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SM Rezaul Karim
Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh

KM Abdul Halim
Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh

Md. Asek Uddin
Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh

Most. Farida Yeasmin
Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh

KM Hasanuzzaman
Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh

Corresponding Author:
SM Rezaul Karim
Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh

Investigation on species composition in Chalan *beel* of Bangladesh

SM Rezaul Karim, KM Abdul Halim, Md. Asek Uddin, Most. Farida Yeasmin and KM Hasanuzzaman

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Abstract
The experiment was carried out to investigate the species composition of fish and prawn in Ruhul *beel* and Bamonji *beel* under Chalan *beel* of Pabna district of Bangladesh. Data were collected from selected sanctuary sites, focus group discussion, personal and group contract as well as Government and Non-Government organizations with prepared and pretested questionnaire. A total of 38 fish species belonging to 24 Genus, 17 families and 8 orders (7 fish, 1 prawn) were recorded during the study period at Ruhul *beel* and Bamonji *beel*. The largest order recorded for both *beels* according to species frequency were Cypriniformes and Perciformes which contributed 36.84% (14 species) and 35.14% (12 species) for Ruhul *beel* and Bamonji *beel* followed by Perciformes and Cypriniformes which contributed 34.21% (13 species) and 32.43% (12 species) for Ruhul *beel* and Bamonji *beel*, respectively. The third largest species was Siluriformes for both *beels* contributed 10.53% (4 species) and 10.81% (4 species) to Ruhul *beel* and Bamonji *beel*, respectively followed by Channiformes which contributed 7.89% (3 species) and 8.11% (3 species) to Ruhul *beel* and Bamonji *beel*, respectively. The prevalence of other 4 orders was Beloniformes, Cyprinidontiformes, Decapoda and Tetraodontiformes both were contributed 2.63% (only 1 species) to Ruhul *beel* and 2.70% (only one species) Bamonji *beel.*

Keywords: Species composition, Chalan *beel*

1. Introduction
Chalan *beel* is a productive water body which extends over four adjacent districts of Bangladesh *viz*; Rajshahi, Pabna, Sirajganj and Natore. The major part of the beel covers an extensive area of Raiganj Upazila of Sirajganj district and Chatmohar and Bhangura Upazila of Pabna district. The fish production could be increased up to 45,000 MT through improving basic management practices (*e.g.* proper execution of fish act; establishment of fish sanctuaries; maintaining minimum water depth in dry season (Karim, 2003) [1]. The greatest breadth of the *beel* is about 13 km from Tarash at the northeast to Narayanpur, near the north bank of the Gumani. Its greatest length is about 24 km from Singra to Kachikata on the Gumani (Banglapedia, 2013) [2]. The species composition was oberved in Chalan *beel* area which is comprised by a series of small depression of which each depression were a separate small *beel* (Sayeed, 2010) [3]. Fish enter to the Chalan *beel* by up-stream migration from the Jamuna River through the Baral and Gumani Rivers when inundation commences in the pre-monsoon period. The Chalan *beel* then serves as an excellent feeding, spawning and nursing ground for many important indigenous fish species (Ahmed and Singh, 1991) [4].
From the findings of Hossain *et al.* (2008) [5] it was recorded that, about 9818 individuals, representing 114 species from 29 families. The most abundant fish species groups were punti (*Puntius sophore* and *Puntius ticto*), followed by chanda (*Chanda nama and Parambassis ranga*). The third most abundant species was tengra (*Mystus vittatus*) in the Gumani River and chapila (*Gudusia chapra*) in the Baral and Katagang Rivers. A decreasing trend was observed in the variability of five species in the Gumani River (*Amblypharyngodon mola; Clupisoma garua; Chela cachius; G. giuris; A. coila*), five in the Baral River (*Punti, Chanda, Botia dario, C. garua, G. giuris*), and six in the Katagang River (*Chanda; Chela Cachius; Mystus Vittatus; B. Dario; C. Garua; G. Giuris*). Many valuable indigenous fish species which were once available in large volumes are currently under threat and severely depleted from the Chalan *beel* area.

2. Materials and Methods

2.1 Data Collection

The primary data was collected from selected sanctuary site and control site using various methods like baseline survey by transaction, focus group discussion, social mapping, wealth ranking, mobility mapping, personal and group contract with prepared and pretested questionnaire etc. The secondary data was collected from Department of Fisheries (DoF), Bangladesh Fisheries Research Institute (BFRI), Rajshahi University (RU), Dhaka University (DU) and Bangladesh Agricultural University (BAU) library, using internet and the selective fish landing centers in the study area.

2.2 Species Count

The number of fish species was counted to estimate the species composition as well as diversity of fish population, while the catch weight of fish offered a quantitative indicator of species biomass also related to the species composition, catch composition and fish diversity. The collected samples were sorted to species level (Kulbicki and Wantiez, 1990) [6]. The fishes were identified upto species level followed by (Rahman, 2005) [7]. Fish species composition and catch composition are usually expressed as the catch-per-unit-effort (gm/unit gear/hour).

2.3 Data Analysis

The previously collected data by the local Upazilla Fisheries Office, Project office and Statistics office was used as baseline for the comparison with data collected in 1st year. On the other hand, data of first year was used as baseline to estimate changing trends of species composition, fish diversity of second year. Then data were entry and processing. Necessaary data on present status of biological species of *beels* were investigated. This term can be used to assessing the degree of exploitation of fishery resources (Degerman *et al.*, 1988) [8].

3. Results

3.1 Frequency Distribution of Fish Species under Different Orders

Frequency distribution of fish species under different Orders has been showed in the Figure 1. A total of 283 fish and prawn individuals from 38 species belonging to 24 Genus, 17 families and 8 orders were recorded during the study period at RB and BB. Frequency of fish species under orders recorded during the study period in RB and BB were estimated minutely. During the study period total 7 orders of fish and one order of prawn were identified from both *beels*. The largest order recorded for both *beels* according to species frequency were Cypriniformes and Perciformes which contributed 36.84% (14 species) and 35.14% (12 species) for RB and BB followed by Perciformes and Cypriniformes which contributed 34.21% (13 species) and 32.43% (12 species) for RB and BB, respectively. The third largest species was Siluriformes for both *beels* contributed 10.53% (4 species) and 10.81% (4 species) to RB and BB, respectively followed by Channiformes which contributed 7.89% (3 species) and 8.11% (3 species) to RB and BB, respectively. The prevalence of other 4 orders was Beloniformes, Cyprinidontiformes, Decapoda and Tetraodontiformes both were contributed 2.63% (only 1 species) to RB and 2.70% (only one species) to BB (Figure 1).

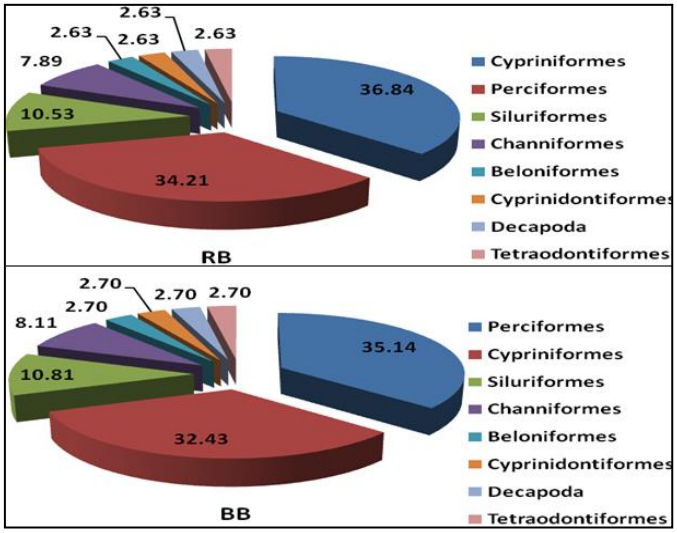

Fig 1: Frequency (%) of fish species under orders recorded during the study in RB and BB.

3.2 Frequency Distribution of Species under different Families

Frequency of fish and prawn under different families recorded during the study period in RB and BB were calculated (Figure 3.2a and Figure 2). Total 16 families of fish and 1 family of prawn were identified in both the *beels*. Among all the families Cyprinidae 34.21% (13 species) was the largest family for RB and BB which contributed 34.21% (13 species) and 30.56 (11 species), respectively. The second highest families were Ambasidae, Channidae, Mastacembelidae and Osphronemidae for both the *beel* which contributed 7.89% (3 species) and 8.33% (3 species) in every family for RB and BB, respectively. The lowest dominant family was Tetraodontidae for both the *beels* which contributed 2.63% (1 species) and 2.78% (1 species) for RB (Figure 3) and BB (Figure 2), respectively. Family-wise species composition for RB by number were consists of Ambassidae 7.89% (3 species), Anabantidae 2.63% (1 species), Bagridae 5.26% (2 species), Belonidae 2.63% (1 species), Channidae 7.89% (3), Cobitidae 2.63 (1 species), Cyprinidae 34.21% (13 species), Cyprinodontidae 2.63% (1 species), Gobitidae 2.63% (1 species), Heteropneustidae 2.63% (1 species), Mastacembelidae 7.89% (3 species), Nandidae 2.63% (1 species), Osphronemidae 7.89% (3 species), Palimonidae 2.63% (1 species), Pristolepidae 2.63% (1 species), Siluridae 2.63% (1 species), Tetraodontidae 2.63% (1 species). Family-wise species composition in case of BB by number was consists of Ambassidae 8.33% (3 species), Anabantidae 2.78% (1), Bagridae 5.56% (2 species), Belonidae 2.78% (1 species), Channidae 8.33% (3 species), Cobitidae 2.78% (1 species), Cyprinidae 30.56% (11 species), Cyprinodontidae 2.78% (1 species), Gobiidae 2.78% (1 species), Heteropneustidae 2.78% (1 species), Mastacembelidae 8.33% (3 species), Nandidae 2.78% (1 species), Osphronemidae 8.33% (3 species), Palimonidae 2.78% (1 species), Pristolepidae 2.78% (1 species), Siluridae 2.78% (1 species), Tetraodontidae (2.78% (1 species).

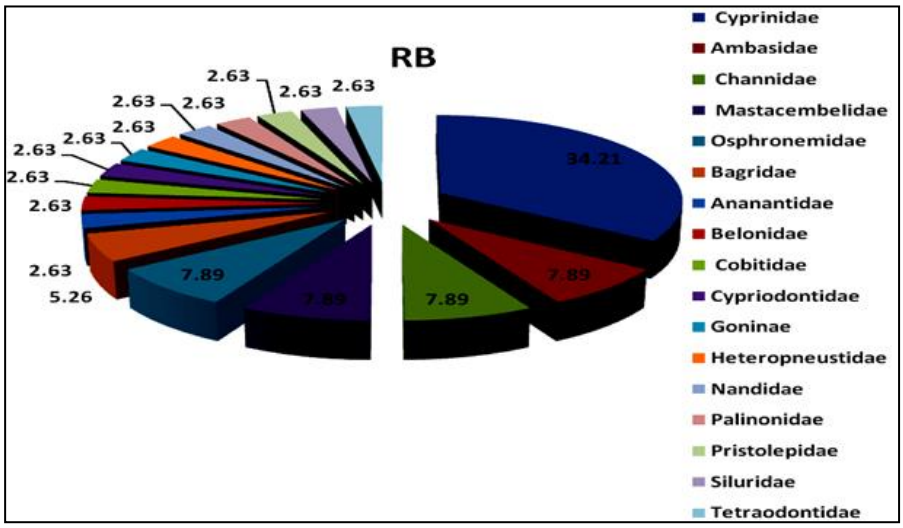

Fig 2: Frequency distribution of fish species under different families recorded during the study period in RB.

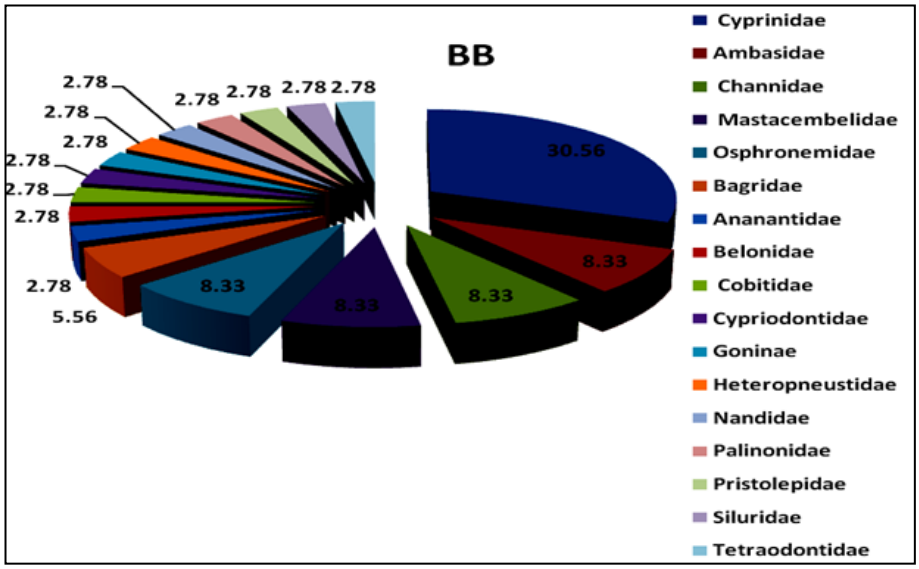

Fig 3: Frequency distribution of fish species under different families recorded during the study period in BB.

4. Discussion

Species composition was differed with seasons and sites. Among the identified orders from the present study 7 orders of fish and one order of prawn. According to frequency of fish species under orders, the largest orders were Cypriniformes and perciformes in RB and BB. There was a distinct variation in the abundance of fish species by months. Every fish species were not available in all the months. The highest abundance was found in November. The lowest numbers of species was found in the month of January. The dominant species among 38 in RB was *M. lamarrei, Chanda sp., Colisa sp., Puntius phutunio, Puntius chola, Esomus danricus* and *Puntius conchonius* whereas in case of BB the dominant species were *Chanda sp., M. lamarrei, Puntius phutunio, Colisa sp., Esomus danricus, Channa punctatus, Puntius chola* and *Xenentodon canchila*. At the present study there were 38 species from RB and 37 species from BB under 8 orders, 17 families (16 from fish and one from prawn) and 24 Genus were recorded which was similar to the result of (Galib *et al.*, 2013; Masai *et al.*, 2001; Rahman *et al.*, 2010; Mohsin *et. al.*, 2013; Shafi and Quddus, 1982 and Emmanuel, 2010) [9, 10, 11, 12, 13, 14].

In the present study, 11 groups fish were recorded such as Barbs and Minnows, Carps, Cat fishes, Gars, Gobies, Loaches, Perch, Prawn, Puffer fishes, Snakeheads and Spiny eels. Overall positive changing trends of 33 species for RB and 9 species for BB were observed. From a case study it was known that before establishment of sanctuary the fish diversity and production was gradually decreased day by day whereas it was started to increase after establishing the sanctuary and at the same time the diversity and production was decreased continuously in BB. 11 groups were recorded from RB and BB such as Barbs and Minnows, Carps, Cat fishes, Gars, Gobies, Loaches, Perch, Prawn, Puffer fishes, Snakeheads, Spiny eels which is supported by the findings of Azher (2009) [15] for Dopi *beel.*

In the present study, total number of species was not increased in both *beels* upto April. After establishing the sanctuary bigger size carp (such as Rui, Catla, Boal) production was decreased however the SIS production was increased. That might be due to the development of suitable feeding and spawning ground for SIS. In the present study, 20 to 23 species were caught by current jal and 22 to 23 species were caught by lift net (Khora jal) which was supported by the findings of Rahman *et al.* (1992) [16].

Among the threatened fishes as described by IUCN (2000) [17]., 5.26% of endangered and 18.42% vulnerable, 5.26% data deficient and 71.05% not threatened species were found in Chalan *beel* during the study. The species richness in RB was range from 13 to 38. Overall species richness was higher in

RB during the study period. After establishment of the sanctuary species richness was increased in Ruhul *beel*. There were 54 threatened species of which only 9 species was found in Ruhul *beel*. Among the 9 threatened species 8 was showed increasing trend which might be due to the establishment of fish sanctuary and it was more or less similar to (FFP, 2005) [18].
The highest fish diversity was found in the month of November in both the *beels* which might be due to high abundance of fish, suitable water level and good weather condition for fish and fishing. Considering all the recorded data it was found that the fish diversity was higher in RB than other site in both years. The species was not reappeared in the *beels* because there has a barrier to connect the *beels* with the rivers and canals. The abundance and production of fish species were bound to the flooding pattern during the study. Catch composition and species composition was differed with seasons or months. Similar result also reported by Bobori and Salvarina (2010) [19].

5. Conclusion
There has been virtually conducted the study on the impacts of fish sanctuaries on the biodiversity of fishers. Once upon a time Ruhul *beel* was highly productive waterbody. However, it is losing its productivity for many natural and manmade reasons. Despite all these problems, Ruhul *beel* still serves as the natural fish bank for the major portion of the people in this *beel* area. However, there are a series of small *beel* under the Chalan *beel* which is quite different from biodiversity, species composition, vegetation, water depth, hydrography, physico-chemical characteristics and biological conditions. The establishment of fish sanctuary might be the so effective tools to improve and defense the fish biodiversity as well as increasing fish production.

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7. Conflict of interests
The authors declare that there is no conflict of interests regarding the publication of this paper.

8. References
1. Karim MS. Causes of fisheries resources reduction in Chalan *beel*. Fish Fortnight Compendium (*Matshya Pakkha Songkolon*), Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh 2003, 95-96.
2. Banglapedia. National Encyclopedia of Bangladesh, Asiatic Society of Bangladesh, Dhaka, Bangladesh 2013. Available from URL: www.banglapedia.org.
3. Sayeed MA. Fish Biodiversity in the Chalan *beel*, A Depression in North West Bangladesh. 2020. A Ph.D. Dissertation, Submitted to the Bangladesh Agricultural University, Mymensingh, Department of Fisheries Biology and Genetics.
4. Ahmed SH, Singh AK. Fishery development in oxbow–lakes (`Mans') of Bihar. Fishing Chimes 1991;11:59-62.
5. Hossain MAR, Nahiduzzaman M, Sayeed MA, Azim M E, Wahab MA, Olin PG, *et al*. The Chalan *beel* in Bangladesh: Habitat and biodiversity degradation, and implications for future management 2008, 13.
6. Kulbicki M, L Wantiez. Variations in the Fish Catch Composition in the Bay of St Vincent, New Caledonia, as Determined by Experimental Trawling, ORSTOM, Noum and New Caledonia. Aust. J Mar. Freshwater Res 1990;41:121-44.
7. Rahman AKA. Freshwater fishes of Bangladesh, 2nd edition, Zoological Society of Bangladesh, Dhaka, Bangladesh 2005, 394.
8. Degerman E, Nyberg P, Appelberg M. Estimating the number of species and relative abundance of fish in oligotrophic Swedish lakes using multi-mesh gillnets. Nordic Journal of Fisheries Research 1988;64:91-100.
9. Galib SM, Naser SMA, Mohsin ABM, Chaki N, Fahad MFH. Fish diversity of the River Choto Jamuna, Bangladesh: Present status and conservation needs. International Journal of Biodiversity and Conservation 2013;5:389-395. doi: 10.5897/IJBC2013.0552.
10. Masai DM, Ojuok JE, Ojwang W. Fish species composition, distribution And abundance in Lake Victoria basin, Kenya. Kenya Marine and Fisheries Research Institute 2001. P.O Box 1881, Kisumu, Kenya.
11. Rahman MF, Barman BK, Martin Van, Dewan S. Impacts of technological interventions on fish production and biodiversity of seasonal floodplains in Bangladesh CBFC Working Paper No. 1. Bangladesh Agricultural University, Mymensingh, The WorldFish Center, Bangladesh and South Asia 2010.
12. Mohsin ABM, Haque MSM, Galib SM, Fahad MFH, Chaki N, Islam MN, *et al*. Seasonal Abundance of Fin Fishes in the Padma River at Rajshahi District, Bangladesh, Department of Fisheries, University of Rajshahi, Rajshahi-6205, Bangladesh, World Journal of Fish and Marine Sciences 2013;5:680-685
13. Shafi M, Quddus MMA. Bangladesh Mathsya Shampad (Fisheries of Bangladesh). Bangla Academy, Dhaka. 1982; 444.
14. Emmanuel BE. Assessment of fishing practices in a tropical low brackish Lagoon ecosystem in southwestern Nigeria. Department of Marine Sciences, University of Lagos, Akoka, Lagos, Nigeria. Journal of life and physical sciences. acta SATECH, 2010; 3: 69-80.
15. Azhar SA. Impact of fish sanctuary on production and biodiversity of Aquatic Organisms in Rivers and *Beel*s of Haor Area. PhD dissertation. Department of Fisheries Management, Bangladesh Agricultural University, Mymensingh 2009.
16. Rahman S, Paul SK, Chu-fa Tsai. The fishing gear selectivity study. Progress Report. Fisheries Research Institute. Third Fisheries Project. Santahar, Bogra 1992, 1-20.
17. IUCN Bangladesh. Red book of threatened fishes of Bangladesh. IUCN (The World Conservation Union), Dhaka, Bangladesh 2000, 116.
18. FFP (Forth Fisheries Project). Final Report. Fourth Fisheries Project, Department of Fisheries, Ministry of Fisheries and Livestock, Government of the Peoples' Republic of Bangladesh, Romna, Dhaka 2005, 9.
19. Bobori DC, Salvarina I. Seasonal variation of fish abundance and biomass in gillnet catches of an East Mediterranean lake: Lake Doirani, Journal of Environmental Biology 2010;6:995-1000. (2010) © Triveni Enterprises, Lucknow (India), www.jeb.co.in