There are about 450 families of freshwater fishes globally. Roughly 40 are present in India. About 25 of these families contain commercially important species (Khodake et al., 2014)

II. Objective of the Study

The main aim of the research work is to find out the fish diversity, level of abundance in the selected wetlands and to find out the present status of the available fish species there.

The objectives are based on the following

- To study the fish diversity of the selected wetlands
- To study the level of abundance of the fish species of the selected wetlands
- To find out the present status (IUCN Status) of the available fish species of the selected wetlands

III. Materials and Methods

1.1 Study Area

The wetlands that are selected for the research work are (a) *Sol beel* is situated between 26°04'59"/-26°03'49" N and 91°26'45" -91°26'43" E and connected to the Kushi River and located in the Kamrup Rural District of Assam (b) *Etila beel* is situated between 26°10'-26°8' N and 92°11'-92°8' E and having a connection to the Kolong river and located in the Kamrup Metro District of Assam (c) *Duani beel* is situated between 26°13'20"/-26°05'30" N and 92°05' -92°1'30" E and connected to the Digaru river and located in the Kamrup Metro District of Assam.

1.2 Selection of Sampling Station:

The sampling stations were selected randomly; altogether five sampling stations were selected for each wetland. All stations were selected at 50 meter distance from each other.

1.3. Data Collection and Analysis:

Fish samples were collected through experimental fishing by using caste nets of various sizes, gill nets (vertical height 1.0 m- 1.5 m; length 30 m -100 m), drag nets (vertical height 2.0 m), fish hooks of various sizes and a variety of gears like polo, juluki, sepa, posa, jakoi etc by local fisherman. The documentation of present study was carried out with the help of local fishermen, having more than 25 years of experience in fishing technologies. Collected fish species were preserved in 10% formaldehyde in the field itself. Fish species have been identified following the literature of Talwar & Jhingran (1991) and Vishwanath (2002). Status assessments of the documented species have been evaluated by IUCN Red list of threatened species (2016).

IV. Results and Discussion

During the research work altogether 29 varieties fish species, belonging to 18 families and 7 orders have been reported in *Sol beel* . Relatively less amount of fish species were reported in *Sol beel* as because this *beel* is gradually converting to agricultural field. And in *Etila beel*, it was recorded 38 fish species belonging to 21 families and 8 orders. In *Duani beel* it was recorded 38 fish species belonging to 18 families and 8 orders. Dominant species of these three *beels* are *Channa punctatus*, *Anabas testudineus*, *Colisa fasciata*, *Amblypharyngodon mola*, *Puntius sophore*, *Heteropneustes fossilis*, *Chanda nama*, *Botia dario*, *Labeo bata*, *Channa gachua*, *Macrognathus aral* and the less dominant fish species includes *Mastacembelus armatus*, *Monopterusuchia*, *Puntius sarana*, *Xenentodon cancila*, *Notopterus chitala*, *Cirrhinus reba*. The study play a great role because indiscriminate killing of brood and juvenile fishes of local and commercial species and over extraction of these fishes during breeding season greatly decreasing the fish diversity of the study area.

Table 1: Fish Diversity of Sol beel of Kamrup Rural District, Assam, India

Sl. No.	Common Name (Assamese)	Scientific Name	Order	Family	IUCN Status	Level of Abundance
1	Arii	<i>Aorichthys seenghala</i>	Siluriformes	Bagridae	LC	R
2	Bami	<i>Mastacembelus armatus</i>	Synbranchiformes	Mastacembelidae	LC	MA
3	Bardaia/Kadali	<i>Ailia coila</i>	Siluriformes	Aillidae	NT	A
4	Barali	<i>Wallago attu</i>	Siluriformes	Siluridae	NT	A
5	Bhakua	<i>Catla catla</i>	Cypriniformes	Cyprinidae	LC	A
6	Bhangone/ Nara	<i>Labeo bata</i>	Cypriniformes	Cyprinidae	LC	A
7	Botia	<i>Botia dario</i>	Cypriniformes	Botiidae	LC	A
8	Chanda	<i>Chanda nama</i>	Perciformes	Ambassidae	LC	A
9	Chengeli	<i>Channa gachua</i>	Perciformes	Channidae	DD	A
10	Cheniputhi	<i>Puntius sarana</i>	Cypriniformes	Cyprinidae	LC	LA
11	Cuchia /Kuchia	<i>Monopterusuchia</i>	Synbranchiformes	Synbranchidae	LC	MA

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12	Darikana	<i>Esomus danricus</i>	Cypriniformes	Cyprinidae	LC	A
13	Gangatope Gedgedi	<i>Tetradon cutcutia</i>	Tetradontiformes	Tetradontidae	NE	A
14	(Khaloibhangi)	<i>Nandus nandus</i>	Perciformes	Nandidae	LC	A
15	Goroi	<i>Channa punctatus</i>	Perciformes	Channidae	LC	A
16	Kandhuli	<i>Notopterus notopterus</i>	Osteoglossiformes	Notopteridae	LC	A
17	Kawoi	<i>Anabas testudineus</i>	Perciformes	Anabantidae	DD	A
18	Kholihona	<i>Colisa fasciata</i>	Perciformes	Belontiidae	NE	A
19	Kokila	<i>Xenentodon cancila</i>	Beloniformes	Belonidae	LC	LA
20	Kurhi	<i>Labeo gonius</i>	Cypriniformes	Cyprinidae	LC	A
21	Magur	<i>Clarias magur</i> <i>Amblypharyngodon mola</i>	Siluriformes	Clariidae	LC	A
22	Moa	<i>Glossogobius giurus</i>	Cypriniformes	Cyprinidae	LC	A
23	Panimutura	<i>Puntius sophore</i>	Perciformes	Gobiidae	LC	A
24	Puthi	<i>Labeo rohita</i>	Cypriniformes	Cyprinidae	LC	A
25	Rau	<i>Heteropneustes fossilis</i>	Siluriformes	Heteropneustidae	LC	A
26	Singhi	<i>Channa striatus</i>	Perciformes	Channidae	NE	A
27	Sol	<i>Mystus tengara</i>	Siluriformes	Bagridae	LC	A
28	Tingorah	<i>Macrornathus aral</i>	Synbranchiformes	Mastacembelidae	LC	A
29	Turi					
		LC= Least concern NT= Near threatened NE= Not evaluated DD= Data deficit IUCN=International Union for Conservation of Nature	A= Abundant MA= Moderately Abundant LA= Less Abundant R= Rare			

Table 2 : Fish Diversity of *Eula beel* of Kamrup Metro District, Assam, India

Sl. No.	Common Name (Assamese)	Scientific Name	Order	Family	IUCN Status	Level of Abundance
1	Arii	<i>Aorichthys seenghala</i>	Siluriformes	Bagridae	LC	R
2	Balibotia	<i>Noemacheilus assamensis</i> <i>Mastacembelus armatus</i>	Cypriniformes	Balitoridae	LC	A MA
3	Bami	<i>Wallago attu</i>	Synbranchiformes	Mastacembelidae	LC	
4	Barali	<i>Ailia coila</i>	Siluriformes	Siluridae	NT	A
5	Bardaia/Kadali	<i>Catla catla</i>	Cypriniformes	Cyprinidae	LC	A
6	Bhakua/Bahu	<i>Labeo bata</i>	Cypriniformes	Cyprinidae	LC	A
7	Bhangone/ Nara	<i>Botia dario</i>	Cypriniformes	Botidae	LC	A
8	Botia	<i>Chanda nama</i>	Perciformes	Ambassidae	LC	MA
9	Chanda	<i>Channa gachua</i>	Perciformes	Channidae	DD	A
10	Chengeli	<i>Puntius sarana</i>	Cypriniformes	Cyprinidae	LC	LA
11	Cheniputhi	<i>Notopterus chitala</i>	Osteoglossiformes	Notopteridae	NT	LA
12	Chital	<i>Esomus danricus</i>	Cypriniformes	Cyprinidae	LC	A
13	Darikana	<i>Rasbora daniconius</i>	Cypriniformes	Cyprinidae	LC	A
14	Darikana	<i>Tetradon cutcutia</i>	Tetradontiformes	Tetradontidae	NE	A
15	Gangatope Gedgedi	<i>Nandus nandus</i>	Perciformes	Nandidae	LC	A
16	(Khaloibhangi)	<i>Channa punctatus</i>	Perciformes	Channidae	LC	A
17	Goroi	<i>Notopterus notopterus</i>	Osteoglossiformes	Notopteridae	LC	MA
18	Kandhuli	<i>Anabas testudineus</i>	Perciformes	Anabantidae	DD	A
19	Kawoi	<i>Colisa fasciata</i>	Perciformes	Belontiidae	NE	A
20	Kholihona	<i>Gudusia variegata</i>	Clupeiformes	Clupeidae	LC	R
21	Karoti	<i>Xenentodon cancila</i>	Beloniformes	Belonidae	LC	A
22	Kokila	<i>Monopterus cuchia</i>	Synbranchiformes	Synbranchidae	LC	MA
23	Kuchia/Cuchia	<i>Labeo gonius</i>	Cypriniformes	Cyprinidae	LC	A
24	Kurhi	<i>Cirrhinus reba</i>	Cypriniformes	Cyprinidae	LC	LA
25	Lasim	<i>Clarias magur</i>	Siluriformes	Clariidae	LC	A
26	Magur					

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27	Mali/ Kaliajora	<i>Labeo calbasu</i>	Cypriniformes	Cyprinidae	LC	A
28	Mirika	<i>Cirrhinus mrigala</i> <i>Amblypharyngodon mola</i>	Cypriniformes	Cyprinidae	LC	A
29	Moa	<i>Glossogobius giuris</i>	Cypriniformes	Cyprinidae	LC	A
30	Panimutura	<i>Puntius sophore</i>	Perciformes	Gobiidae	LC	A
31	Puthi	<i>Puntius conchonius</i>	Cypriniformes	Cyprinidae	LC	A
32	Puthi	<i>Labeo rohita</i>	Cypriniformes	Cyprinidae	LC	A
33	Rau	<i>Rita rita</i>	Siluriformes	Bagridae	LC	R
34	Ritha	<i>Heteropneustes fossilis</i>	Siluriformes	Heteropneustidae	LC	A
35	Singhi	<i>Channa striatus</i>	Perciformes	Channidae	NE	A
36	Sol	<i>Mystus tengara</i>	Siluriformes	Bagridae	LC	A
37	Tingorah	<i>Macrogathus aral</i>	Synbranchiformes	Mastacembelidae	LC	A
38	Turi					
LC= Least concern NT= Near threatened NE= Not evaluated DD= Data deficit IUCN=International Union for Conservation of Nature		A= Abundant MA= Moderately Abundant LA= Less Abundant R= Rare				

Table 3: Fish Diversity of Duani beel of Kamrup Metro District, Assam, India

Sl. No.	Common Name (Assamese)	Scientific Name	Order	Family	IUCN Status	Level of Abundance
1	Arii	<i>Aorichthys seenghala</i> <i>Noemacheilus assamensis</i>	Siluriformes	Bagridae	LC	R
2	Balibotia	<i>Mastacembelus armatus</i>	Cypriniformes	Balitoridae	LC	A
3	Bami	<i>Wallago attu</i>	Synbranchiformes	Mastacembelidae	LC	A
4	Barali	<i>Ailia coila</i>	Siluriformes	Siluridae	NT	A
5	Bardaia/Kadali	<i>Catla catla</i>	Cypriniformes	Cyprinidae	LC	A
6	Bhaku/Bahu	<i>Labeo bata</i>	Cypriniformes	Cyprinidae	LC	A
7	Bhangone/ Nara	<i>Botia dario</i>	Cypriniformes	Botidae	LC	A
8	Botia	<i>Chanda nama</i>	Perciformes	Ambassidae	LC	A
9	Chanda	<i>Channa barca</i>	Perciformes	Channidae	DD	A
10	Chengeli	<i>Puntius sarana</i>	Cypriniformes	Cyprinidae	LC	LA
11	Cheniputhi	<i>Notopterus chitala</i>	Osteoglossiformes	Notopteridae	NT	LA
12	Chital	<i>Esomus danricus</i>	Cypriniformes	Cyprinidae	LC	A
13	Darikana	<i>Rasbora daniconius</i>	Cypriniformes	Cyprinidae	LC	A
14	Darikana	<i>Tetradon cutcutia</i>	Tetradontiformes	Tetradontidae	NE	A
15	Gangatope Gedgedi (Khaloibhangi)	<i>Nandus nandus</i>	Perciformes	Nandidae	LC	A
16	Goroi	<i>Channa punctatus</i> <i>Notopterus notopterus</i>	Perciformes	Channidae	LC	A
17	Kandhuli	<i>Anabas testudineus</i>	Perciformes	Anabantidae	DD	A
18	Kawoi	<i>Colisa fasciata</i>	Perciformes	Belontiidae	NE	A
19	Kholihona	<i>Gudusia variegata</i>	Clupeiformes	Clupeidae	LC	R
20	Karoti	<i>Xenentodon cancila</i>	Beloniformes	Belonidae	LC	A
21	Kokila					
22						

23	Kuchia/Cuchia	<i>Monopterusuchia</i>	Synbranchiformes	Synbranchidae	LC	MA
24	Kurhi	<i>Labeogonius</i>	Cypriniformes	Cyprinidae	LC	A
25	Lasim	<i>Cirrhinusreba</i>	Cypriniformes	Cyprinidae	LC	LA
26	Magur	<i>Clariasmagur</i>	Siluriformes	Clariidae	LC	A
27	Mali/ Kaliajora	<i>Labeocalbasu</i>	Cypriniformes	Cyprinidae	LC	A
28	Mirika	<i>Cirrhinusmrigala</i>	Cypriniformes	Cyprinidae	LC	A
29	Moa	<i>Amblypharyngodonmola</i>	Cypriniformes	Cyprinidae	LC	A
30	Panimutura	<i>Glossogobiusgiuris</i>	Perciformes	Gobiidae	LC	A
31	Puthi	<i>Puntius sophore</i>	Cypriniformes	Cyprinidae	LC	A
32	Puthi	<i>Puntius conchonus</i>	Cypriniformes	Cyprinidae	LC	A
33	Rau	<i>Labeorohita</i>	Cypriniformes	Cyprinidae	LC	A
34	Ritha	<i>Ritarita</i>	Siluriformes	Bagridae	LC	R
35	Singhi	<i>Heteropneustesfossilis</i>	Siluriformes	Heteropneustidae	LC	A
36	Sol	<i>Channa striatus</i>	Perciformes	Channidae	NE	A
37	Tingorah	<i>Mystustengara</i>	Siluriformes	Bagridae	LC	A
38	Turi	<i>Macrognathus aral</i>	Synbranchiformes	Mastacembelidae	LC	A
LC= Least concern NT= Near threatened NE= Not evaluated DD= Data deficit IUCN=International Union for Conservation of Nature		A= Abundant MA= Moderately Abundant LA= Less Abundant R= Rare				

V. Conclusion

Presence of fishes in an aquatic habitat is a good indicator of the health and status of that ecosystem. There are many reasons why ecologists are interested in ascertaining the diversity status. Fisheries are probably more diverse group at all taxonomic levels and have more species than all other vertebrate groups. Fish is a basic diet of the people of Assam. 90% of the population of Assam eats fish. The per capita consumption of fish is 5 kg per year. The *beels* in Brahmaputra valley, in general, capable of producing about 500 kg fish/hect./year. But present rate of production is 100 kg fish/hect./year. No scientific attempt has so far been made to evaluate the problems and potentialities of the *beels* to help fish production. The fish species of the study area is under heavy pressure due to indiscriminate killing of fries, fingerlings and gravid fish. Killing of gravid fishes causes heavy loss of eggs per day during the breeding season. Festive fishing is another major constraint which causes great depletion of fish species because during this practice a sizeable number of breeders are lost. Festive fishing is associated with the celebration of different festivals by different ethnic communities. Due to decreasing fish catch many fisherman converted the wetland areas into agricultural land. Non implementation of fishery acts also greatly decreasing the fish diversity of the study area. Due to the above mentioned reasons, and other anthropogenic activities, the diversity of fish species in the study area is greatly decreasing day by day. Therefore the documentation of available fish species and evaluation of their present status is utmost necessity for proper implementation of further conservation measures.

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