

## Check-list of bony fish collected from the Upper Halda River, Chittagong, Bangladesh

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**Abstract.** The Halda River of Bangladesh gains its importance as natural spawning ground of major carp fishes. A check-list of bony fish in the Halda River was carried out. It appeared that the fish fauna in this river is dominated by the family of Cyprinidae (28.57 %) represented by 18 species, followed by Gobiidae (9.52 %) represented by 6 species and Schibeidae (7.94 %) with 5 species, than Bagridae and Channidae (6.35 %) with 4 species each, Siluridae (4.76 %) with 3 species. Among the listed families, there are 14 families represented by a single species and 4 families by 2 species. The total number of species is 63 belonging to 51 genera pertaining to 24 families and 9 orders. The present study reported 5 migrant species from the Bay of Bengal and 3 species as exotic species.

**Key Words:** Check-list, biodiversity, Halda River, exotic species, threatened species.

**Introduction.** Fresh water biodiversity are in a state of critically endangered due to the climate change and habitat destruction. Degradation of stream and riverine ecosystem causes ultimate destruction to the structure and function of stream biota (Stoddard et al 2006). This problem is more acute in a developing country like Bangladesh. From the ecological point of view, fish is very important not only because of its economic value, but also because of sensitivity to ecological changes and represents a wide range of tolerance at community level (Pielou 1966). So, fish assemblages have widely been used as biological indicators to estimate and evaluate the level of degradation and health of rivers and streams (Vijaylaxmi et al 2010).

Bangladesh is a drainage passage for a complex Ganges-Brahmaputra-Meghna river system and rich in various fisheries resources. The inland water of Bangladesh provides 260 species of fishes (Rahman 1989). In addition to a total of 475 marine fish species of which 65 commercially important fish species have been recorded (Hossain 1970) and 12 culturable species of exotic fishes have been introduced in Bangladesh (DOF 2005).

There is an increasing concern about the effects of major natural or human perturbations on aquatic ecosystems. It should be noted that knowledge of freshwater biodiversity is incomplete. There are about 700 rivers in Bangladesh, but relatively little is known about the fish biodiversity and distribution though during the last century and last decades some studies (Chowdhury et al 2010; Hossain et al 2007; Bhuiyan 1964; Hossain 1970; Bhuiyan et al 1992; Doha 1973; Rahman 1989; Islam & Hossain 1983; Kamal 2000) were made. So, extensive researches are required to prepare a database of fish fauna aiming to contribute a better knowledge of the fish diversity in these rivers.

Halda River is the only natural spawning ground of major Indian carps (*Catla catla*, *Labeo rohita* and *Cirrhinus cirrhosus*) in Bangladesh, which produce 217-4111 kg wild carp seeds per year (Ahmad 1948; Azadi 1979). A major portion of the country's pond carp culture is dependent on these wild seed (Azadi 1979). But the fish diversity of this river has little studied. It is widely accepted that the aquatic biodiversity of Bangladesh including Halda River has not been described statistically (Chowdhury et al 2010). For the implementation of National Biodiversity Strategy and Action Plan it is

necessary to manage some of the separate elements of which biodiversity are composed (Chowdhury et al 2010). For all the above reasons, the purpose of this paper is to update the species check-list and to report new record of species inhabiting the Halda River, in order to facilitate further studies on this fauna by interested researchers. This list aims at building up faunistic information about the species available in the fresh waters of Bangladesh.

**Material and Method.** The Halda River is a major tributary of river Karnaphuli in Chittagong district of Bangladesh. The river originates from the Hill Ranges in the Chittagong hill tracts range at latitude  $22^{\circ} 38' 00''$  N and longitude  $92^{\circ} 10' 00''$  E and enters into Chittagong district through Fatikchhari upazila. Then it flows southwest keeping off the higher regions to the north and then due south past Bibirhat, Nazirhat, Sattarghat and other important places of Fatikchhari, Hathazari, Raozan and Kotwali Upazilla of Chittagong which form it's basin. It falls into the Karnaphuli River at Kalurghat at latitude  $22^{\circ} 25' 13''$  N and longitude  $91^{\circ} 52' 33''$  E. The total length of this river is about 81 km. Sampling stations was divided into three different stations which cover upper zone (Fatikchhari-Sattarghat) of this river. The Sampling stations were Nazirhat Bridge ( $S_1$ ) at  $22^{\circ} 37' 38''$  N and  $91^{\circ} 47' 51''$  E, Sattaghat Bridge ( $S_2$ ) at  $22^{\circ} 30' 51''$  N and  $91^{\circ} 50' 43''$  E, and Garduara ( $S_3$ ) at  $22^{\circ} 29' 59''$  N and  $91^{\circ} 51' 58''$  E (Figure 1). Sampling station  $S_2$  and  $S_3$  were located at the mouth of two major tributary of this river, the Boalia tributary and Cheng khali tributary respectively.

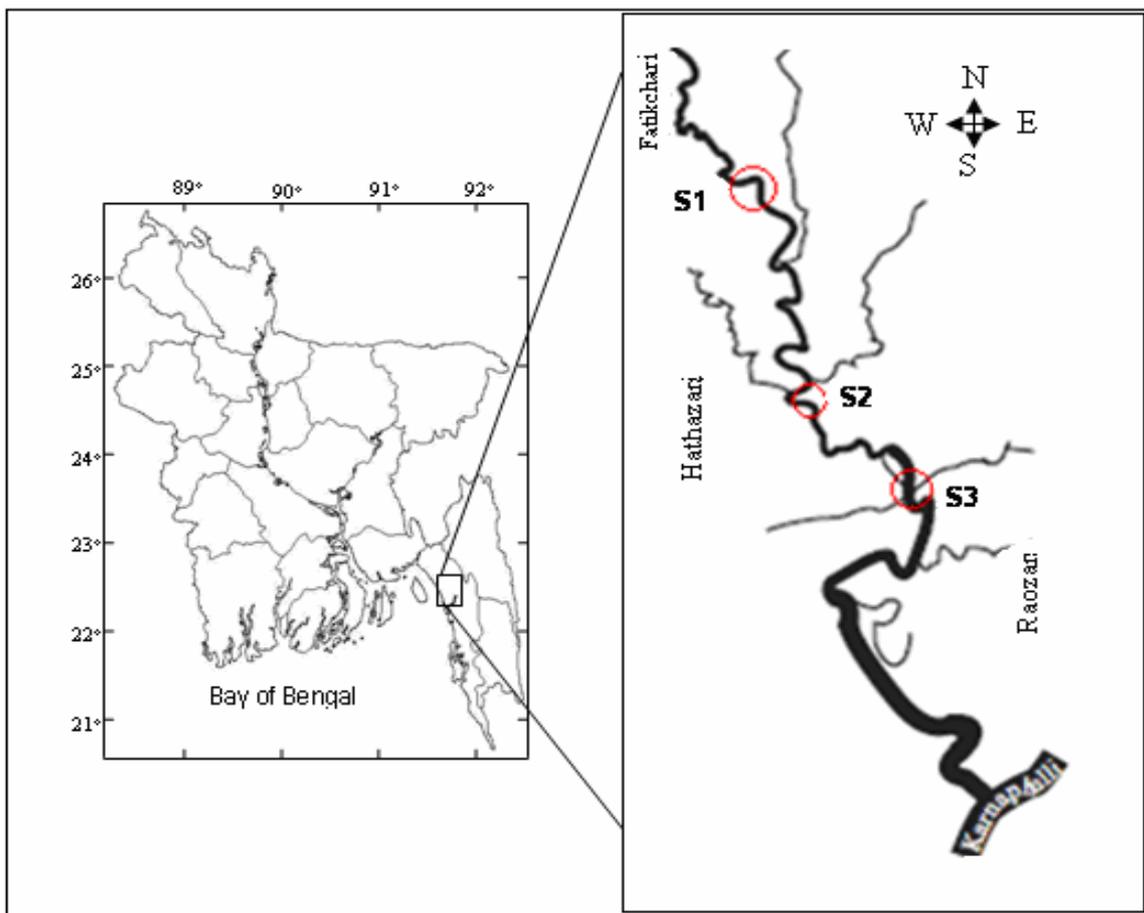


Figure 1. The geographical location of the Halda River with the three sampling sites. (Source: Landsat satellite image NASA, USA).

Fishes were collected and identified directly from the three selected site during the study period. Weekly visit were made to the sampling stations. Immediately photographs were taken earlier to preservation since formalin decolorizes the fish color on long

preservation. Formalin solution was prepared by diluting one part of concentrated formalin or commercial formaldehyde with nine parts of water *i.e.*, 10 % formalin (Hamillto-Buchanan 1822). Fishes brought to the laboratory were fixed in this solution. The specimens were identified with the help of catalogs and systematically categorized, mainly by using the standard keys of Qureshi & Qureshi (1983) and the system mentioned by Nelson (1994).

**Results and Discussion.** The results of this study are demonstrated in table 1. There are twenty four families of which 14 are represented by a single species, 4 by two species, 1 by three species and the remaining fish families recorded (5 families) were represented by more than 3 species. This richest family in terms of the number of species was Cyprinidae (28.57 %) represented by 18 species, Gobiidae (9.52%) represented by 6 species and Schibeidae (7.94 %) with 5 species, while the fourth place was occupied by Bagridae and Channidae (6.35 %) which is represented by 4 species per each. The latter come the families of Siluridae (4.76 %) represented by 3 species, followed by Ambassidae, Clupidae, Engraulidae and Mastacembelidae (3.14 %) represented by 2 species.

Only one flat fish was identified during the entire study period (*Cynoglossus cynoglossus*). The high percentage of fish species revealed by the family Cyprinidae might be due to the presence of an appropriate environment and river bottom that the member of this family prefers. The same results were observed somewhere else. Joadder (2012) reported the domination of this family in Atrai River of Naogaon district. Rahman (1989) showed that this family is dominant in the fresh water fishes of Bangladesh. It is clear that the Perciformes was the sub dominates order among the identified species. This is not a surprising result because this order is considered to be the largest within the teleost fish. Several authors have given a different fish species composition for a different section of Bangladesh (Bhuiyan 1964; Doha 1973; Bhuiyan et al 1992; Chowdhury et al 2010). Pertinent literature shows that 76 species were recorded from the Halda River by Emran (2009) in his study on fish fauna of the Halda River. No other records are available on this river after this study. Present study shows the presence of 63 species. Among these, 4 are newly recorded fish species in this river which were not recorded in earlier study (Emran 2009). 18 species were not recorded in the study which was earlier recorded by Emran (2009) because the lower portion and the estuarine zone were not included in the present investigation. However, a significant increase in number of species is observed. This increase in fish species could be explained on the basis that the present study used different fishing gears to collect the fish, in addition to the fish specimens obtained in different depths and different areas, from the fishermens. And it is also due to the migration phenomenon which increas the number of species in this river.

Our study revealed 5 migrant species (*Cynoglossus cynoglossus*, *Setipinna taty*, *Trypauchen vagina*, *Polynemus paradiseus* and *Odontamblyopus rubicundus*) from the Bay of Bengal, which represent 8 % of the total number of fish species recorded in the present study. There were 3 exotic species (*Ctenopharyngodon idella*, *Hypophthalmichthys molitrix*, *Cyprinus carpio*) also recorded which represent 1.89 % of total number of species.

The IUCN adopted Red List categories of animals and plants to evaluate the extinction risk of many species. The aim is to suggest the importance of conservation issues to the public and policy makers, as well as help the international community to try to reduce species extinction. A total of 54 native freshwater fish species of Bangladesh have been declared as threatened species by IUCN Bangladesh (2000). Among them 22 species were recorded in Halda River. Which is 34.92 % of the total identified species in the Halda River. Out of the twenty two, 3 species were found in Critically Endangered, 11 species were found in Endangered, 8 species belongs to Vulnerable (Table 1).

Table 1

## Bony fish species collected from the Upper Halda River

No.	Order	Family	Species
1	Beloniformes	Belonidae	<i>Xenentodon cancila</i> (Hamilton, 1822)
2		Clupeiformes	Clupeidae
3	<i>Corica soborna</i> Hamilton, 1822		
4	Engraulidae		<i>Setipinna phasa</i> (Hamilton, 1822)
5			<i>Setipinna taty</i> (Valenciennes, 1848)
6	Cypriniformes	Cobitidae	<i>Botia dario</i> ** (Hamilton, 1822)
7			<i>Lepidocephalichthys guntea</i> (Hamilton, 1822)
8		<i>Cirrhinus cirrhosus</i> (Bloch, 1795)	
9		<i>Catla catla</i> (Hamilton, 1822)	
10		<i>Amblypharyngodon mola</i> (Hamilton, 1822)	
11		<i>Labeo rohita</i> (Hamilton, 1822)	
12		<i>Labeo calbasu</i> ** (Hamilton, 1822)	
13		<i>Labeo gonius</i> ** (Hamilton, 1822)	
14		<i>Labeo bata</i> ** (Day, 1878)	
15		<i>Puntius sophore</i> (Menon, 1974)	
16	Cyprinidae	<i>Puntius terio</i> (Hamilton, 1822)	
17		<i>Esomus danricus</i> (Hamilton, 1822)	
18		<i>Rasbora rasbora</i> ** (Hamilton, 1822)	
19		<i>Pethia ticto</i> * (Hamilton, 1822)	
20		<i>Ctenopharyngodon idella</i> (Valenciennes, 1844)	
21		<i>Hypophthalmichthys molitrix</i> (Valenciennes, 1844)	
22		<i>Cyprinus carpio</i> (Linnaeus, 1758)	
23		<i>Chela cachius</i> (Hamilton, 1822)	
24		<i>Salmophasia bacaila</i> (Hamilton, 1822)	
25		<i>Danio dangila</i> (Hamilton, 1822)	
26	Cyprinodontiformes	Aplocheilidae	<i>Aplocheilus panchax</i> (Hamilton, 1822)
27	Osteoglossiformes	Notopteridae	<i>Notopterus notopterus</i> * (Pallas, 1769)
28		Ambassidae	<i>Chanda nama</i> * Hamilton, 1822
29			<i>Parambassis baculis</i> (Hamilton, 1822)
30		Anabantidae	<i>Anabas testudineus</i> (Bloch, 1792)
31			<i>Channa punctata</i> (Bloch, 1793)
32	Channidae	<i>Channa orientalis</i> * Bloch & Schneider, 1801	
33		<i>Channa striata</i> (Bloch, 1793)	
34		<i>Channa marulius</i> ** (Hamilton, 1822)	
35		Perciformes	<i>Apocryptes bato</i> (Hamilton, 1822)
36	<i>Pseudapocryptes elongatus</i> (Cuvier, 1816)		
37	<i>Glossogobius giuris</i> (Hamilton, 1822)		
38	Gobiidae		<i>Stigmatogobius sadanundio</i> (Hamilton, 1822)
39		<i>Trypauchen vagina</i> (Bloch & Schneider, 1801)	
40		<i>Odontamblyopus rubicundus</i> (Hamilton, 1822)	

No.	Order	Family	Species	
41		Nandidae	<i>Nandus nandus</i> * (Hamilton, 1822)	
42	Perciformes	Osphronemidae	<i>Trichogaster fasciata</i> Bloch & Schneider, 1801	
43		Sciaenidae	<i>Johnius coitor</i> (Hamilton, 1822)	
44		Polynemidae	<i>Polynemus paradiseus</i> Linnaeus, 1758	
45		Pleuronectiformes	Cynoglossidae	<i>Cynoglossus cynoglossus</i> (Hamilton, 1822)
46			<i>Sperata aor</i> * (Hamilton, 1822)	
47		Bagridae	<i>Mystus vittatus</i> (Bloch, 1794)	
48			<i>Mystus tengara</i> ** (Hamilton, 1822)	
49			<i>Mystus gulio</i> (Hamilton, 1822)	
50		Clariidae	<i>Clarias batrachus</i> (Linnaeus, 1758)	
51		Heteropneustidae	<i>Heteropneustes fossilis</i> (Bloch, 1794)	
52		Pangasiidae	<i>Pangasius pangasius</i> *** (Hamilton, 1822)	
53	Siluriformes		<i>Neotropius atherinoides</i> (Bloch, 1794)	
54			<i>Eutropiichthys vacha</i> *** (Hamilton, 1822)	
55			Schilbeidae	<i>Clupisoma garua</i> *** (Hamilton, 1822)
56				<i>Silonia silondia</i> ** (Hamilton, 1822)
57				<i>Ailia coila</i> * (Hamilton, 1822)
58				<i>Wallago attu</i> (Bloch & Schneider, 1801)
59			Siluridae	<i>Ompok pabda</i> ** (Hamilton, 1822)
60		<i>Ompok bimaculatus</i> ** (Bloch, 1794)		
61	Synbranchiformes	Mastacembelidae	<i>Mastacembelus armatus</i> ** (Lacepede, 1800)	
62				<i>Macrognathus aculeatus</i> (Bloch, 1786)
63				Synbranchidae

\*\*\*\* Critically Endangered; \*\*\* Endangered; \*\* Vulnerable.

**Conclusions.** The knowledge accumulated so far shows that the Halda River holds wide fish diversity. Since many of species are still unexplored, a much greater sampling effort is necessary to produce a complete scenario of the fish diversity in the basin, where potentially several new species may be discovered. Moreover, this river is currently the main source of wild fry of Indian carps of the country, which generates a high fishing pressure on its natural stocks. Under this circumstance, a better understanding of the diversity and distribution of fishes in the Halda River is urgently needed.

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