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Present status and threats to fish diversity of wetlands of Chhatak, Bangladesh

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Abstract

The present study was conducted for a period of one year from April 2016 to March 2017 to identify the present status and threats to fish diversity in the wetlands of Chhatak, Bangladesh. A total of 71 fish species, including prawn under 11 orders and 25 families were recorded from the wetlands. Cypriniformes (32.38%) was the most dominant order, followed by Siluriformes (25.35%), Perciformes (19.72%), Synbranchiformes and Channiformes (5.63%), Clupeiformes (4.23%), Decapoda (4.23%), Beloniformes (2.82%), Osteoglossiformes (2.82%), Tetraodontiformes (1.41%) and Cyprinodontiformes (1.41%). Cyprinidae was the most dominant family contributing 20 species. The recorded species were categorized on the basis of availability into four statuses and found as available (40.85%), less available (29.58%), rare (14.08%) and very rare (15.49%). The present study suggested that use of appropriate fishing gears, establishment of the sanctuary, community based fisheries management, stocking of commercially important fish species, implementation of fishing laws and regulation, Government support and fishermen's awareness can save the valuable fish diversity of the study area.

Keywords: Fish, Diversity, Wetlands, Chhatak, Management

1. Introduction

Bangladesh, a floodplain delta of the Ganges, Brahmaputra and Meghna rivers is endowed with a vast expanse of enormous and globally famous wetlands. The country possesses 46,99,387 hectares of inland waters in the form of permanent rivers and streams (8,53,863 ha), estuarine and mangrove swamps (1,77,700 ha), beels (1,14,161 ha), Kaptai Lake (68,800 ha), baors (5,488 ha), floodplains (27,02,304 ha), small ponds and tanks (3,71,309 ha), shrimp farms (2,75,274 ha) and seasonal culture ponds (1,30,488 ha) [1]. Wetlands can be defined as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres" [2]. Haors and beels are specially considered for supporting major subsistence and commercial fisheries, while the seasonally flooded lands support major rice-growing activities, and the abundant aquatic vegetation provides rich grazing for domestic livestock as well as fuel and fertilizers for the local people [3]. Chhatak is supporting a huge waterbody as wetlands and famous for its rich fish diversity. Wetlands are known to provide a large range of benefits including provision of food, fiber, fuel, flood control, ground water replenishment, support to biodiversity, recreation and cultural values. These goods and services support livelihoods of large communities, particularly the poorest of the poor who depend on wetland resources for sustenance [4]. More than 50% of the world's wetlands have been altered, degraded, or lost in the last 150 years [5]. Wetlands are under threat due to unsystematic utilization, encroachments and reclamation, urbanization and drawbacks from agricultural development and flood control actions [6-8]. The decline in wetlands has resulted in more than 40% of freshwater fish species being classed as threatened [9]. Before undertaking any fisheries management tool, the fish diversity in the water must be known [10] but there is no published literature on fish diversity of wetlands of Chhatak. Considering the above mentioned situation, the study was carried out to identify the present status and threats to the fish diversity of wetlands of Chhatak, Bangladesh for proper management.

2. Materials and Methods

The present study was conducted on wetlands of Chhatak under Sunamganj district, Bangladesh for a period of one year from April 2016 to March 2017. Chhatak is located in between 24°49' and 25°06' north latitudes and in between 91°27' and 91°49' east longitudes ^[11] (Fig. 1). Fishermen of the study area were engaged in fishing in Surma river, Chela river, Katakhal khal, Mirza khal, Pekuar haor, Nandir haor, Doniar haor and Talir haor. Both primary and secondary sources were considered to interpret the results during data collection. Primary data about present status of fish and threats for fish diversity were collected by 80 questionnaire interviews (QI) from randomly selected fishermen. Besides, a total of 10 focus group discussions (FGDs) were done to collect data in which each group consisting 12-15 members. QI and FGDs were made in ten (10) villages named Kalaruka, Shongkorpur, Tengargaon, Loxmibaor, Goneshpur, Jamura,

Bahadurpur, Jointapur, Binoyonpur and Poroshpur under Kalaruka, Noarai, Dakshin Islampur, Saidergaon and Dakshin Khurma union. The secondary information about status and threats to fish diversity were collected from upazila fisheries office, district fisheries office (DFO) of Sunamganj, books and journals. After collecting the data through questionnaire interviews and FGDs, it was cross-checked through interviews of upazila fisheries officer (UFO), district fisheries officer (DFO), local leaders, fish traders and NGO workers in the study area. The fish and prawn species were categorized into 4 groups on the basis of availability as- available (A): species found available throughout the year; less available (LA): species found infrequently; rare (R): species found periodically; and very rare (VR): species found fortuitously. Finally data were analyzed using Microsoft office excels 2010.



Fig 1: Map showing Chhatak (Yellow box) and study area (Black circles) (Source: Banglapedia, 2014)

3. Results and Discussion

3.1 Present status of fish diversity in wetlands of Chhatak

A total of 71 fish species and prawn species of 11 orders and 25 families were recorded from the wetlands of Chhatak (Table 1). Nuruzzaman ^[12] recorded 141 species of fish from Tanguar haor in Sunamganj district. Mahalder and Mustafa ^[13] recorded 126 fish species from 39 families in the Sunamganj haor area that indicate higher fish diversity than the present study. Mazumder *et al.*, ^[14] recorded a total of 54 fish species belonging to the 6 orders, 19 families and 39 genera from Hail haor. Saha and Hossain ^[15] recorded a total of 40 species of fish including exotic species from Salda beel. Nath *et al.*, ^[16] found 47 species in Borulia haor which were lower than the present study. Paik and Chakraborty ^[17] recorded 75 species different aquatic habitat (pond, lake, canal, river and paddy field) which was more or less same to the present findings. Rahman *et al.*, ^[18] recorded a total of 80

species of fish under 9 orders and 24 families from Padma distributary of the Ganges River, Northwestern Bangladesh. Azadi and Alam ^[19] found a total of 93 species of Ichthyofauna (finfish and shellfish) from River Halda. Chowdhury *et al.*, ^[20] reported 98 fish species in the Naaf river, Islam *et al.* ^[21] recorded a total of 114 fish species under 12 orders and 36 families from Payra River that indicate higher fish diversity than this study. Mohsin and Haque ^[22] reported 56 fish species in the Mahananda river, Galib *et al.*, ^[23] reported 63 species of fish in the Choto jamuna river, Nabi *et al.*, ^[24] reported 35 species of fish in the Bakkhali river these findings are lower than the present study. In comparison with the mentioned Haor and river, the wetlands of Chhatak is very rich in fish diversity. Bhuiyan *et al.*, ^[25] recorded 73 species from Padma river near Rajshahi which support the present findings.

Table 1: Present status of fish diversity in wetlands of Chhatak

Sl. No.	Family	Local name	English name	Scientific name	Habitat	Present status	IUCN status
Beloniformes							
1	Belontiidae	Kakila	Fresh water gar fish	<i>Xenotodon cancila</i>	Haor and Beel	LA	LC
2	Hemiramphidae	Ek thota	Wrestling halfbeak	<i>Dermogenys pusilla</i>	Haor and Beel	R	LC
Channiformes							
3	Channidae	Taki	Spotted snakehead	<i>Channa punctatus</i>	Haor and Beel	A	LC
4	Channidae	Cheng	Asiatic snakehead	<i>Channa orientalis</i>	Haor and Beel	LA	LC
5	Channidae	Shol	Snakehead murrel	<i>Channa striatus</i>	Haor and Beel	A	LC
6	Channidae	Gozar	Giant snakehead	<i>Channa marulius</i>	Haor and Beel	LA	EN
Clupeiformes							
7	Clupeidae	Ilish	Hilsa shad	<i>Tenualosa ilisha</i>	River	LA	LC
8	Clupeidae	Chapila	Indian river shad	<i>Gudusia chapra</i>	River, Haor and Beel	LA	VU
9	Clupeidae	Katchki	Ganges river sprat	<i>Corica soborna</i>	River	LA	LC
Cypriniformes							
10	Cobitidae	Gutum	Guntea loach	<i>Lepidocephalichthys guntea</i>	Haor and Beel	LA	LC
11	Cobitidae	Bou rani	Bengal loach	<i>Botio dario</i>	River	LA	EN
12	Cobitidae	Maitta rani	Hora loach	<i>Botia dayi</i>	River	VR	EN
13	Cyprinidae	Catla	Indian major carp	<i>Catla catla</i>	River, Haor and Beel	A	LC
14	Cyprinidae	Rohu	Indian major carp	<i>Labeo rohita</i>	River, Haor and Beel	A	LC
15	Cyprinidae	Mrigal	Indian major carp	<i>Cirrhinus cirrhosus</i>	River, Haor and Beel	A	NT
16	Cyprinidae	Common carp	Common carp	<i>Cyprinus carpio</i>	River, Haor and Beel	A	EX
17	Cyprinidae	Gonia	Kuria labeo	<i>Labeo gonius</i>	River, Haor and Beel	A	NT
18	Cyprinidae	Grass carp	Grass carp	<i>Ctenopharyngodon idella</i>	River, Haor and Beel	A	EX
19	Cyprinidae	Kalibaush	Black rohu	<i>Labeo calbasu</i>	River, Haor and Beel	A	LC
20	Cyprinidae	Silver carp	Silver carp	<i>Hypophthalmichthys molitrix</i>	River	R	EX
21	Cyprinidae	Bata	Bata	<i>Labeo bata</i>	River, Haor and Beel	A	LC
22	Cyprinidae	Chela	Fine scale razor belly minnow	<i>Chela cachius</i>	River, Haor and Beel	R	VU
23	Cyprinidae	Mola	Mola Carplet	<i>Amblypharyngodon mola</i>	River, Haor and Beel	LA	LC
24	Cyprinidae	Darkina	Flaying barb	<i>Esomus danricus</i>	Haor and Beel	LA	LC
25	Cyprinidae	Dhela	Cotio	<i>Osteobrama cotio</i>	River, Haor and Beel	R	NT
26	Cyprinidae	Tit punti	Ticto barb	<i>Puntius ticto</i>	Haor and Beel	A	VU
27	Cyprinidae	Teri punti	One spot barb	<i>Puntius terio</i>	Haor and Beel	A	LC
28	Cyprinidae	Jat punti	Spot fin swamp barb	<i>Puntius sophore</i>	Haor and Beel	A	LC
29	Cyprinidae	Shar punti	Olive barb	<i>Puntius sarana</i>	River, Haor and Beel	R	LC
30	Cyprinidae	Raj punti	Java barb	<i>Puntius gonoiotus</i>	River, Haor and Beel	LA	EX
31	Cyprinidae	Along	Bengal barb	<i>Megarasbora elanga</i>	River	VR	EN
32	Cyprinidae	Banshpata	Sind danio	<i>Devario devario</i>	River	VR	LC
Cyprinodontiformes							
33	Aplocheilidae	Kanpona	Blue panchax	<i>Aplocheilus panchax</i>	Haor and Beel	VR	LC
Osteoglossiformes							
34	Notopteriidae	Chital	Clown knifefish	<i>Notopterus chitala</i>	River	VR	EN
35	Notopteriidae	Foli	Bronze Featherback	<i>Notopterus notopterus</i>	River and Haor	R	VU
Perciformes							
36	Ambassidae	Lamba chanda	Elongated glass perchlet	<i>Chanda nama</i>	River, Haor and Beel	LA	LC
37	Ambassidae	Lal chanda	Indian glass perchlet	<i>Parambassis lala</i>	River, Haor and Beel	VR	LC
38	Ambassidae	Gol chanda	Indian glass fish	<i>Parambassis ranga</i>	River, Haor and Beel	A	LC
39	Anabantidae	Koi	Climbing perch	<i>Anabas testudineus</i>	River, Haor and Beel	A	LC
40	Cichlidae	Tilapia	Mozambique tilapia	<i>Oreochromis mossambicus</i>	Haor and Beel	R	EX
41	Gobiidae	Bele	Tank goby	<i>Glossogobius giuris</i>	Haor and Beel	LA	LC
42	Nandidae	Meni	Gangetic leafyfish	<i>Nandus nandus</i>	Haor and Beel	A	NT
43	Osphronemidae	Boro khalisha	Striped gourami	<i>Colisa fasciatus</i>	Haor and Beel	A	NO
44	Osphronemidae	Choto khalisha	Honey gourami	<i>Colisa chuno</i>	Haor and Beel	A	NO
45	Osphronemidae	Lal khalisha	Dwarf gourami	<i>Colisa lalia</i>	Haor and Beel	VR	NO
Siluriformes							
46	Bagridae	Gulsha	Long whiskered catfish	<i>Mystus cavasius</i>	River, Haor and Beel	LA	NT
47	Bagridae	Bujuri	Long bled catfish	<i>Mystus tengra</i>	Haor and Beel	A	LC
48	Bagridae	Tengra	Striped dwarf catfish	<i>Mystus vittatus</i>	River, Haor and Beel	A	LC
49	Bagridae	Ayre	Long whiskered	<i>Mystus aor</i>	River and Haor	LA	VU

			catfish				
50	Bagridae	Rita	Whale catfish	<i>Rita rita</i>	River and Haor	LA	EN
51	Clariidae	Magur	Walking catfish	<i>Clarius batrachus</i>	Haor and Beel	A	LC
52	Heteropneustidae	Shing	Stinging catfish	<i>Heteropneustes fossilis</i>	Haor and Beel	A	LC
53	Pangasiidae	Pangus	Yellowtail catfish	<i>Pangasius pangasius</i>	River	VR	EN
54	Schilbeidae	Bacha	Batchwa vacha	<i>Eutropiichthys vacha</i>	River	R	LC
55	Schilbeidae	Garua	Garua Bachcha	<i>Clupisoma garua</i>	River	VR	EN
56	Schilbeidae	Kajuli	Gangetic ailia	<i>Ailia coila</i>	River	R	LC
57	Schilbeidae	Batasi	Indian potasi	<i>Pseudotropius atherinoides</i>	Haor and Beel	LA	NT
58	Schilbeidae	Shillong	Silond catfish	<i>Silonia silondia</i>	River	VR	LC
59	Siluridae	Boal	Freshwater shark	<i>Wallago attu</i>	River, Haor and Beel	A	VU
60	Siluridae	Pabda	Pabo catfish	<i>Ompok pabo</i>	Haor and Beel	A	CR
61	Siluridae	Kani pabda	Butter catfish	<i>Ompok bimaculatus</i>	Haor and Beel	LA	EN
62	Siluridae	Madhu pabda	Pabdah catfish	<i>Ompok pabda</i>	Haor and Beel	A	EN
63	Sisoridae	Baghair	Dwarf goonch	<i>Bagarius bagarius</i>	River	VR	CR
Synbranchiforme							
64	Mastacembelidae	Boro Baim	Zig-zag eel	<i>Mastacembelus armatus</i>	River, Haor and Beel	LA	EN
65	Mastacembelidae	Guchi	Barred spiny eel	<i>Macrogathus pancalus</i>	Haor and Beel	A	LC
66	Mastacembelidae	Tara Baim	Lesser spiny eel	<i>Macrogathus aculeatus</i>	Haor and Beel	A	NT
67	Synbranchidae	Kuchia	Mud eel	<i>Monopterusuchia</i>	Haor and Beel	R	VU
Tetraodontiformes							
68	Tetraodontidae	Potka	Ocellated pufferfish	<i>Tetraodon cutcutia</i>	Haor and Beel	LA	LC
Shellfish species: Decapoda							
69	Palaemonidae	Kalo icha	Monsoon river prawn	<i>Macrobrachium malcolmsonii</i>	Haor and Beel	A	NO
70	Palaemonidae	Sada icha	Prawn	<i>Macrobrachium sp.</i>	Haor and Beel	A	NO
71	Palaemonidae	Golda	Prawn	<i>Macrobrachium rosenbergii</i>	River	R	NO

A: available, LA: less available, R: rare, VR: very rare, CR: critically endangered, EN: endangered, VU: vulnerable, NT: near threatened, NO: not threatened, LC: least concern and EX: exotic species.

Among 25 families recorded during the study period Cyprinidae was the most dominant family contributing 20 species followed by Bagridae, Schilbeidae, Siluridae, Channidae, Ambassidae, Cobitidae, Mastacembelidae, Palaemonidae, Osphronemidae and Notopteriidae (Table 1).

Mazumder *et al.*,^[14] Nath *et al.*,^[16] De *et al.*,^[26] Giri *et al.*,^[27] Mohan and Singh^[28], Mohsin *et al.*,^[29] recorded maximum number of finfish species under the family Cyprinidae which support the findings of the present study.

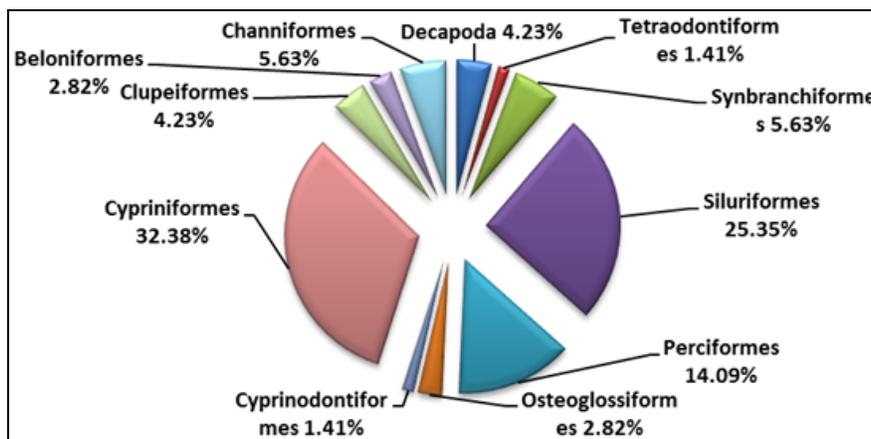


Fig 2: Order basis percentage composition of recorded fish species in the study area

The order basis percentage analysis of the recorded fish species on the basis of availability showed the highest occurrence from the order Cypriniformes (32.38%), followed by Siluriformes (25.35%), Perciformes (14.09%), Synbranchiformes (5.63%), Channiformes (5.63%), Clupeiformes (4.23%), Decapoda (4.23%), Beloniformes (2.82%) and Osteoglossiformes (2.82%). Tetraodontiformes and Cyprinodontiformes the same and lowest percentage (1.41%) of the total number of species (Fig. 2). Rahman *et al.*,^[18] found Cypriniformes as most dominant order constituting

35% of the total fish population followed by Siluriformes, Perciformes, Clupeiformes, Synbranchiformes, Osteoglossiformes, Beloniformes, Mugiliformes and Tetraodontiformes. Cypriniformes and Siluriformes (18 species each) were recorded as the most dominant fish in the Hail haor Mazumder *et al.*,^[14]. These results support the present results. The present finding showed the rich status of fishes of the wetlands of Chhatak, but this is also representing the declining trends of wetland fishes of Bangladesh. Among the total species found during the study, 29 species

were available (40.85%), 21 species were less available (29.58%), 10 species were rare (14.08%) and 11 species were very rare (15.49%) (Fig. 3) based on availability status.

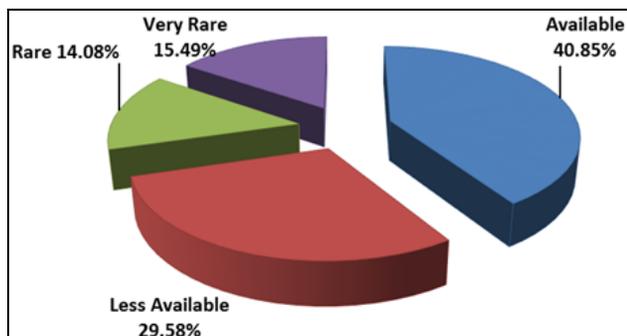


Fig 3: Present status of recorded fish species in the study area

According to the respondents, very rare species as Maitta rani (*Botia dayi*), Along (*Megarashbora elanga*), Banshpata (*Devario devario*), Kanpona (*Aplocheilus panchax*), Chital (*Notopterus chitala*), Lal chanda (*Parambasis lala*), Lal khalisha (*Colisa lalia*), Pangus (*Pangasius pangasius*), Garua (*Clupisoma garua*), Shillong (*Silonia silondia*) and Baghair (*Bagarius bagarius*) were available for at least 10-20 years ago. But now-a-days these species are facing high risk of extinction. Islam *et al.*,^[21] recorded available (43.86%), less available (29.82%), rare (18.42%) and very rare (7.89%) from Payra river. Flowra *et al.*,^[30] recorded available (45%), less available (33.33%), rare (13.33%) and very rare (8.33%) from Baral River, Natore, Bangladesh. This supports the present findings.

According to the red list of IUCN^[31], a total of 64 species are threatened in Bangladesh among them only 20 species were found from the present study. The IUCN^[31] status of these 20 threatened species were 2 critically endangered (out of 9 species), 11 endangered (out of 30 species) and 7 vulnerable. Center for Natural Resource Studies (CNRS)^[32] found 32 species as threatened from Hakaluki haor. Pandit *et al.*,^[33] found 20 species as threatened from the Soma Nadi Jalmohal. Sandha River is a habitat of 26 threatened species Hanif *et al.*,^[34] Azadi and Alam^[19] found 3 critically endangered, 9 endangered and 8 vulnerable species. These results are similar to the present results.

3.2 Threats to fish diversity

Some natural and manmade factors consequently destroying the spawning, feeding and nursing grounds of many economically important wetland species. Main threats to the fish diversity in the wetlands of Chhatak were overfishing, use of illegal fishing gears, siltation and sedimentation, katha fishing, fishing by dewatering/irrigation, low water depth, low current, increasing fishermen and fishing pressure, catching of SIS by moshari (Net) jal, catching of brood fish, use of chemical fertilizers and over doses of insecticides and pesticides in agricultural land adjacent to wetlands, creation of barrier and making obstacle in natural movement of fishes, sand and stone collection from river, drought in summer, dust from crusher mill adjacent to river and loss of connection of river with khal, beel etc. The findings clearly represent the declining trends of fish diversity in the study area which warning the gradual declination of fish diversity of wetlands of Bangladesh. Stoddard *et al.*,^[35] observed similar decline causes of fish diversity of inland water bodies of Bangladesh. Islam *et al.*,^[21]; Rahman *et al.*,^[18]; Pandit *et al.*,^[33]; Flowra *et*

al.,^[30] found the same declining causes which support the present results.

4. Conclusion

Wetland resources form the basis of economy of Bangladesh and it is essential for the survival and balance of nature and human welfare. Destruction of habitat of many important fish species is the current alarming issue and thus its conservation and management is the only solution. Present study suggested some recommendations i.e. use of illegal fishing gears must be stopped and banned, catching of juvenile and brood fish should be stopped, katha and dewatering fishing must be stopped, number of fish sanctuaries should be increased, community based fisheries management, stocking of economically important fish species, dredging of wetlands, create public and fishermen's awareness and proper implementation of existing fishing laws and regulations. Besides, financial support from government to create alternative livelihood opportunities to reduce fishing pressure on wetlands. Finally, since the fish and fisheries of the study area supports livelihood of large number of poor fishermen, government should take necessary steps to conserve the fish diversity for sustainable production from the wetlands of Chhatak.

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