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Fish Biodiversity in Kafrikhal *beel* under Mithapukur Upazila, Rangpur, Bangladesh

Md. Abdul Halim, M A Salam and Md. Shahdat Hossain

Abstract

The present study was conducted to know the fish biodiversity in Kafrikhal *beel* under Mithapukur Upazila, Rangpur, Bangladesh. It was undertaken during the period of January to March 2011. A questionnaire had used to collect the key informations from 50 randomly selected fishermen from the study areas. The present study had revealed the presence of 54 species of fish from the Kafrikhal *beel* including 10 endangered and 7 critically endangered. Among the recorded 54 species; 15 species were abundant (27.78%), 13 species common (24.04%), 19 species less common (35.19%) and 7 species were rare (12.96%) respectively. Catfishes (24.07%) were the most dominant group followed by Carps (16.67%), Barbs (9.26%), Perches (12.96%), Snakeheads (87.40%), Eels (5.55%), Minnows (3.70%), Clupeids (3.70%) and Miscellaneous (16.67%) respectively. It will be very helpful to identify areas of high fish biodiversity and to mitigate the loss of fish biodiversity in the Kafrikhal *beel*.

Keywords: Fish biodiversity, Kafrikhal *beel*, Mitigation of biodiversity loss

1. Introduction

Bangladesh is an agricultural country [5]. Agricultural is included as agriculture, fisheries, livestock. Fisheries and aquaculture play a crucial role as a source of animal protein for billions of people worldwide and support the livelihoods of 10-12 % inhabitants in the world. In 2011, global aquaculture production was increased to 62.7 from 59 million tons in 2010 of which 89% came from Asia where Bangladesh achieved 5th position [11] which was replaced by 4th position through advancement in 2013 [12]. Demand for fish is leaping with the population increase in Bangladesh for the last three decades [11] which has increased the land use competition between agricultural crop production and fish farming [1]. Bangladesh is blessed with a vast extensive water resources in the form of ponds, natural depressions (*haors* and *beels*), lakes, canals, rivers and estuaries covering an area of 4.56 million ha and 2,640 sq nautical miles area in Bay of Bengal [8]. The country is represented by the great combined delta and flood plains criss-crossed by numerous rivers and their tributaries. In Bangladesh, total fish production has increased about 1.5 folds in 10 years, from just over 24,40,011 metric tons in 2006-07 to 36,84,245 metric tons in 2014-2015 [9]. About 6 million peoples are directly or indirectly engage in this sector [9]. A large portion of rural family members are engaged in fishing from the *beels* and other open water bodies. *Beels* are large surface water bodies that accumulate surface runoff water through internal drainage channels; these depressions are mostly topographic lows produced by erosions and are seen all over the country. Bangladesh has a total of about 4,500 *beels* covering an area of about 1,14,161 ha which is 2.91% of total inland water bodies [9]. These provide nearly 2.51% of total inland fish production. The overall production of *beels* is about 88,911 MT which is rather low. Total area of Kafrikhal *beel* is 132 acres. Average fish production is 41.577 MT approximately. About 54 different species fish have been found in this *beel*. Biodiversity is the quantity, variety and distribution across biological scales ranging through genetics and life forms of populations, species, communities and ecosystems [20]. It affects the capacity of living systems to respond to changes in the environment, underpins ecosystem function and provides the ecosystem goods and services that support human well-being [7, 15]. Bangladesh ranked third in Asia, with approximately 260 indigenous fresh water species with 143 small indigenous species [22]. The inland aquatic habitats of Bangladesh are rich in faunal biodiversity containing at least 265 species of finfish, 63 species of prawn, several species of turtles, tortoises, freshwater mussels and other living aquatic organisms [21].

Among 260 species of freshwater fishes, 143 may be considered as small indigenous species (SIS). Small indigenous species of fish grow to a maximum length of 25 cm and can multiply rapidly in any freshwaters and also in captivity. Fish biodiversity in Bangladesh including SIS are Indian major carps, minor carps, large and small catfishes, river shads, snakeheads, freshwater eels, perches, loaches, anchovies, gobies, feather backs, rays, glassfishes, mullets, minnows, barbs and pomprates. About 54 freshwater species are critically or somewhat endangered in Bangladesh [18]. Among them 14 species are listed as critically endangered; 27 as endangered and 14 as vulnerable. Among the 260 freshwater fish species 54 are threatened in Bangladesh [16]. The conservation of biodiversity and reported that the factors adversely affecting aquatic communities are encroachment, siltation, weed infestation and pollution [19]. The sustainability of the fishery reported that considerable illegal fishing, using banned gears and small-meshed nets was prevalent and considered to be detrimental to the sustainability of the fishery [6]. Runoff from agricultural and urban areas, the invasion of exotic species, and the creation of dams and water diversion have been identified as the greatest challenges to freshwater environments [3]. This *beel* plays a very important role in the alleviation of rural poverty and supplying food to the poor fishing community. Fisheries managers and policy makers must, therefore, take a precautionary approach in their management of fish diversity.

2. Materials and Methods

The study was carried out in Kafrikhal *beel* under Mithapukur Upazila in Rangpur district during period of January to March 2011. In the study, a total of 50 fishermen (both professional and subsistence) were randomly selected from three villages (Jalapur-20, Edgharpur-15 and Horiharpur-15) surrounding the *beel*. At first, primary information was collected from Senior Upazila Fisheries Officer, Mithapukur regarding the fish biodiversity and fish availability in Kafrikhal *beel*. During collection of data, both primary and secondary sources were considered. For the study a combination of interview schedule, participatory rural appraisal (PRA) tool such as, focus group discussion (FGD), social mapping and cross interviews with key informants were used for fishermen. The collected data were summarized and processed for analysis by using MS Excel and SPSS-20 version. Tables, graph, pie-chart etc. had been used for data presentation.

3. Results

A variety of fishes which comprising of 54 species were recorded at Kafrikhal *beel* represented by catfishes, carps, snakehead, perch, eels, barbs and minnows, clupeids and other miscellaneous species which are described below.

3.1. Catfishes

Thirteen species of catfish (24.07%) were recorded in study areas during the period of study (Table 1).

Table 1: A list of catfishes as recorded during the period of present study

SI No.	Family	Local name	Common name	Scientific name	Remarks
1	Bagridae	Gulsha	Long whiskered catfish	<i>Mystus cavasius</i>	Rare
2	Bagridae	Bujuri	Long bled catfish	<i>Mystus tengra</i>	Less common
3	Bagridae	Ritha	Rita	<i>Rita rita</i>	Less common
4	Bagridae	Tengra	Striped dwarf catfish	<i>Mystus vittatus</i>	Less common
5	Bagridae	Aair	Long whiskered catfish	<i>Mystus aor</i>	Rare
6	Clariidae	Magur	Walking catfish	<i>Clarius batrachus</i>	Common
7	Heteropneustidae	Shing	Stinging catfish	<i>Heteropneustes fossilis</i>	Less common
8	Schilbeidae	Gharua	Gharua bachcha	<i>Clupisoma garua</i>	Less common
9	Schilbeidae	Batashi	River catfish	<i>Pseudeutropius atherinoides</i>	Less common
10	Schilbeidae	Kajoli	Gangetic ailia	<i>Ailia coilia</i>	Common
11	Schilbeidae	Bacha	River catfish	<i>Eutropiichthys vacha</i>	Rare
12	Siluridae	Modhu pabda	Butter catfish	<i>Ompok pabda</i>	Less common
13	Siluridae	Boal	Freshwater shark	<i>Wallago attu</i>	Common

3.2. Carps

During the period of present investigation 9 species of carps (16.67%) were recorded (Table 2).

Table 2: A list of carp species as recorded during the period of study

SI No.	Family	Local name	Common name	Scientific name	Remarks
1	Cyprinidae	Rui	Indian major carp	<i>Labeo rohita</i>	Abundant
2	Cyprinidae	Carpio	Common carp	<i>Cyprinus carpio</i>	Common
3	Cyprinidae	Kalibaus	Black rohu	<i>Labeo calbasu</i>	Common
4	Cyprinidae	Goinna	Goniya	<i>Labeo goniua</i>	Rare
5	Cyprinidae	Silver carp	Silver carp	<i>Hypophthalmict-hys molitrix</i>	Less common
6	Cyprinidae	Catla	Indian major carp	<i>Catla catla</i>	Less common
7	Cyprinidae	Mrigal	Indian major carp	<i>Cirrhinus cirrhosus</i>	Less common
8	Cyprinidae	Bata	Minor carp	<i>Labeo bata</i>	Common
9	Cyprinidae	Bhagna	Reba	<i>Cirrhinus reba</i>	Less common

3.3. Snakehead

Four species of snakehead (7.40%) were recorded during study period (Table 3).

Table 3: A list of snakeheads as recorded during the period of study

SI No.	Family	Local name	Common name	Scientific name	Remarks
1	Channidae	Shol	Snakehead murrel	<i>Channa striatus</i>	Less Common
2	Channidae	Taki	Spotted snakehead	<i>Channa punctatus</i>	Abundant
3	Channidae	Cheng	Asiatic snakehead	<i>Channa orientalis</i>	Common
4	Channidae	Gojar	Giant snakehead	<i>Channa marulius</i>	Rare

3.4. Perches

In case of perch, 7 species of perches (12.96%) were recorded (Table 4).

Table 4: A list of perch species as recorded during the period of study

SI No.	Family	Local name	Common name	Scientific name	Remarks
1	Anabantidae	Khalisha	Striped gourami	<i>Colisa fasciatus</i>	Less common
2	Anabantidae	Khalisha	Honey gourami	<i>Colisa chuno</i>	Less common
3	Anabantidae	Koi	Climbing perch	<i>Anabas testudineus</i>	Abundant
4	Centropomidae	Kata chanda	Round glass perchlet	<i>Chanda baculis</i>	Common
5	Centropomidae	Lal chanda	Indian glass perchlet	<i>Chanda ranga</i>	Rare
6	Centropomidae	Nama chanda	Elongated glass perchlet	<i>Chanda nama</i>	Abundant
7	Nandidae	Veda	Mud perch	<i>Nandus nandus</i>	Less common

3.5. Eels

Three species of eels (5.55%) including guchi baim (*Macrognathus pancalus*), tara baim (*Macrognathus aculeatus*) and lal baim (*Macrognathus armatus*) were abundantly found (Table 5).

Table 5: A list of eel species as recorded during the period of present study

SI No.	Family	Local name	Common name	Scientific name	Remarks
1	Mastacembelidae	Guchi baim	Striped spiny eel	<i>Macrognathus pancalus</i>	Abundant
2	Mastacembelidae	Tara baim	One-Striped spiny eel	<i>Macrognathus aculeatus</i>	Abundant
3	Mastacembelidae	Lal baim	Tire-track striped spiny eel	<i>Macrognathus armatus</i>	Abundant

3.6. Barbs and minnows

During study period five species of barbs (9.26%) and two species of minnows (3.70%) were found (Table 6).

Table 6: A list of barbs and minnows as recorded during the period of study

SI No.	Family	Local name	Common name	Scientific name	Remarks
1	Cyprinidae	Mola	Barb	<i>Amblypharyngodon mola</i>	Abundant
2	Cyprinidae	Dhela	Barb	<i>Rohtee cotio</i>	Less common
3	Cyprinidae	Jatputi	Spot fin swamp barb	<i>Puntius sophore</i>	Common
4	Cyprinidae	Titputi	Fire-fin barb	<i>Puntius ticto</i>	Abundant
5	Cyprinidae	Sharputi	Barb	<i>Puntius sarana</i>	Less common
6	Cyprinodontidae	Darkina	Top minnow	<i>Esomus danricus</i>	Abundant
7	Cyprinodontidae	Pach chokha	Top minnow	<i>Aplocheilus panchas</i>	Abundant

3.7. Clupeids

In case of clupeids, two species (3.70%) fish were found in the study areas (Table 7).

Table 7: A list of clupeid fish species as recorded during the period of study

SI No.	Family	Local name	Common name	Scientific name	Remarks
1	Clupeidae	Kachki	Ganga river sprat	<i>Corica soborna</i>	Abundant
2	Clupeidae	Chapila	Indian river shad	<i>Gadusia chapra</i>	Common

3.8. Miscellaneous

Nine other miscellaneous (12.52%) fish species (Table 8) were recorded during study period.

Table 8: A list of miscellaneous fish species as recorded during the period of study

SI No.	Family	Local name	Common name	Scientific name	Remarks
1	Belontiidae	Kakila	Freshwater gar fish	<i>Xenentodon cancila</i>	Common
2	Cobitidae	Rani	Bengal loach	<i>Botia Dario</i>	Less common
3	Cobitidae	Gutum	Guntea loach	<i>Lepidocephalus guntea</i>	Abundant
4	Gobiidae	Bailla	Bar-eyed goby	<i>Glossogobius giuris</i>	Abundant
5	Notopteridae	Chitol	Humped feather back	<i>Notopterus chitala</i>	Less Common
6	Palaemonidae	Beel chingri	River prawn	<i>Macrobrachium daganum</i>	Common
7	Palaemonidae	Gura chingri	Monsoon river prawn	<i>Macrobrachium lumarre</i>	Abundant
8	Tetraodontidae	Choto tepa	Ocellated puffer fish	<i>Tetraodon cutcuttia</i>	Rare
9	Palaemonidae	Golda chingri	Freshwater prawn	<i>Macrobrachium rogenbergii</i>	Common

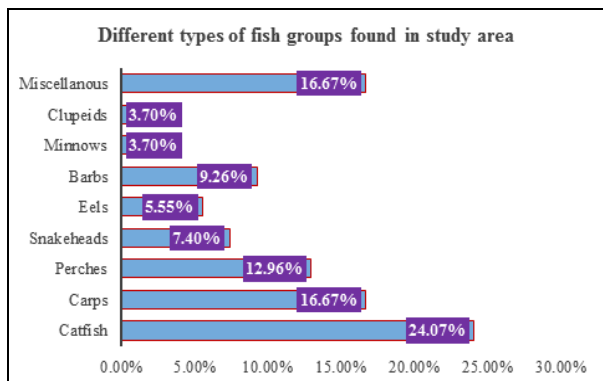


Fig 1: Different types of fish groups recorded during the period of study

According to their availability, all the species were classified into four types such as abundant, common, less common and rare (Fig: 2)

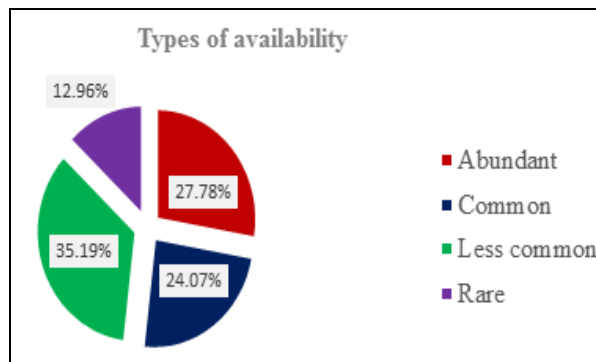


Fig 2: Types of availability of species

In further analyzing the data including the information obtained from the local people on the abundance of fish, they were categorized as endangered and critically endangered (Table 9)

Table 9: Critically endangered and endangered species detected in the study area

Sl. No	Local name	Scientific name	Critically Endangered	Endangered
1	Goinna	<i>Labeo gonius</i>	X	
2	Gojar	<i>Channa marulius</i>	X	
3	Gulsha	<i>Mystus cavasius</i>	X	
4	Lal chanda	<i>Chanda ranga</i>	X	
5	Chep chela	<i>Chela cachius</i>		X
6	Dhela	<i>Osteobrama cotio</i>		X
7	Bujuri	<i>Mystus tengara</i>		X
8	Sarpunti	<i>Puntius sarana</i>		X
9	Rani	<i>Botia Dario</i>		X
10	Ritha	<i>Rita rita</i>		X
11	Kajoli	<i>Ailia coila</i>		X
12	Garua bacha	<i>Clupisoma garua</i>		X
13	Bacha	<i>Eutropiichthys bacha</i>	X	
14	Madhu pabda	<i>Ompok pabda</i>		X
15	Aair	<i>Mystus air</i>	X	
16	Madhu pabda	<i>Ompok pabda</i>		X
17	Choto tepa	<i>Tetraodon cutcuttia</i>	X	

Note: X indicates the status of species in the respected category.

4. Discussion

Bangladesh having vast and diversified water resources of 4.34 million ha is unique in term of valuable wetland ecosystem and associated aquatic biodiversity ranking third in Asia with approximately 260 indigenous fresh water species [22]. During the period of study 54 species of the fish fauna were recorded. Among them, 13 catfishes, 9 species of carps, 4 species of snakeheads, 7 species of perches, 3 species of eels, 5 species of barbs, 2 species of minnows, 2 species of clupeid species, and other miscellaneous 9 species were found in varying level of abundance. According to the abundance of fish species, they were categorized into 4 groups like, abundant (27.78%), common (24.07%), less common (35.19%) and rare (12.96%). Among 54 species the highest numbers of fishes were catfish (24.07%) and the lowest (3.70%) were minnows and clupeids. A total of 68 species recorded of fish in water bodies of Itna, Kishoregonj [25]. About 260 species of freshwater fish recorded belonging to 55 families in Bangladesh [21]. This was because only the observed fishes were recorded. The regular presence of freshwater catfish recorded belonging to the family Siluridae in the beels, haor, baors, flooded water bodies, ponds, streams and rivers of Bangladesh [24]. Carps (16.67%) were the valuable fish in Kafrikhal beel. A total of 92 species of fish

and prawn identified from Sylhet-Mymensingh sub-basins [14]. A total of 14 species of non-resident fish and resident species identified which 30 were common, 9 rare and 5 highly endangered in Pirla beel under Netrokona district [24]. A list of 106 fish species published belonging to 68 genera from the district of Mymensingh and Tangail [15]. About 105 fish species recorded from Chalan beel [2]. Among them 45 were threatened, 25 endangered, 14 vulnerable and 6 were critically endangered. In the present study 10 species of endangered fish and 7 species of critically endangered were recorded which indicate the probable benefit of establishment of fish centuary in different sections of the river Kafrikhal beel over the recent past. There were some rare species which were very incidentally or occasionally available, such as- *Botia dario*, *Clupisoma garua*, *Puntius ticto*, *Osteobrama cotio* etc. The species *Botia dario* is endangered, *Clupisoma garua* is critically endangered, *Osteobrama cotio* is endangered agreeing with the present findings [16]. Once upon a time, small fishes were abundant in the rivers, beels, jheels, canals, streams, ponds etc. in Bangladesh [2, 17, 23]. But now-a-days, these species of fish are going to be disappeared despite of their ability to reproduce naturally due to environmental degradation. Fish habitat destruction by roads, embankments, drainage and flood control, and natural siltation along with

over-fishing, have been commonly cited as causes of the deterioration of the country's resources [4, 15].

5. Conclusion

Nowadays the fish biodiversity of the Kafrikhal *beel* is under great threat due to fishing pressure, overfishing, pollution, siltation, urbanization and human intervention. These have been created a great impact on *beel* ecology. As a result, the water quality is deteriorating day by day and the availability of fish species and another aquatic biodiversity is decreasing gradually. The complete drying up in many parts of this *beel* is a common scenario during lean season, which is detrimental to fish populations and ecosystem. The findings of the study will be applicable to the management of this *beel*. Our govt. should take proper steps to save fish biodiversity in this *beel*. People in adjacent areas should awareness. Moreover, the findings will to be useful to students, researchers and policy makers.

6. References

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