ICTHYOFAUNA OF MADHUMATI RIVER AT MOHAMMADPUR, MAGURA

Md. Anichur Rahman, AHM Shafullah Habib*
Shova Saha and Mallika Saha

Department of Zoology, Faculty of Life and Earth Sciences
Jagannath University, Dhaka-1100, Bangladesh

Abstract: The investigation was conducted on the present situation of fish biodiversity and abundance of fish fauna at two different points of Madhumati River at Mohammadpur upazilla under Magura district from October 2018 to September 2019. A total of 83 species of fresh water fish species were recorded belonging to 58 genera of 28 families under 11 orders. Cypriniformes was recorded as the dominant order comprising 26 species constituting 31% of the total. According to IUCN 59% of fish species were Least Concern, 12% were Vulnerable, 11% were Endangered, 9% were Near Threatened, 1% of each were Data Deficient and Critically Endangered locally, and 7% Exotic fish species were also enlisted. Annual value of Shannon diversity index (H) was 1.974 and Simpson diversity index (λ) was 0.272 which indicate highest diversity of fish was in March. Annual Margalef’s richness index (D) was 6.654 and Pielou’s evenness index (E) was 0.447 denote highest richness was in November and evenness was in March. The river was found to have moderate type of diversity in terms fish species composition.

Key words: Madhumati River, fish fauna, diversity status, diversity indices, diversity richness

INTRODUCTION

Bangladesh is favoured with various inland water bodies endowed with rich diversity in fish species (Islam et al., 2016). It has the third biggest aquatic fish biodiversity in Asia, after China and India, with about 800 species in fresh, brackish and marine waters (Hussain and Mazid, 2001). It enriched with fish fauna support at least 265 freshwater fin fish species under 154 genera and 55 families (Rahman, 2005). More detailed systematic account of the Inland Fisheries of the Indian Region and Adjacent countries including Bangladesh has been made by Talwar and Jhingran (1991). Bangladesh is one of the world’s prominent fish producing country with a total production of 4.276 million MT in FY 2017-18 (DoF, 2018). Through this remarkable achievement Bangladesh for the first time in the history has become self-sufficient in fish production.

* Author for corresponding: <ahmshabib@gmail.com>

©2021 Zoological Society of Bangladesh DOI: https://doi.org/10.3329/bjz.v49i1.53679
providing 62.58 g of fish per person in everyday dietary consumption. Last 10 years average growth performance of this sector is 5.26%, which seems quite consistent and encouraging (DoF, 2018).

Madhumati is a very important river in Bangladesh having very wide and extensive. It is also one of the longest rivers in Bangladesh and a distributary of the Ganges flows through Kushtia, Magura, Jessore, Faridpur, Pirojpur and Khulna districts in the country. The river has been named as the Gorai in the upper part and Madhumati in the lower. The Gorai River started its course at Talbaria, north of Kushtia town and 19 km downstream from Hardinge Bridge. South of Kushtia its first branch, the Kaliganga joined with the Kumar River near Shailkupa. The main river is divided and rejoined several times as it flows southeast to Mohammadpur upazila under Magura district. From this point it changes its name to Madhumati (Banglapedia, 2014).

Works on status of freshwater fish and diversity of fish in Bangladesh have been done by Shafi and Quddus (1982), Hossain et al. (2013), Galib et al. (2013), Joadder et al. (2015), Islam et al. (2016) and Easmin et al. (2018), whereby checklist of fish, showing conservation status of fish and diversity of fish was made. IUCN Red list of Bangladesh (2015) reported a total of 253 fish species were assessed of which 64 species have been found threatened consisting 25.3% of the total species. Among them 9 species were evaluated as Critically Endangered (CR), 30 species as Endangered (EN), 25 species as Vulnerable (VU), 27 species as Near Threatened (NT), 122 species as Least Concern (LC) and the rest 40 species were considered Data Deficient (DD). No fish was identified as extinct or regionally extinct.

The deterioration of natural water bodies resulting from human interference due to construction of roads, deforestation, embankments, invasion to agricultural lands, indiscriminate use of pesticides and natural causes had negative impact of fish diversity in the river. It was selected for its contribution in fisheries sectors. Fish status in the river may impact on the society of the river area. The rich diversity may elucidate further fish resources in the area which may ensure the protein supply of the local people. Instead, the indiscriminate harmful techniques of fishing, use of different fishing gears threatens the biodiversity of the seasonal floodplains. In case of less diversity awareness program may be initiated alongside the river for the development of the fish fauna of the river. Hence, there is necessity to update the species check-list of fish available in the Madhumati River and present status of the fish and
their diversity, richness and evenness in the river. This exploration was aimed to build up authentic information about the species available at the Madhumati River in south-west part of country.

**MATERIAL AND METHODS**

The Madhumati River was selected for this study to assess the fish fauna and their current status. The fish samples were collected monthly from the river during October 2018 to September 2019. Two points were selected in Magura District at Mohammadpur Upazila, which were Elangkhali Ghat (23°24′29.7″N and 89°36′16.5″E) and Jhama Bazar Ghat (23°36′03.4″N and 89°57′94.3″E). Monthly fish samples were collected from the selected spots directly from the fishermen, retailers, ‘Nikari’, ‘Bapari’ and ‘Aratdar’ from the two preselected sites. Some fishes were directly identified in the sampling spots and rest of the fish specimens were carried in ice box or safeguarded in 4 to 6% buffered formalin solution to the Fisheries Laboratory, Department of Zoology, Jagannath University for identification and further taxonomic study. Large fishes were easily counted and recorded but small fishes were counted using the following formula (Iqbal et al. 2015):

\[
N = N_s \times \frac{W_t}{W_s}
\]

Where, \(N\) is the total number of a fish species, \(N_s\) is number of individual small fish in each subsample, \(W_t\) is the total weight of small fish found in the sample and \(W_s\) is weight of subsample. Fish species were identified based on their morphometric and meristic characters following Fish Base (2020), Rahman (2005), Talwar and Jhingran (1991) and Bhuiyan (1964). Identified fishes were systematically arranged according to Nelson (2006). Fish status were categorized according to IUCN Redlist (2015, Volume 5: Freshwater Fish). Diversity, richness and evenness were calculated using the following formulae:

Shannon–Weaver diversity index, \(H = -\Sigma Pi \ln Pi\) (Shannon–Weaver, 1949)

Simpson index, \(\lambda = \Sigma Pi^2\) (Simpson, 1949)

Margalef's richness index, \(D = \frac{(S-1)}{\ln(N)}\) (Margalef, 1968)

Pielou’s evenness index, \(E = \frac{H}{\ln(S)}\) (Pielou, 1966)

Where, \(H\) and \(\lambda\) is the diversity index, \(Pi\) is the relative abundance \((n/N)\), \(n\) is the number of individual for each species, \(N\) is the total number of individual, \(D\)
is the richness index, \( E \) is the similarity or evenness index, \( S \) is the total number of species and \( \ln \) is the natural logarithm.

Statistical analysis was done with help of Microsoft Office Excel 2016.

**RESULTS AND DISCUSSION**

A total 83 species under 58 genera were identified belonging to 28 families under 11 orders (Table 1, Fig 7–89). The most dominant order was Cypriniformes comprising 31% of all the number of species recorded and the number of fish species was 26. Other dominating orders were Perciformes, Siluriformes, Clupeiformes and Channiformes which comprised 20, 19, 6 and 4 species of fish respectively. The lowest numbers of fish species representing orders were Anguilliformes, Pleuronectiformes, Synbranchiformes and Tetraodontiformes that consisted only 1 species of fish each (Fig. 1). Galib \textit{et al.} (2013) reported on the fish fauna of Choto Jamuna River and a total of 63 species of fishes had been recorded under 41 genera, 23 families and 9 orders. The most dominant order was Cypriniformes comprising 34.92%, next to Cypriniformes, other dominant orders were Siluriformes, Perciformes and Synbranchiformes constituting 28.57%, 19.05% and 6.35% of species recorded respectively. Islam \textit{et al.} (2016) found Perciformes as most dominant order constituting 42.62% of the total fish population followed by Siluriformes (11.48%), Clupeiformes (9.84%), Pleuronectiformes (3.29%), Synbranchiformes (3.29%), Osteoglossiformes (1.64%), Beloniformes (1.64%), Mugiliformes (4.92%), Cypriniformes (16.39%) and Tetraodontiformes (4.92%) in the Sibsa River in South-Western Bangladesh.

In family composition, the most dominant family was Cyprinidae comprising 22 species under 12 genera. The minimal number (1 species) belonged to 11 families of fish viz. Ophichthidae, Pangasiidae, Synbranchidae, Heteropneustidae, Nandidae, Mugilidae, Anabantidae, Cynoglossidae, Belonidae, Hemiramphidae, Tetraodontidae (Fig. 2). Azadi and Alam (2013) reported Cyprinidae as the most dominant family comprising 20 species and other dominant families were Gobiidae, Schilbeidae and Bagridae constituting 11, 5 and 4 species respectively in the Halda River.

According to IUCN (2015), 59% of fish species were Least Concern, 12% were Vulnerable, 11% were Endangered, 9% were Near Threatened and 1% was Data Deficiency and Critically Endangered and 7% Exotic species were also recorded (Fig. 3). Easmin \textit{et al.} (2018) reported 77 species of fish in the Jamuna River where 59% was Least Concern (LC), 23% were Threatened including 1% Critically Endangered (CR), 12% Endangered (EN) and 10% Vulnerable (VU) species, and 5% Exotic fish was also recorded during the study period.
## Table 1. Fish species of Madhumati River of Magura

| Order               | Family            | Scientific Name                  | Local Name | English Name          | Local Status | Global Status |
|---------------------|-------------------|----------------------------------|------------|-----------------------|--------------|---------------|
| Osteoglossiformes   | Notopteridae      | 1. Chitala chitala               | Chital     | Clown knife fish      | EN           | NT            |
|                     |                   | 2. Notopterus notopterus         | Foli       | Bronze feather back  | VU           | LC            |
| Anguilliformes      | Ophichthidae      | 3. Pisonophis boro               | Kharu, Hijra | Rice paddy eel      | LC           | LC            |
| Synbranchiformes    | Synbranchidae     | 4. Monopterus cuchia             | Kuchia, Kuicha | Cuchia               | VU           | VU            |
| Clupeiformes        | Clupeidae         | 5. Corica soboma                 | Kachki     | Ganges river spral   | LC           | LC            |
|                     |                   | 6. Pelona dithela                | Choukka    | Indian peliona       | LC           | NE            |
|                     |                   | 7. Tenualoa ilisha               | Ilish      | Hilsha shad          | LC           | LC            |
| Engraulidae         |                   | 8. Gudusia chapra                | Chapila    | Indian river shad    | VU           | LC            |
|                     |                   | 9. Setipinna phasa               | Phasa      | Gangatic hairfin anchovy | LC       | LC            |
|                     |                   | 10. Setipinna taty               | Teli phasa | Scaly hairfin anchovy | LC           | NE            |
| Channiformes        | Channidae         | 11. Channa marulius              | Gajar      | Great snakehead      | EN           | LC            |
|                     |                   | 12. Channa orientalis            | Cheng      | Walking snakehead    | LC           | LC            |
|                     |                   | 13. Channa puncta                | Taki       | Spotted snakehead    | LC           | LC            |
|                     |                   | 14. Channa striata               | Shol       | Snakehead murrel     | LC           | LC            |
| Cypriniformes       | Cyprinidae        | 15. Amblypharyngodon mola        | Mola       | Mola carplet         | LC           | LC            |
|                     |                   | 16. Aspidoparia morar            | Morar, Morari | Aspidopara      | VU           | NE            |
|                     |                   | 17. Barbonymus gonionotus        | Thai sarpunti | Java barb        | Exotic      | Exotic        |
|                     |                   | 18. Catla catla                  | Catla      | Catla                | LC           | NE            |
|                     |                   | 19. Cirinus cirrhosus            | Migal      | Migal crap          | NT           | VU            |
|                     |                   | 20. Cirinus reba                 | Tatkini    | Reba                 | NT           | LC            |
|                     |                   | 21. Cyprinus carpio var. carpio  | Common carp | Common carp      | Exotic      | Exotic        |
|                     |                   | 22. Cyprinus carpio var. nudus   | Carpu      | Common carp         | Exotic      | Exotic        |
|                     |                   | 23. Esomus dancius               | Darkina    | Flying barb          | LC           | LC            |
|                     |                   | 24. Hypophthalmichthys molitix   | Silver carp | Silver carp   | Exotic      | Exotic        |
|                     |                   | 25. Hypophthalmichthys nobilis   | Big-head carp | Big-head carp | Exotic      | Exotic        |
|                     |                   | 26. Labeo bata                   | Bata       | Bata labeo          | LC           | LC            |
|                     |                   | 27. Labeo calbasu                | Kalibaus   | Orange fin labeo    | LC           | LC            |
|                     |                   | 28. Labeo rohita                 | Rui        | Rohu                 | LC           | LC            |
|                     |                   | 29. Osteobrama cotio             | Lohasur, Keti | Cotia       | NT           | LC            |
|                     |                   | 30. Pethea conchonius            | Kanchan punti | Rosy barb       | LC           | LC            |
|                     |                   | 31. Pethea guganio               | Mola punti | Glass barb          | LC           | LC            |
|                     |                   | 32. Pethea ticto                 | Tilt punti | Ticto barb          | VU           | LC            |
| Order                  | Family              | Scientific Name                                    | Local Name         | English Name       | Local Status | Global Status |
|-----------------------|---------------------|---------------------------------------------------|--------------------|--------------------|--------------|---------------|
| 33. Puntius chola     |                     | Chala punti                                        | Swamp barb         | LC                 | LC           |               |
| 34. Puntius sophore   |                     | Jat punti                                         | Pool barb          | LC                 | LC           |               |
| 35. Salmostoma bacala|                     | Narkali chela                                      | Large razorbelly minnow | LC                | LC           |               |
| 36. Salmostoma phulo |                     | Fulchela                                           | Finescale razorbelly minnow | NT                | LC           |               |
| 37. Botia dario       | Cobitidae           | Rani                                              | Bengal loach       | EN                 | LC           |               |
| 38. Botia lochachata  |                     | Putul                                             | Reticulate loach   | EN                 | NE           |               |
| 39. Lepidocephalichthys annandalei |         | Gutm                                              | Annandale loach    | VU                 | LC           |               |
| 40. Lepidocephalichthys guntea |              | Gutm                                              | Guntea loach       | LC                 | LC           |               |
| 41. Mystus bleekeri   | Siluriformes Bagridae | Gulsha tengra                                     | Day’s mystus tengra | LC                 | LC           |               |
| 42. Mystus cavarius   |                     | Kabashi tengra                                     | Gangetic mystus tengra | NT                | LC           |               |
| 43. Mystus tengara    |                     | Bajari tengra                                      | Stripped dwarf catfish | LC          | LC           |               |
| 44. Mystus vittatus   |                     | Tenga                                             | Asian striped catfish | LC                | LC           |               |
| 45. Rita rita         |                     | Rita                                              | Rita               | EN                 | LC           |               |
| 46. Sperata aor       |                     | Ayre                                              | Long-whiskered catfish | VU                | LC           |               |
| 47. Sperata seenghala |                     | Guijja, Ayre                                       | Giant river catfish | VU                 | LC           |               |
| 48. Ompok pabda       | Siluridae           | Madhu pabda                                        | Pabda catfish      | EN                 | NT           |               |
| 49. Wallago attu      |                     | Boal                                              | Freshwater shark   | VU                 | NT           |               |
| 50. Ailia coila       | Schilbeidae         | Kajuli, Baspata                                    | Gangetic ailia Bacara | LC                  | NT           |               |
| 51. Clupisoma garua   |                     | Ghaura                                            | Garua bacha        | EN                 | NE           |               |
| 52. Eutropichthys murius |                 | Muri bacha                                        | Murus vacha        | LC                 | LC           |               |
| 53. Eutropichthys vacha |                 | Bacha                                             | Batchwa vacha      | LC                 | LC           |               |
| 54. Pangasius pangasius | Pangasiidae       | Pangas                                            | Pungas catfish     | EN                 | LC           |               |
| 55. Bagarius bagarius | Sisoridae           | Baghair                                           | Devil catfish      | CR                 | NT           |               |
| 56. Gagata cenia      |                     | Cenia                                             | Indian gagata      | LC                 | LC           |               |
| 57. Clarias batrachus | Claridae            | Magur                                             | Walking catfish    | LC                 | LC           |               |
| 58. Clarias gariepinus|                     | African magur                                     | North african catfish | Exotic             | Exotic       |               |
| 59. Heteropeuceus fossilis | Heteropneustidae | Shing                                             | Stinging catfish   | LC                 | LC           |               |
| 60. Chanda nama       | Perciformes Ambassidae | Nama                                             | Elongated glass-perchlet | LC                  | LC           |               |
| 61. Parambassis lala  |                     | Lal chanda                                        | Highfin glassy perchlet | LC                | NE           |               |
| 62. Parambassis ranga |                     | Ranga chanda                                      | Indian glassy fish | LC                 | LC           |               |
| 63. Johnius coltor    | Sciaenidae          | Koitor poa                                        | Coltor croaker     | LC                 | LC           |               |
| 64. Otolithoides pama |                     | Poa                                               | Pama croaker       | LC                 | NE           |               |
| 65. Nandus nandus     | Nandidae            | Bheda                                             | Mottled            | NT                 | LC           |               |
### Icthyofauna diversity in madhumati

| Order           | Family               | Scientific Name                  | Local Name       | English Name          | Local Status | Global Status |
|-----------------|----------------------|----------------------------------|------------------|-----------------------|--------------|---------------|
| Mugilidae       | Gobiidae             | Rhinomugil corsula               | Khorsula         | Corsula mullet        | LC           | LC            |
|                 |                      | Mugilidae                       | Bele             | Goby                  | VU           | LC            |
|                 |                      | Glossogobius giuris              | Bele             | Tank goby             | LC           | LC            |
|                 |                      | Oxyurchthydes microlepis        | Nuna baila       | Small scaled goby     | LC           | NE            |
|                 |                      | Pseudapocryptes elongatus       | Chewa            | Lanceolate goby       | LC           | LC            |
| Gobiidae        |                      | Eleotris lutea                   | Kuli, Goby       | Lutea sleeper         | DD           | NE            |
|                 |                      | Odontamblyopus rubicundus       | Lal chewa        | Rubicundus            | LC           | NE            |
|                 |                      | Gobioididae                     |                  |                       |              |               |
|                 |                      | Macrognathus aculeatus           | Tara baim        | Lesser spiny eel      | NT           | NE            |
|                 |                      | Macrognathus pancalus           | Guchi baim       | Barred spiny eel      | LC           | LC            |
|                 |                      | Mastacembelus armatus            | Sal baim         | Zig-zag eel           | EN           | NE            |
|                 |                      | Mastacembelida                  |                  |                       |              |               |
|                 |                      | Anabas testudineus              | Koi              | Climbing perch        | LC           | DD            |
|                 |                      | Trichogaster chuna              | Chuna kailisha   | Dwarf gourami         | LC           | LC            |
|                 |                      | Trichogaster fasciatus          | Khalsha          | Banded gourami        | LC           | LC            |
|                 |                      | Trichogaster lalia              | Lal Khalisha     | Dwarf gourami         | LC           | LC            |
| Beloniformes    | Cynoglossidae        | Paraplagusia bilineata          | Kukur jeeb       | Fingerlip tongue sole | LC           | NE            |
| Belonidae       |                      | Xenentodon cancila              | Kakila           | Freshwater garfish    | LC           | NE            |
| Hemirhamphidae  |                      | Hyporhamphus limbatus           | Ek thulta         | Congaturi halfbeak    | LC           | NE            |
| Tetraodontiforms| Tetradontidae        | Leiodon cutcutia                | Tepa             | Ocellated puffer fish | LC           | LC            |

CR= Critically Endangered, EN= Endangered, VU= Vulnerable, NT= Near Threatened, LC= Least Concern, DD= Data Deficient, NE= Not Evaluated.

![Pie chart showing species composition in different orders of fish.](image)
Fig. 2. Species composition of different families of fish in Madhumati River.

Fig. 3. Local status of fish fauna in the Madhumati River.

A total 25 species of fish were found as Threatened locally where the highest number 6 representing the Siluriformes following 5 representing the Cypriniformes (Fig. 4). The lowest number of Threatened species was 1 in each order of Anguiliformes, Synbranchiformes, Beloniformes, Pleuronectiformes and Tetraodontiformes (Fig. 4). In Halda River among 83 species 3 were Critically Endangered and 8 were Vulnerable (Azadi and Alam, 2013).

On global context, 53 (64%) species of fish were Least Concern, 16 (19%) were Not Evaluated, 5 (6%) were Near Threatened, 2 (3%) were Vulnerable and 1 (1%) was Data Deficiency. Six (7%) Exotic species were also recorded in this study (Fig. 5). Joadder et al. (2015) working on Padma River found 72% of the total fish species to be Least Concern and global conservation status was not assessed by IUCN of 13% species.
According to Global status, 4 species of fish were recorded as Threatened among them 2 belonged to the order Perciformes and 1 of each species was found under orders Cypriniformes and Siluriformes (Fig. 6). According to Global status, two species of each were Threatened belonging to Cypriniformes and Synbranchiformes, as reported by Easmin et al. (2018) in the Jamuna River.
Diversity, Richness and Evenness indices of fishes in Madhumati River:

Higher Shannon diversity index was found in March 2.651 and lower 1.369 in January (Table 2). The higher Shannon diversity index value indicates the higher species diversity of the area. Thus in the river highest diversity was seen in March and lowest diversity of fish was in January in the river. Highest Simpson index was 0.429 in January and lowest 0.099 in March (Table 2). Simpson index value ranges between 0 to 1 and low value represents higher diversity. So, according to Simpson’s index highest diversity was observed in March and lowest in January.

Highest Margalef’s Richness value was 4.747 in November and lowest in 2.884 June (Table 2). Margalef’s richness index value depends on species number. Higher the species number, it expresses higher richness in that ecosystem. Highest species number was found in November and lowest species number was found in June. So, November was the highest richness and June was the lowest richness month in term of species richness.

Highest Pielou’s Evenness was 0.629 in March and lowest was 0.388 in January. Pielou’s evenness index value range from 0 to 1, if the value is towards 1, shows species number to be more evenly distributed. Therefore, in March the species were more evenly distributed and less evenly distributed in January.

Annual Shannon diversity index, Simpson diversity index, Richness index, Evenness Index values were 1.974, 0.272, 6.654 and 0.447 respectively (Table 2). Annual values of indices shown moderately diversified, Richest and evenly

| Months     | Number of species | Number of Individuals | Shannon diversity index (H) | Simpson diversity index (λ) | Margalef’s richness index (D) | Pielou’s evenness index (E) |
|------------|-------------------|-----------------------|-----------------------------|-----------------------------|-------------------------------|-----------------------------|
| October’18 | 38                | 2489                  | 2.177                       | 0.180                       | 4.732                         | 0.594                       |
| November’18| 48                | 19913                 | 2.099                       | 0.110                       | 4.747                         | 0.549                       |
| December’18| 34                | 29526                 | 1.480                       | 0.336                       | 3.206                         | 0.419                       |
| January’19 | 34                | 16058                 | 1.369                       | 0.429                       | 3.407                         | 0.388                       |
| February’19| 36                | 7476                  | 1.920                       | 0.245                       | 3.924                         | 0.531                       |
| March’19   | 41                | 26184                 | 2.651                       | 0.099                       | 3.932                         | 0.629                       |
| April’19   | 33                | 18553                 | 1.700                       | 0.277                       | 3.256                         | 0.486                       |
| May’19     | 32                | 18394                 | 1.568                       | 0.282                       | 3.157                         | 0.452                       |
| June’19    | 32                | 46463                 | 1.393                       | 0.313                       | 2.884                         | 0.402                       |
| July’19    | 36                | 11781                 | 1.890                       | 0.238                       | 3.734                         | 0.525                       |
| August’19  | 36                | 10120                 | 1.738                       | 0.298                       | 3.795                         | 0.483                       |
| September’19| 40               | 17841                 | 1.631                       | 0.351                       | 3.984                         | 0.441                       |
| Annual     | 83                | 224798                | 1.974                       | 0.272                       | 6.654                         | 0.447                       |
Icthyofauna diversity in madhumati

1. Chitala chitala
2. Notopterus notopterus
3. Pisodonophis boro
4. Monopterus cuchia
5. Corica soborna
6. Pellona ditchela
7. Tenualosa ilisha
8. Gudusia chapra
9. Setipinna phasa
10. Setipinna taty
11. Channa marulius
12. Channa orientalis
13. Channa punctata
14. Channa striata
15. Amblypharyngodon mola
16. Aspidoparia morar
17. Barbonymus gonionotus
18. Catla catla
19. Cirrhinus cirrhosus
20. Cirrhinus reba
21. Cyprinus carpio var. carpio
22. Cyprinus carpio var. nudus
23. Esomus danricus
24. Hypophthalmichthys molitrix
31. Hypophthalmichthys nobilis  
32. Labeo bata  
33. Labeo calbasu  
34. Labeo rohita  
35. Osteobrama coto  
36. Pethia conchonius  
37. Pethia guganio  
38. Pethia ticto  
39. Puntius chola  
40. Puntius sophore  
41. Salmostoma bacaila  
42. Salmostoma phulo  
43. Botia dario  
44. Botia lohachata  
45. Lepidocephalichthys annandalei  
46. Lepidocephalichthys guntea  
47. Mystus sbleekeri  
48. Mystus cavasius  
49. Mystus tengara  
50. Mystus vittatus  
51. Rita rita  
52. Sperata aor  
53. Sperata seenghala  
54. Ompok pabda
Icthyofauna diversity in madhumati

55. Wallago attu
56. Ailia coila
57. Clupisoma garua

58. Eutropiichthys murius
59. Eutropiichthys vacha
60. Pangasius pangasius

61. Bagarius bagarius
62. Gagata cenia
63. Clarias batrachus

64. Clarias gariepinus
65. Heteropneustes fossilis
66. Chanda nama

67. Parambassis lala
68. Parambassis ranga
69. Johnius coitor

70. Otolithoides pama
71. Nandus nandus
72. Rhinomugil corsula

73. Eugnathogobius oligactis
74. Glossogobius giuris
75. Oxyurichthys smicrolepis

76. Pseudapocryptes elongatus
77. Eleotris lutea
78. Odontamblyopus rubicundus
distributed in number respectively in the Madhumati River. Easmin et al. (2018) found in the Jamuna River the annual values of Shannon diversity index (H), Simpson index (λ), Margalef’s richness index (D) and Pielou’s evenness index (E) as 3.350, 0.053, 6.931 and 0.772 respectively. Overall values of diversity, richness and evenness indices were found as 3.717, 6.954 and 0.897, respectively by Galib et al. (2013) in Choto Jamuna River. Overall values of diversity, richness and evenness indices were found to be 1.42, 6.64 and 0.86, respectively by Rahman et al. (2015) in the Talma River. From this study and according to the experiences shared by some fishermen engaged fishing in this river, the fish biodiversity of the Madhumati River has declined with time due to over exploitation, natural causes such as flooding, siltation, drought and natural
calamities, construction of obstacle for fish migration and breeding and lack of social awareness.

**CONCLUSION**

This is a preliminary and baseline study and have some limitations. A small part of the river was considered in this study which may not reflect the exact condition of the river. This study suggests the decline trend of the existing fish fauna and degrading the biodiversity. Extensive and complete study on this river along with social impact of local people may reveal the exact condition of the river.

**Acknowledgement:** The authors are very grateful to National Science and Technology (NST) Fellowship Program (Fiscal year 2019-2020, merit position: 492) granted by the Government of Bangladesh supporting financially to conduct the research properly.

**LITERATURE CITED**

AZADI, M.A. and ARSHAD-UL ALAM, M. 2013. Ichthyofauna of the River Halda, Chittagong. *Bangladesh J. Zool.* 41(2): 113-133.

BANGLAPEDIA, 2014. National encyclopedia of Bangladesh. Asiatic society of Bangladesh.http://en.banglapedia.org/index.php?titl=Gorai-Madhumati River.

BHUIYAN, A.L. 1964. *Fishes of Dacca.* Asiatic Soc. Pakistan, Publ. No. Dacca. 148 pp.

DoF, 2018. Yearbook of Fisheries Statistics of Bangladesh, 2017-18. Fisheries Resources Survey System (FRSS), Department of Fisheries. Bangladesh: Ministry of Fisheries, 2018. Volume 35

EASMIN, M.N., HABIB, A.H.M. SHAFIULLAH, AKTER, S. and MAJUMDER, K. 2018. Status and diversity of ichthyofauna of Jamuna River, Bangladesh. *Jagannath University Journal of Life and Earth Sciences* 4(1) 12 – 24.

FISHBASE, 2020. https://www.fishbase.se/search.php,Creative Commons Attribution-Noncommercial 3.0 Unported License. (CC-BY-NC). Visited on April 2020.

GALIB, M.S., NASER, A.M.S., MOHSIN, M.B.A., CHAKI, N. and FAHAD, H.F. 2013. Fish diversity of the River Choto Jamuna, Bangladesh: Present status and conservation needs. *Academic Journals* 5(6): 389-395.

HOSSAIN, S.M., DAS, G.N., SARKER, S. and RAHMAN, Z.M. 2013. Fish diversity and habitat relationship with environment variables at Meghna River estuary, Bangladesh. *Egyptian J. Aquatic Res.* 38: 213-226.

HUSSAIN, M.G. and MAZID, M.A. 2001. Genetic improvement and conservation of carp species in Bangladesh. Bangladesh Fisheries Research Institute and International Center for Living Aquatic Resources Management, p. 74.
IQBAL, M.M., NASREN, S., ABDULLAH-ALMAMUN, M. and HOSSAIN, M.M. 2015. Fish assemblage including threatened species in Hakaluki Haor, Sylhet, Bangladesh. *J. Aqua Trop.* **30**(3-4): 233-246.

ISLAM, K.M., HABIB, A.K., AHSAN, E.M., ALI. M.M. and BASAK, K.S. 2016. Fish biodiversity at Sibsa River in South-Western Bangladesh: status and conservation requirements. *International J. of Fisheries and Aquatic Studies* **4**(1): 24-28.

IUCN, 2015. Red list of threatened animals of Bangladesh Volume 5. IUCN, international Union for Conservation of Nature, Bangladesh Country Office, Dhaka, xvi, 360pp.

JOADDER, R.A.M., GALIB, M.S., HAQUE, M.M.S. and CHAKI, N. 2015. Fishes of the River Padma, Bangladesh: Current trend and conservation status. *J. of Fisheries* **3**(2):259-266.

MARGALEF, R. 1968. Perspectives in Ecological Theory. Chicago: University of Chicago Press.

NELSON, J.S. 2006. Fishes of the World. 4th Edition, John Wiley & Sons, Hoboken, 601 pp.

PIELOU, E.C. 1966. The Measurement of Diversity in Different Types of Biological Collections. *J. of Theoretical Biology* **13**:131-144.

RAHMAN, A.K.A. 2005. Freshwater fishes of Bangladesh. 2nd ed., Zool. Soc. Bangladesh, Dhaka, Bangladesh. 394 pp.

RAHMAN, M.A., MONDAL, M.N., HANNAN, M.A. and HABIB, K.A. 2015. Present status of fish biodiversity in Talma River at Northern Part of Bangladesh, *International Journal of Fisheries and Aquatic Studies* **3**(1): 341-348.

SHAFI, M. and QUDDUS, M.M.A. 1982. Bangladesher Matsho Sampad (Fisheries of Bangladesh, in Bengali). Bangla Academy, Dacca, Bangladesh. 444 pp.

SHANNON, C.E. and WEAVER, W.J. 1949. The Mathematical Theory of Communication. University of Illinois Press, Urbana, 117pp.

SIMPSON, E.H. 1949. Measurement of Diversity. *Nature* **163**: 688.

TALWAR, P.K. and JHINGRAN, A.G. 1991. Inland Fishes of India and Adjacent Countries. Oxford-IBH Publishing Co. Pvt. Ltd., New Delhi, 1158 p.

(Manuscript received on 26 November 2020 revised on 10 March 2021)