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Study of aquatic biodiversity of Nethai River in Bangladesh

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ABSTRACT

A total number of 57 species of fishes, three species of prawn, one species of crabs and four species of reptiles were identified so far from the Nethai River in Bangladesh. About 10 types of fishing gear and craft were found in operation. Increasing rate of seine net (Kapuri jal) and gill net (current jal) were identified as detrimental gear killing including different species during post spawning periods. The increasing rate in exploitation of the water bodies a thread to aquatic biodiversity of the Nethai River. The total production of upper and lower stretch was decreased from 82.79 to 37.25 mt and 92.82 to 41.45 mt within five years and the total production had sharply decreased from 100% to 42.62% and 100% to 44.07% over the same period. As a result, a number of commercial important fish species like as major carps, mohasher (*Tot tor, Tor putitora*), nandina (*Labeo nandina*), olive barb (*Puntius sarana*) and reptiles (*Kachuga kachuga* and *Morenia petersi*) was extinct.

Key wards: Biodiversity, Extinct, Endangered, Vulnerable, Lower risk, Threatened.

Nethi River is an important river in Dhubaura Upazilla of Mymensingh district. The upper region of Nethai River is hilly area of Shibbari under the district of Thura, Maghaloya, India. In its 32-35 km long course, the river flows across the Rangsingpore from northern to southern Roykandulia through the Upazilla of Dhubaura, Mymensingh before joining the Kangshow River. The water flow in the river is continuous. During monsoon, the water flow comes down from the upper region of hilly Meghaloya, India and water flow does not confine within the banks. As a result, it seriously over floods four union of Dhubaura Upazilla in every year.

Once this river had abundance of native wild fish species, crabs and reptiles. Due to over-exploitation and various ecological changes in the Nethi River, some important fish species, and reptiles have disappeared because of changing aquatic ecosystems. The downstream of the river system is siltated, which reduces the rate of water flow, habitat degradation and reduced the feeding and breeding grounds of fishes. Indiscriminate destructive fishing practices, soil erosion, siltation, construction of flood control and drainage structures and agro-chemicals have caused havoc to the aquatic biodiversity in Bangladesh. The present study was conducted to determine the abundance, species combination, catch statistics and related aspects of Nethi River in two flood phases: the early and the deep flood phase. The early flood phase (April to early June) occurs in the early monsoon season when the water level in rivers and basin is relatively low, whereas the deep flood phase (June to September) begins when the water level in the Nethi and Kangshow River, causing deep flooding in the four unions of Dhubaura Upazilla, Mymensingh and Gaukandia union of Durgapur Upazilla, Netrokona. Floodwater in flood plains starts receding in the post-monsoon season (October to December). The water recession starts at shallow areas and water surface area shrinks, fishes and other aquatic organism move with water flow into deep water area of the river. Aquatic biodiversity of an area have been studied in relation to ecology of rivers, flood plain and the entire catchments area of a water body.

MATERIALS AND METHODS

The present study was conducted during 2001-2005 with particular emphasis on soil and water quality, biological productivity and biotic communities and status of fishery exploitation. For this purpose the river course was divided into upper and lower stretches. 1.

The river courses of Bhuynpara and Dhigolbadh (boarder of India) to Kalshindur constitute the Upper stretch and 2. Kalshindur to Roykandulia village via Rangsingpore had constituted the Lower stretch, in which the Nathai joins with the Kangshow River.

Water Quality Parameters, plankton and sampling of fish

Water temperature was recorded using a Celsius thermometer and transparency was measured by using a Secchi disc of 20 cm diameter. Dissolved oxygen and pH were measured directly using a digital electronic oxygen meter (YSI Model 58) and an electronic pH meter (Jenway Model 3020). Alkalinity was determined by titrimetric method (Clesceri *et al.*1989). The plankton sample was collected every week using 0.55 blotting silk plankton net and later analyzed numerically with the help of Sedgewick-Rafter counting cell (SR-cell) under a compound microscope (Clesceri *et al.*1989). Calculation of the abundance of plankton was done by Stirling, 1985.

Each stretch of the river was sampled simultaneously during winter (mid November to February), premonsoon (February to April), monsoon (May to August) and post monsoon (September to mid November) for assessment of fish abundance and availability. The present study, being a rapid survey, gives only a broad picture of a stock of fishes, crabs and reptles that could be obtained through market survey (Ghoshgaon bazar, Kalshindur bazar, Rangsingpore bazaar, Purakandulia bazaar, Charuapara bazar and Dhubaura bazar) and interaction with fisherman in the riverside and even in the river.

The data were analyzed through one way ANOVA using MSTAT followed by Duncan's Multiple Range Test to find out whether any significant difference existed among treatment means (Zar, 1984).

RESULTS AND DISCUSSION

Physical characteristics

Soil texture of Nathi river bed varied from sandy to loam sand. In the upper stretch, structure of the bed appeared to have predominantly sandy and in the lower stretch the soil was recorded sandy to loam.

The results of the physico-chemical parameters of the Nethi River, were are furnished in Table 2, which included temperature, transparency, pH, dissolve oxygen and alkalinity of water were found to be in a normal range.

Plankton population

The plankton abundance in Nethai River is presented in Table 3 which shows that the quantity of phytoplankton and zooplankton was predominant in the lower stretch of the river. Plankton population was much less in the upper stretch of the river where running water flows throughout the year. Twenty seven genera of phytoplankton were recorded from the upper stretch and 30 genera from the lower stretch. The phytoplankton population comprised of 4 broad groups viz., Chlorophyceae, Bacillariophyceae, Cyanophyceae and Euglenophyceae. The zooplankton population of the Nethai River was comprised of two major groups viz., Rotifera and Crustacea. A total number of 9 and 12 genera of zooplankton were recorded from upper stretch and lower stretch. Plankton studies showed that chlorophyceae is the only group which occurred throughout the river course indicating the freshness of the environment.

Craft and gears used

Fishermen generally used boat for transport of nets and related materials during fishing, for fish catch they use seine net or ber jal, komor jal, thela jal, dharma jal, bua jal, lift net, cast net, current jal and various type fish trap, hook and line according to season and availability of different species of fishes.

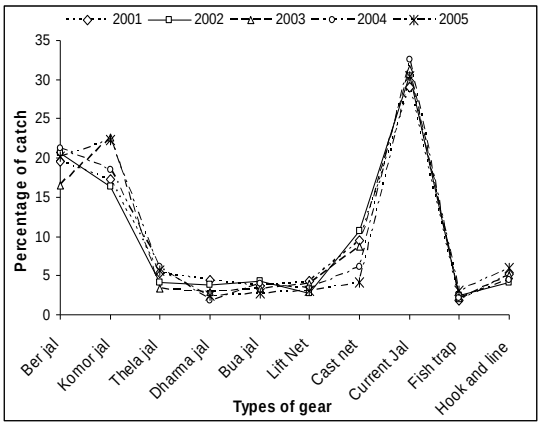

Figure 1. Percent composition of catches by different types of fishing gear, 2001- 2005.

It is found from figure 1 that fishing efforts were generally increasing by using illegal fishing gear like current jal and bar jal (kaperi jal). The percentage of fish catch statistics by using current jal and bar jal (kaperi jal) were 28.60%, 30.50%, 31.40%, 32.50% and 33.40% and 19.30%, 20.4%, 21.30%,22.2% and 22.3% in the year 2001, 2002, 2003, 2004 and 2005, respectively. As a result, a significant reduction in the abundance fish was noted in the Nethi River every year.

Fish catch and composition

Estimation of catch and catch composition in riverine fisheries pose considerable problems due to absence of specific landing and marketing centers. But the present study, being a survey, gives only a broad picture of a stock of fishes, crabs and reptiles that could be obtained through collection of different species directly from fishers" catch, market survey. Local knowledge as well as interaction with fishers' in the riverside and even in the river considered also. An organized sampling program was run for a long time to get a true picture of the catch and composition.

The total catch statistics of fishes in the upper stretch and lower stretch of Nethi River was recorded to be 82.35, 65.43, 52.93, 43.67 and 35.70 mt and 92.87, 70.89, 62.62, 51.65 and 40.93 mt in the year 2001, 2002, 2003, 2004 and 2005, respectively. It was found that the total catch of fishes had sharply decreased in the upper stretch and lower stretch, respectively. Commercial important major carps mohasseer (*Tot tor*), putitor mohasher (*Tor putitora*), nandina (*Labeo nandina*), local sarpunti, (*Puntius sarana*) and Reptiles (*Kachuga kachuga* and *Morenia petersi*) were rarely found in the year of 2001 to 2003 in the upper and lower stretch. But these species were extinct in 2004-2005. A total of about 65 species of wildlife have been found from the Nethai River in 2001-2005. The catch statistics of fishes from the upper stretch was found to be 100%, 79.53%, 62.27%, 53.03% and 42.62% and in the lower stretch 100%, 76.33%, 67.43%, 55.91% and 44.07% in the year 2001, 2002, 2003, 2004 and 2005, respectively (Figure 2 & 3).

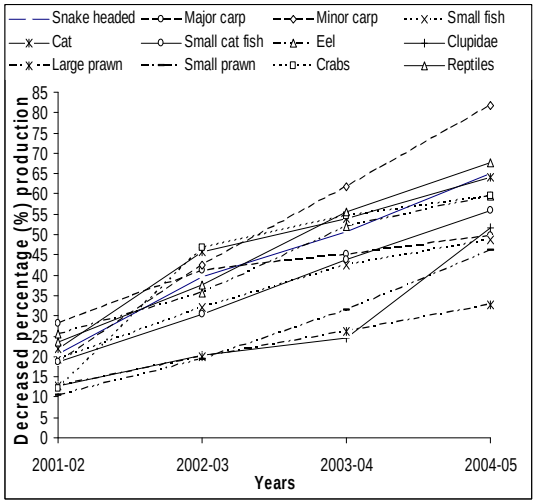

Figure 2. Production percentage of different groups of wildlife in the upper stretch of Nethai River.

There is a significant variation ($P<0.05$) in the catch statistics of upper and lower stretches.

A total of four species of fresh water turtles were namely *Lissemys punctata*, *Kachuga tecta*, *Kachuga kachug and Morenia petersi* were found. The Nethai in its 32-35 km stretch between

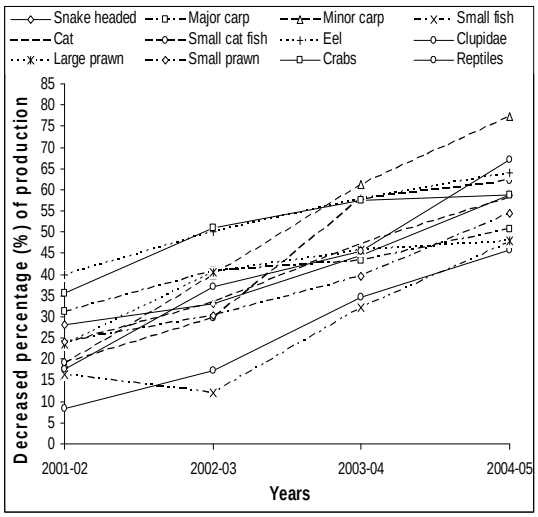

Figure 3. Production percentage of different groups of wildlife in the lower stretch of Nethai River.

Bhuynapara and Roykandulia have been investigated during 2001-2005. It was found that fishing effort with mesh size was increased in every year. As a result, average size and number of individual fish declined every year.

During five year investigation period, the physico-chemical factors and plankton were found to be in normal level. A significant rise in pH during pre-monsoon followed by a drop in monsoon was noted. Oxygen values were uniformly high in upper stretches (7.00-8.22 mg/L) and relatively lower (5.80-7.74 mg/L) in the lower stretch. Similar phenomena were noted by Saha *et al.* (1988).

It was found that fishing effort with various type of fishing gear (especially mesh size and current jal) and fish trap mesh size and current jal (gill net) uses had been increased in every year but average size and number of individual fish were reduced in the Nethai River. Cast net **(**Kepla Jal/ Jaki jal) is used whole year in the Nethi River. This net is also used in other area of Bangladesh (Ahmed, 1962). The catch statistics of fishes in the upper stretch declined from 100% to 42.62% and in the lower stretch 100% to 44.07% within five years, respectively which was very similar to the study of Moyle and Leidy, 1992 who found that worldwide 20% of all freshwater species are extinct, endangered or vulnerable. The total catch statistics data of fishes in the upper and lower stretch indicated that percentage of different group of fishes had sharply decreased in every year. As a result, commercial important major carps mohasseer (*Tot tor*), putitor mohasher (*Tor putitora*), nandina (*Labeo nandina*), local sarpunti (*Puntius sarana*) and reptiles (*Kachuga kachuga* and *Morenia petersi*) were extinct in 2004-2005 which is more or less similar to the report of IUCN, (1996-98).

Due to over-exploitation and various ecological changes in natural aquatic ecosystem of Nethai River, these commercial important major carps are in the verge of extinction, which are similar to the findings of Sarker (1993). Among carps *L. gonia, L. rohita, L. mrigala, C. carpio* among catfishes *M. seenghala, M. aor, Rita rita, Mystus menoda* and *W. attu* occurred significantly in the study area. Dhela, *Rohtee cotio* was declining day by day. It was also found that the number of Crabs, *Stylla sp.* and Reptiles, *Lissemys punctata, Kachuga tecta*, were also declining day by day. During winter season *Kachuga tecta* was caught in the pile fishery and other fish traps. Turtile, *Morenia petersi* was caught in the Nethi River. This species has been reported to be distributed between the Ganges River and the Brahmaputra River and the species is endemic to Bangladesh (Khan, 1982). Das (1991) mentioned that the Bengal Eyed Turtile, *Morenia petersi* is restricted to the eastern part of the Ganges and the western part of the Brahmaputra. Turtles in the Nethai River have been declining because of dewaterization of its habitat for irrigation in the winter season. Another reason is destruction in its breeding ground and nesting sites. Over exploitation for local consumption and trade indiscriminately posses a threat to all species of turtles as well.

The result of the present study demonstrated that the fish stocks have been depleted due to construction of flood control barrage, soil erosion, siltation and drainage structures and agro-chemicals. The downstream of the river system is siltated, which reduces the rate of water flow and causes habitat degradation. Domestic organic wastes (sewage) directly or indirectly through canals or drains to the rivers or other water bodies are polluting the

aquatic ecosystem. The genetic stock structure of fish populations is reduced due to pollution and destructive fishing practices. Indiscriminate killing of fish occurs due to the use of pesticides in improper doses, use of forbidden chemicals, aerial spray of chemicals used for paddy field etc. which was very much similar to the study of Mazid (2002). In addition, indiscriminate destructive fishing practices have caused havoc to the aquatic biodiversity of Nethai River. As a result, the ecosystem and biological diversity of the Nethi River have been depleting at an unprecedented rate. Similar findings were noted by Hussain and Hossain 1999. Intervention to control floods, adoption of new agricultural technologies and construction of road networks has altered the ecology of Nethai River significantly which was similar to the report of Khan (1993) and Ali (1991). Stock of the wildlife broad fishes and other species in the breeding ground have suffered significant damages, resulting in a reduction of biodiversity as well as a decline in the socioeconomic importance of Nethai River as a source of food and materials of livihood which was very similar to the findings of Nishat 1993 and Zaman 1993. Dister (1990) described flood plains as strips of bottom land following the courses of river and streams in the case of central Europe. They are characterized by a transition between flood and dry stages, the most important ecological factor. Other ecological factors, such as dynamics of ground water level, erosion process, material transport and sedimentation, depend in the fluctuation in the water level. Inundation is the ecological link between individual floodplain sections and between these and rivers which is very similar to the investigation Nethai River.

Table 1 Physical features of sediment of the river Nathi sand and clay also

Location	Soil texture of the river bed (%)		
	Sandy	Loam sand	Clay
Upper stretch	89.2±5.62	8.6±4.22	2.2±2.32
Lower stretch	62.0±6.11	18.5±3.88	19.5±4.80

Figures with different superscripts in the same row varied significantly (P > 0.05).

Table 2 Physico-chemical parameters of experimental Nethi River

Parameters	Upper stretch	Upper stretch
Temperature (^oC)	26.29±4.81^b (18.3-30.50)	27.35±5.01^a (18.40-31.10)
Transparency (cm)	30.88±6.60^b (19.33-40.60)	46.22±8.03^a (16.80-69.28)
pH	7.88± 0.28 (7.60-8.04)	7.11±1.06 (5.80-8.00)
Dissolved oxygen (mg/L)	7.59±0.42 (7.00-8.22)	6.85±0.66 (5.80-7.74)
Alkalinity (mg/L)	117.97±15.14 (92.0-141.66)	119.437±17.56 (82.80-146.40)

Figures with different superscripts in the same row varied significantly (P > 0.05). Figures in the parenthesis indicate the range.

Table 3 Mean variation of phytoplankton (individual/ml) and zooplankton (organism/ml) population in the Nethi River

Plankton group	Upper stretch	Lower stretch
Chlorophyceae	11.50±5.34^b (12.33-28.46)	18.86±8.96^a (16.42-47.44)
Bacillariophyceae	18.57±7.02^b (17.30-40.62)	24.04±11.20^a (20-52.34)
Cyanophyceae	08.22±3.78^b (10.22-22.00)	11.37±6.55^a (18.22-35.33)
Euglenophyceae	0.00±0.00	1.44±1.02 (0.00-3.2)
Total Phytoplankton (10^3 cells/L)	38.29±12.17^b	55.71±14.49^a
Rotifera	4.42±2.45^b (4.1-5.16)	6.12±3.00^a (4.2-7.82)
Crustaceae	3.08±2.46^b (2.2-3.80)	4.04±3.61^a (3.0-5.22)
Others	1.65±0.35^b (1.1-2.03)	1.77±0.39^a (1.80-2.2)
Total Zooplankton (10^3 organisms/L)	9.15±1.39^b	11.93±2.16^a

Figure in the same row having the same superscript are not significantly different (P>0.05). Figures in the parenthesis indicate the range

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Table 4 Catch statistics and status of inland fishes of Nethai River in the year 2001-2005
Status code: E: Extinct, CR: Critically Endangered, EN- Endangered, VU-Vulnerable, LR- Lower risk, NO- Not threatened (As per IUCN, 2000)

SL No	Local name	Scientific name	Production (ton)										Status
			Upper stretch					Lower stretch					
			2001	2002	2003	2004	2005	2001	2002	2003	2004	2005	
	Knife fish												
1	Chitol	*Notopterus chitala*	0.94	0.83	0.54	0.44	0.12	1.08	0.89	0.61	0.5	0.25	EN
2	Foli	*Notopterus notopterus*	0.38	0.34	0.15	0.08	0.05	0.39	0.09	0.33	0.13	0.08	EN
3	Kaikka/Kakila	*Xenentodon cancila*	1.88	1.41	1.24	1.06	0.95	2.2	1.66	1.52	1.41	1.18	LR
		Sub-total	3.2 ±0.76	2.58 ±0.54	1.93 ±0.16	1.58 ±0.30	1.12 ±0.26	3.67 ±0.24	2.64 ±0.23	2.46 ±0.21	2.04 ±0.20	1.51 ±0.19	
	Major carp												
4	Catla	*Catla catla*	1.01	0.98	0.88	0.71	0.59	1.21	1.1	0.99	0.88	0.61	EN
5	Rui/Ruhit	*Labeo rohita*	1.21	1.03	0.98	0.89	0.84	1.35	1.13	1.04	0.98	0.81	EN
6	Mrigal/ Mirka	*Cirrhinus mrigala*	1.56	1.05	0.97	0.85	0.83	1.66	1.24	1.16	0.97	0.82	EN
7	Mashol /Mahashol	*Tot tor*	0.1	0.08	0.04	0.02	0.1	0.09	0.07	0.04	0.01	0.0	E
8	Tutitor mohasher	*Tor putitora*	0.08	0.02	0.01	0	0	0.04	0.03	0.01	0.0	0.0	E
9	Nandina/Nandil	*Labeo nandina*	0.21	0.11	0.04	0.0	0.0	0.31	0.12	0.09	0.0	0.0	E
10	Kalbaus/ Kaila	*Labeo calbasu*	2.09	1.3	1.12	1.01	0.88	2.99	1.62	1.29	1.14	1.02	EN
11	Ghonia	*Labeo gonius*	2.02	1.45	1.25	1.02	0.81	2.01	1.43	1.21	1.04	0.98	EN
12	Common carp	*Cyprinus carpio*	3.9	2.76	2.58	2.19	2.06	3.4	2.24	2.46	2.38	2.22	VU
		Sub-total	12.18 ±1.23	8.75 ±0.82	7.15 ±0.66	6.69 ±0.61	6.12 ±0.64	13.06 ±1.21	8.98 ±0.75	7.75 ±0.78	7.4 ±0.74	6.46 ±0.68	
	Mainor carp												
13	Bata/ Bhagna	*Cirrhinus reba*	1.29	1.05	0.84	0.52	0.29	1.42	1.09	0.89	0.66	0.41	EN
14	Bhangna bata /Bata	*Labeo bata*	1.1	1.01	0.79	0.6	0.25	1.21	1.08	0.92	0.68	0.38	EN

SL No	Local name	Scientific name	Production (ton)										Status
			Upper stretch					Lower stretch					
			2001	2002	2003	2004	2005	2001	2002	2003	2004	2005	
15	Puda/Saralpunti	*Puntius sarana*	0.58	0.36	0.08	0.01	0	0.86	0.66	0.29	0.01	0	E
		Sub-total	2.97 ±0.61	2.42 ±0.11	1.71 ±0.43	1.13 ±0.31	0.54 ±0.65	3.49 ±0.08	2.83 ±0.26	2.1 ±0.45	1.35 ±0.09	0.79 ±0.34	
16	**Small fish** Mola/ Moya	*Amblypharyngodon mola*	0.94	0.85	0.72	0.61	0.53	1.01	0.91	0.86	0.79	0.53	EN
17	Chela/Chep Chela	*Chela cachius*	0.56	0.46	0.40	0.37	0.34	0.68	0.55	0.51	0.5	0.42	EN
18	Laubuca/kashkhaira	*Chela laubuca*	0.47	0.38	0.35	0.29	0.35	0.62	0.61	0.55	0.52	0.44	EN
19	Baspata/ Chapchela	*Danio devario*	0.41	0.31	0.3	0.26	0.28	0.55	0.41	0.4	0.41	0.36	EN
20	Dhela/ Dhiphali	Rohtee *cotio*	0.46	0.42	0.38	0.19	0.01	0.44	0.33	0.31	0.14	0.02	CR
21	Chola punti	*Puntius chola*	0.44	0.36	0.31	0.24	0.23	0.45	0.37	0.32	0.33	0.23	EN
22	Taka punti	*Puntius conchonius*	0.44	0.43	0.38	0.36	0.35	0.49	0.39	0.37	0.33	0.28	EN
23	Phutani punti	*Puntius phutunio*	0.69	0.56	0.44	0.41	0.38	0.61	0.51	0.45	0.38	0.34	EN
24	Jatpunti/Vali Punti	*Puntius Sophore*	0.46	0.45	0.38	0.43	0.48	0.52	0.44	0.37	0.32	0.33	EN
25	Teri punti	*Puntius terio*	0.52	0.4	0.37	0.33	0.32	0.41	0.38	0.37	0.31	0.31	EN
26	Tit Punti	*Puntius ticto*	0.69	0.55	0.47	0.36	0.36	0.59	0.54	0.49	0.4	0.39	VU
27	Fulchela	*Salmostoma phulo*	0.59	0.41	0.37	0.29	0.29	0.61	0.54	0.46	0.37	0.31	EN
28	Chanda	*Chanda nama*	1.01	0.85	0.68	0.67	0.36	1.22	0.95	0.83	0.82	0.61	EN
29	Chanda	*Pseudambasis bacuculis*	0.55	0.44	0.39	0.31	0.5	0.64	0.56	0.57	0.41	0.28	EN
30	Ranga chanda	*Pseudambasis ranga*	0.6	0.41	0.36	0.31	0.3	0.76	0.61	0.7	0.47	0.34	EN
31	Rani/Botya	*Botia dario*	0.54	0.46	0.38	0.28	0.15	0.66	0.53	0.74	0.49	0.35	EN
32	Rani	*Botia dayi*	0.44	0.35	0.33	0.29	0.19	0.53	0.49	0.59	0.3	0.22	EN
33	Gutum	*Lepidocephalus gontea*	1.05	0.69	0.38	0.36	0.35	1.25	0.96	1.27	0.7	0.56	EN

Continued

SL No	Local name	Scientific name	Production (ton)										Status
			Upper stretch					Lower stretch					
			2001	2002	2003	2004	2005	2001	2002	2003	2004	2005	
34	Potka	*Tetrodon cutcutia*	1.28	1.06	0.85	0.66	0.46	1.34	1.15	1.49	1.06	0.8	EN
35	Baila/ bele	*Glossogobus giuris*	0.99	0.74	0.67	0.52	0.5	1.06	0.83	1.04	0.76	0.46	EN
		Sub-total	13.13 ±026	10.58 ±0.20	8.92 ±0.36	7.54 ±0.14	6.72 ±0.12	14.44 ±0.29	12.06 ±0.23	12.69 ±0.32	9.81 ±0.22	7.58 ±0.61	
	Cat fish												
36	Ayre/Aor	*Mystus aor*	2.08	1.91	1.11	0.96	0.78	2.16	2.01	1.88	1.37	0.99	EN
37	Guizza/ Guizza	*Mystus seenghala*	1.86	1.46	1.08	0.89	0.65	1.66	1.51	1.12	0.95	0.88	CR
38	Baghair	*Bagarius yarrellii*	0.92	0.66	0.57	0.41	0.29	0.99	0.77	0.69	0.46	0.33	CR
39	Shillong	*Silonia silondia*	1.06	0.97	0.86	0.61	0.43	1.46	1.35	1.03	0.98	0.51	EN
40	Rita	*Rita rita*	2.25	1.26	1.02	0.83	0.65	2.35	1.13	1.07	0.92	0.61	EN
41	Gang Magur	*Mystus menoda*	1.86	1.25	1.01	0.9	0.81	1.94	1.38	1.08	0.99	0.91	EN
42	Chaka	*Chaca chaca*	1.05	0.99	0.88	0.68	0.55	1.12	1.03	1	0.88	0.76	EN
43	Boal	*Wallago attu*	5.99	4.82	3.22	2.59	1.99	7.59	5.53	4.96	3.58	3.06	LR
		Sub-total	17.07 ±1.64	13.32 ±1.33	9.75 ±0.83	7.87 ±0.67	6.15 ±0.52	19.27 ±2.15	14.71 ±1.54	12.83 ±1.40	10.13 ±0.97	8.05 ±0.86	
	Small cat fish												
44	Bujuri	*Mystus tengra*	2.52	2.13	1.85	1.56	1.05	2.63	2.24	2.01	1.74	1.17	VU
45	Tengra	*Mystus vitttus*	2.13	1.65	1.24	1.04	0.95	2.33	1.78	1.43	1.13	1.01	EN
46	Gulsa	*Mystus cavasius*	1.95	1.54	1.32	0.95	0.73	1.89	1.57	1.48	1.22	0.99	EN
47	Kani Pabda	*Ompok bimaculatus*	1.53	1.37	1.28	1.02	0.91	1.88	1.46	1.28	1.09	0.98	EN
48	Madhu Pabda	*Ompok pabda*	1.6	1.22	1.08	0.95	0.77	2.04	1.69	1.42	1.1	0.98	EN
49	Kajuli	*Ailia coila*	0.85	0.45	0.36	0.32	0.25	0.99	0.79	0.64	0.34	0.28	EN
50	Gharua	*Clupisoma garua*	0.93	0.81	0.72	0.61	0.49	0.98	0.84	0.72	0.56	0.42	EN

Continued

SL No	Local name	Scientific name	Production (ton)										Status
			Upper stretch					Lower stretch					
			2001	2002	2003	2004	2005	2001	2002	2003	2004	2005	
51	Muri Bacha	*Clupisoma murias*	0.98	0.87	0.66	0.46	0.32	1.15	0.87	0.77	0.52	0.32	EN
52	Bacha	*Eutropiichthys vacha*	0.69	0.56	0.45	0.33	0.26	0.83	0.72	0.64	0.52	0.36	EN
53	Batashi	*Pseudontropius atheronoides*	1.11	1.02	0.98	0.79	0.58	1.56	1.22	1.06	0.86	0.77	EN
		Sub-total	14.29 ±0.62	11.62 ± 0.52	9.94 ±0.36	8.03 ±0.38	6.31 ±0.29	16.28 ±0.62	13.18 ± 0.51	11.45 ±0.46	9.08 ±0.43	7.28 ±0.34	
54	**Eels** Baim	*Mastacembalus armatus*	2.26	1.98	1.58	1.12	1.01	2.85	1.68	1.34	1.17	1.08	VU
55	Kuicha	*Monopterus cuchia*	2.86	1.98	1.72	1.34	1.06	2.97	1.82	1.56	1.29	1.02	EN
		Sub-total	5.12 ±0.42	3.96 ±0.35	3.30 ±0.39	2.46 ±0.16	2.07 ±0.04	5.82 ±0.08	3.50 ±0.10	2.90 ±0.16	2.46 ±0.08	2.10 ±0.04	
56	**Clupidae** Hilsha (Jatka)	*Hilsa illisha*	0.26	0.13	0.09	0.06	0.06	0.15	0.11	0.1	0.08	0.06	EN
57	Chapila	*Gadusia chapra*	1.24	1.08	0.99	0.9	0.6	1.22	1.12	1.01	0.8	0.66	VU
		Sub-total	1.24 ±0.42	1.08 ±0.35	0.99 ±0.39	0.90 ±0.16	0.60 ±0.04	1.22 ±0.08	1.12 ±0.10	1.01 ±0.16	0.80 ±0.08	0.66 ±0.04	
58	**Large Prawn** Golda Isa	*Machrobrachiu rosenbergii*	1.26	1.1	1.01	0.93	0.85	1.88	1.44	1.12	1.02	0.98	EN
		Sub-total	1.26 ±0.0	1.1 ±0.0	1.01 ±0.0	0.93 ±0.0	0.85 ±0.0	1.88 ±0.0	1.44 ±0.0	1.12 ±0.0	1.02 ±0.0	0.98 ±0.0	
59	**Small prawn** Gura Isa	*Nematopalaemon tenuipes*	3.11	2.60	2.40	1.9	1.45	3.49	2.47	2.38	1.98	1.55	NO
60	Gul Isa	*Machrobrachium malcolmsnii*	2.02	2.0	1.84	1.61	1.31	2.96	2.42	2.12	1.92	1.41	VU

Continued

SL No	Local name	Scientific name	Production (ton)										Status
			Upper stretch					Lower stretch					
			2001	2002	2003	2004	2005	2001	2002	2003	2004	2005	
		Sub-total	5.13 ±0.77	4.6 ±0.42	4.24 ±0.39	3.51 ±0.21	2.76 ±0.09	6.45 ±0.37	4.89 ±0.04	4.5 ±0.18	3.9 ±0.04	2.96 ±0.1	
	Crabs												
61	Kakra	*Stylla serrata*	2.51	2.21	1.34	1.14	1.02	2.62	1.69	1.28	1.11	1.08	VU
		Sub-total	2.51 ±0.0	2.21 ±0.0	1.34 ±0.0	1.14 ±0.0	1.02 ±0.0	2.62 ±0.0	1.69 ±0.0	1.28 ±0.0	1.11 ±0.0	1.08 ±0.0	
	Reptiles												
62	Spotted Flapshell	*Lissemys punctata*	1.68	1.46	1.22	1.01	0.93	1.8	1.5	1.27	1.08	0.68	E
63	Common Roof Turtile	*Kachuga tecta*	1.42	1.04	0.91	0.61	0.45	1.51	1.29	1.08	0.95	0.59	E
64	Painted Roof Turtile	*Kachuga kachuga*	0.75	0.51	0.35	0.18	0.00	0.84	0.68	0.54	0.38	0.19	EN
65	Bengal Eyed Turtile	*Morenia petersi*	0.4	0.24	0.17	0.09	0.00	0.52	0.38	0.24	0.14	0.08	EN
		Sub-total	4.25 ±0.59	3.25 ±0.54	2.65 ±0.39	1.89 ±0.42	1.38 ±0.39	4.67 ±0.59	3.85 ±0.52	3.13 ±0.47	2.55 ±0.45	1.54 ±0.29	
		Total	82.79 ±5.66	66.0 ±4.39	52.93 ±3.60	43.67 ±3.07	35.10 ±2.52	92.87 ±6.33	70.89 ±5.01	62.62 ±4.62	51.65 ±3.68	40.99 ±3.03	

REFERENCES

Ahmed, K.K., Haque, G.C. Halder and S.B. Saha. 1997. Ecological studies on the planktonic organisms of Kaptai Lake. *Bangladesh J. Agrl*., **22**: 63-67.

Ali, M. Y. 1991. Towards sustainable development: fisheries resources of Bangladesh International Union for Conservation of nature and Natural Resources. The World Conservation Union. National Conservation Strategy of Bangladesh and Bangladesh Agricultural Research Council.96p.

Clesceri, L. S., A. E. Greenberg and R. R. Trussell. 1989. Standard Methods of the Examination of Water and Wastewater (17th ed.). American Public Health Association, American Water Works Association and Water Pollution Control Federation, 1015 Washington D. C., USA 20036, 10-203.

Das, I. 1991. Colour Guide to the turtles and Tortoises of the Indian sub continent. R& A publishing Ltd.

Dister Email. 1990. Floodplain protection in Central Europe. World Wildlife Fund (WWF) Institute of Floodplains Ecology Visiting Card 31/90, Germany.

Hussain, M. G. and M. A. Hossain. 1999. Controlled breeding technology and step for conservation of gene pool of certain endangered fish species of Bangladesh. *Fish. News Letter*, **7**(1-3):2-3.

IUCN, Bangladesh. 1998. List of threatened animals of Bangladesh. Paper presented in the Special Workshop on Bangladesh Red Book of Threatened Animals, 22 February 1998, Dhaka, Bangldesh. 13 pp.

IUCN, 2000. Red book of threatened Fishes of Bangladesh. IUCN – The World Conservation Union xii+116 pp.

Khan, H. R.1993. Water development activities and their impacts on wetlands. P23-32 .*In*: A. Nisat, Z. Hossain, M. K. Roy, and Ansarul Karim (eds.). Freshwater wetlands in Bangladesh: Issues and Approaches for management. IUCN, Gland Switzerland. xii+283pp.

Khan, M. A. R.1982. Chelonians of Bangladesh and their conservation, *J. Bombay Nat. Hist. Soc*. **79** (i): 110-116.

Mazid M. A. 2002. Development of Fisheries in Bangladesh: Plans and Strategic for Income Generation and Poverty Alleviation. Fisheries Research Institute, Mymensingh, Bangladesh. 78-79 pp.

Moyle, P. L. and R. A. Leidy. 1992. Loss of biodiversity in aquatic ecosystem: Evidence from Fish Fauna. *In*: P. L. Fielder and H. L. Jani (eds). Conservation of Biology: the Theory and Practice of Nature Conservation, Preservation and Management. Chapman and Hall, New York, USA. 562 p.

Nishat, A. 1993. Freshwater wetlands in Bangladesh: status and issues. P.9-22 *In*: A. Nishat Z. Hossain, M. K. Roy, and Ansarul Karim (eds.). Freshwater wetlands in Bangladesh: Issues and Approaches for management. IUCN, Gland Switzerland. xii+283pp.

Saha, S. B., M. V. Gupta and M. Sahabuddin. 1988. Studies on the comparative efficacy of different fertilizers on the production of silver carp fry. *Bangladesh J. Fish*., **11** (2): 11-20.

Sarker, S. U. 1993.Faunal diversity and their conservation in freshwater wetlands. In.: Nisat A. Hussain Z. Roy M. K. and Karim A. (eds.). Freshwater wetlands in Bangladesh-issues and approaches for management. IUCN, The world Conservation Union. 105-122 pp.

Stirling, H. P. 1985. *Chemical and Biological Methods of Water Analysis for Aquaculturist.* Institute of Aquaculture, University of Stirling, Scotland, UK. 119 p.

Zaman, S. M. H. 1993. Agricultural development and sustainablility of wetlands. P 63-178 *In*: A. Nishat Z. Hossain, M. K. Roy, and Ansarul Karim (eds.). Freshwater wetlands in Bangladesh: Issues and Approaches for management. IUCN, Gland Switzerland. xii+283pp.

Zar, J. H. 1984. *Biostatistics*. Prentice-Hall, Inc. Englewood Cliffs, New Jersey, USA.718