



Fish diversity of Halir *Haor*, Sunamganj, Bangladesh: A checklist

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ABSTRACT

The present study was carried out to assess the fish species availability in the Halir *haor* of Sunamganj district in Bangladesh from May 2019 to January 2020. A total of 68 fish species including prawn have been documented belonging to 11 orders and 25 families. Cypriniformes was found to be the most dominant order comprising 30.88%, followed by Siluriformes (25%), Perciformes (14.71%), Synbranchiformes (5.88%), Channiformes (5.88%), Clupeiformes (4.41%), Decapoda (4.41%), Beloniformes (2.94%) and Osteoglossiformes (2.94%). Tetraodontiformes and Anguiliformes were the least numerous orders constituting only 1.47% of the total number of species. Out of 68 species, 20 species belonged to the threatened where 8 species were vulnerable, 9 endangered and 3 critically endangered. Maximum number of species (51) were recorded in the month of January while lowest number (22) in the month of July. Additionally, based on the availability, 36.76%, 29.41%, 23.53% and 10.29% were found to be available, less available, rare and very rare, respectively. The present study revealed the major threats to Halir *haor* including habitat loss and degradation, indiscriminate harvesting of fish, fry and fingerlings, pollution and climate change. Establishment of fish sanctuaries to conserve both threatened and non-threatened fish species is recommended.

INTRODUCTION

Bangladesh is the largest river delta in the world, blessed with diverse inland, coastal and marine water resources. Freshwater fisheries resources of this country are distributed into river, estuary, beels, floodplain, lake, pond/ditch, *haor* and *baor* etc. (Alam et al., 2014). The freshwater fisheries resources of Bangladesh thought to be very rich and diverse and considered to accommodate at least 265 species of finfishes (Rahman, 2005). Alarmingly, fish species availability in Bangladesh has been suffered from human intervention resulting in habitat loss and degradation, overfishing, pollution etc. and as a consequence, many fish species have become highly endangered (Rahman et al., 2015; Galib et al., 2013). Even so, IUCN categorized a total of 64 fish species of Bangladesh as threatened (IUCN, 2015). Nowadays, the conservation of aquatic biodiversity has gained great ecological

importance over recent years (Hossain et al., 2012).

Haors are defined as saucer or bowl shaped shallow depressions covering about 25% of the North-Eastern part of Bangladesh (CNRS, 2004). The *haor* region comprises a wide variety of finfish including 143 indigenous and 12 exotic species along with several species of freshwater prawns (BHWDB, 2012). There are altogether 411 *haors* comprising an area of about 8000 km² dispersed in the districts of Sunamganj, Sylhet, Moulvibazar, Hobiganj, Netrakona, Kishoreganj and Brahmanbaria (BHWDB, 2011). *Haor* is a highly productive natural source and plays a crucial role in supplying protein. Particularly, fishing communities secure their livelihoods from *haor* fisheries related activities such as capturing fish, fish trading, fish drying and net weaving.

The Halir *haor* is located at Jamalganj upazila in Sunamganj district. The total area of the Halir

haor is approximately 7800 ha and surrounded by 33 villages. There are 7 small, medium and large inter-connected beels such as Sundorpur, Chatidhora, Boiggani, Kosma, Sindikka, Koijajinar and Dudharbeels. The Halir *haor* is a harbor of fish and non-fish organisms like prawns, snails, mussels and different types of aquatic vegetation. However, for sustainable exploitation and proper management of resources, the fish diversity in the water must be known (Huda et al. 2009). But there is no published research on its fish diversity and their ecological status. Hence, the present study attempted to prepare the checklist of fish species in the Halir *haor* with special emphasis on threatened fish species in the study area.

MATERIALS AND METHODS

The research was accomplished in Jamalganj upazila, under Sunamganj district, Sylhet, Bangladesh from May 2019 to January 2020. The fish samples were collected twice in a month from the local fishermen, fish landing centers and also from Suchna bazar fish market (Figure 1). During the study period different types of fishing gears were found to catch fishes namely cast nets, gill nets, lift nets and fishing traps locally known as *dohair*, *britti* and *kholsun* etc. The fish collected during sampling were identified primarily on the spot. However, species that seemed difficult to identify on spot were preserved in 10% buffered formalin solution and transported to the laboratory of Fish Biology and Genetics, Sylhet Agricultural University for identification and further study. The fish species were identified and sorted based on their external morphology (Rahman, 2005; Talwar and Jhingran, 1991).

Fish species availability were determined on the basis of abundance and categorized into 4 major groups as- available (A): species found available throughout the year; less available (LA): species found infrequently; rare (R): species found periodically; and very rare (VR): species found fortuitously (Gain et al., 2015; Rahman et al., 2012). Furthermore, necessary information about status and threats to fish diversity were also collected through interview of 100 fishermen, fish traders, local people and other key informants from the sampling areas. A semi-structured

questionnaire was prepared to carry out the survey works. Focus group discussion was also done in fish landing centers, fish bazar, and fisher's village of the selected sampling sites. After collecting the data through questionnaire interviews and FGDs, it was cross-checked through interviews of upazila fisheries officer (UFO), local leaders, fish traders and NGO workers in the study area. Moreover, discussion with upazila fisheries officer, NGO personnel, local leaders and experienced fishers were done regarding to management of this *haor*. Finally, all the collected data were accumulated and analyzed by Microsoft Excel 2013 and then presented in textual, tabular and graphical forms.

RESULTS AND DISCUSSION

A total of 68 species including prawn under 11 orders and 25 families were accounted in Halir *haor* during the study period (Table 1). Since there is no previous study on fish fauna of this *haor* it was not possible to compare the present findings. However, this result is similar or somewhat lower than the diversity of some other *haors* of Sylhet region. Iqbal et al. (2015) recorded total 83 species from Hakaluki *haor* in Sylhet district. In the Sunamganj *haor* area, Mahalder and Mustafa (2013) found 126 fish species from 39 families. Though the present findings were lower than those findings, presence of similar number of fish species was also documented in the Dekhar *haor* of Sunamganj district where 63 species were recorded by Roy et al. (2019) and 65 species were recorded by Pandit et al. (2015). In addition, Mazumder et al. (2016) recorded a total of 54 fish species from Hail *haor*. Roy (2010) recorded 47 species of fish fauna including prawn species from the Pagnar *haor* in Jamalganj under Sunamganj district which were lower than the present study.

Cyprinidae was the most abundant family with 19 species constituting 27.94% of all the number of species recorded (Figure 2). Next to Cyprinidae, other dominant families were Bagridae comprising 8.82% (6 species), Siluridae 5.88% (4 species) and Channidae 5.88% (4 species). Furthermore, three species belonged to family Mastacembelidae, Palaemonidae, Osphronemidae, Clupeidae, Schilbeidae and Ambassidae comprising 4.41%. Family Cobitidae and Notopteriidae comprising 2.94% (2 species). Only one species belonged to

family Sisoridae, Clariidae, Heteropneustidae, Chacidae, Hemiramphidae, Belonidae, Nandidae, Pristolepidae, Gobiidae, Anabantidae, Synbranchidae, Tetradontidae and Anguillidae (1.47%). Maximum number of finfish species under the family Cyprinidae were documented in Hail *haor* (Mazumder et al., 2016), Hakaluki *haor* (Iqbal et al., 2015) and Dekhar *haor* (Pandit et al., 2015) which are consistent with the findings of the present study.

Cypriniformes was found to be the most leading family (30.88%), followed by Siluriformes (25%), Perciformes (14.71%), Synbranchiformes (5.88%),

Channiformes (5.88%), Clupeiformes (4.41%), Decapoda (4.41%), Beloniformes (2.94%) and Osteoglossiformes (2.94%). Tetraodontiformes and Anguiliformes were the same and lowest percentage (1.47%) of the total number of species (Figure 1). Similar findings were reported by several researchers where they observed Cypriniformes as the most dominant order (Das et al., 2017; Mazumder et al., 2016; Iqbal et al., 2015). This is because Cypriniformes, Siluriformes and Perciformes are the most dominant groups in freshwater bodies of Bangladesh (Rahman, 2005).



Figure 1: Fish diversity in Halir *Haor*

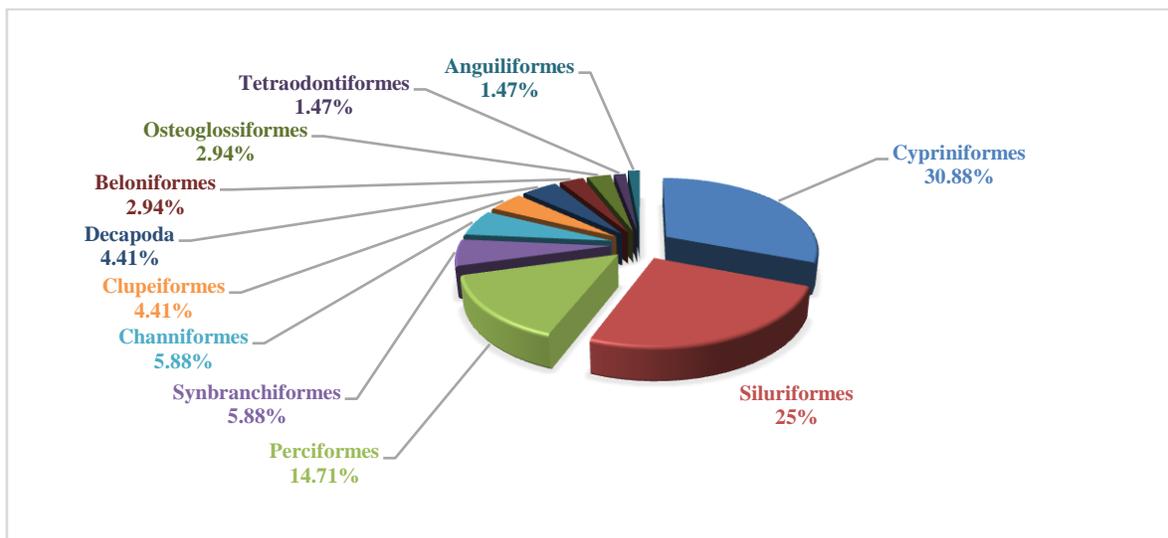


Figure 2: Order basis percentage of recorded fish species in the Halir *haor*

Table 1: Present status of fish diversity in Halir haor

SI	Family	Local Name	English Name	Scientific Name	Remarks	IUCN Status
Cypriniformes						
1	Cyprinidae	Rui	Indian Major Carp	<i>Labeo rohita</i>	A	LC
2		Catla	Indian Major Carp	<i>Catla catla</i>	LA	LC
3		Mrigal	Indian Major Carp	<i>Cirrhinus cirrhosus</i>	A	NT
4		Kalibaush	Indian Major Carp	<i>Labeo calbasu</i>	A	LC
5		Gonia	KuriaLabeo	<i>Labeo gonius</i>	LA	NT
6		Grasscarp	Grasscarp	<i>Ctenopharyn godonidella</i>	LA	EX
7		Bata	Minor Carp	<i>Labeo bata</i>	R	LC
8		Lachu	Reba Carp	<i>Cirrhinus reba</i>	A	NT
9		Mola	Carplet	<i>Amblypharyn godonmola</i>	A	LC
10		Dhela	Cotio	<i>Osteo bramacotio</i>	R	NT
11		Chela	FinescaleRazorbelly Minnow	<i>Salmostoma phulo</i>	LA	NT
12		Darkina	Flaying Barb	<i>Esomous danricus</i>	R	LC
13		Tit punti	Ticto Barb	<i>Puntius ticto</i>	A	VU
14		JatPunti	Spot Fin Swamp Barb	<i>P. sophore</i>	A	LC
15		Teri punti	One Spot Barb	<i>Puntius terio</i>	LA	LC
16		Jhilipunti	Golden Dwarf Barb	<i>Pethia gelius</i>	R	NT
17		Sharpunti	Olive Barb	<i>Puntius sarana</i>	R	NT
18		Mohashol	Tor Mahseer	<i>Tor tor</i>	VR	CR
19		Silvercarp	Silvercarp	<i>Hypophthalmichthys molitrix</i>	LA	EX
20	Cobitidae	Rani	Bengal loach	<i>Botia dario</i>	VR	EN
21		Gutum	Guntea loach	<i>Lepidocephalus guntea</i>	A	LC
Siluriformes						
22	Bagridae	Tengra	Striped dwarf catfish	<i>M. vitatus</i>	A	LC
23		Bujuri	Long bled catfish	<i>M. tenagra</i>	A	LC
24		Gulsha	Long whiskered catfish	<i>Mystus cavasius</i>	LA	NT
25		Rita	Whale catfish	<i>Rita rita</i>	R	EN
26		Ayre	Long whiskered catfish	<i>Sperata aor</i>	R	VU
27		GuizzaAyre	Giant River Catfish	<i>Sperata seenghala</i>	R	VU
28		Siluridae	Pabda	Pabo Catfish	<i>Ompok pabo</i>	A
29	kanipabda		Indian Butter Catfish	<i>Ompok bimaculatus</i>	A	EN
30	Modhupabda		Butter Catfish	<i>O. pabda</i>	R	EN
31	Boal	Freshwater shark	<i>Walla goattu</i>	A	VU	
32	Schilbeidae	Batashi	Indian potasi	<i>Pseudeutropius atherinoides</i>	R	LC
33		Bacha	Batchwavacha	<i>Eutropiichthys vacha</i>	R	LC
34	Garua	GaruaBachcha	<i>Clupiso magarua</i>	R	EN	
35	Sisoridae	Baghair	Dwarf goonch	<i>Bagarius yarrellii</i>	VR	CR
36	Clariidae	Magur	Walking catfish	<i>Clarias batrachus</i>	A	LC
37	Heteropneustidae	Shing	Stinging catfish	<i>Heteropneustes fossilis</i>	A	LC
38	Chacidae	Chaka	Indian Chaca	<i>Chaca chaca</i>	VR	EN
Osteoglossiformes						
39	Notopteridae	Foli	Bronze Featherback	<i>Notopterus notopterus</i>	LA	VU
40		Chitol	Clown knifefish	<i>Notopterus chitala</i>	R	EN
Clupeiformes						
41	Clupeidae	Chapila	Indian river shad	<i>Gadusia chapra</i>	LA	VU
42		Ilish	Hilsa shad	<i>Tenualosa ilisha</i>	LA	LC

43	Kachki	Ganges river sprat	<i>Coricaso borna</i>	LA	LC
Beloniformes					
44	Hemiramphidae	Ekthuta	Wrestling halfbeak	<i>Hyporamphus limbatus</i>	LA LC
45	Belonidae	Kakila	Fresh water gar fish	<i>Xenentodon cancila</i>	LA LC
Perciformes					
46	Ambassidae	LombaChanda	Elongated glass perchlet	<i>Chanda nama</i>	LA LC
47		LalChanda	Indian glass perchlet	<i>Pseudambassis lala</i>	R LC
48		GolChanda	Indian glass fish	<i>Pseudambassis ranga</i>	A LC
49	Nandidae	Meni	Gangeticleaffish	<i>Nandus nandus</i>	A NT
50	Badiidae	Napit Koi	Blue Perch	<i>Badis badis</i>	VR NT
51	Gobiidae	Bele	Tank goby	<i>Glossogobius giuris</i>	A LC
52	Anabantidae	Koi	Climbing perch	<i>Anabas testudineus</i>	A LC
53	Osphronemida	BaroKhalisha	Striped Gourami	<i>Trichogaster fasciatus</i>	A LC
54		LalKhalisha	Dwarf Gourami	<i>Trichogaster lalius</i>	LA LC
55		ChutoKhalisha	Honey Gourami	<i>Trichogaster sota</i>	A LC
Channiformes					
56	Channidae	Gojar	Giant snakehead	<i>Channa marulius</i>	R EN
57		Cheng	Asiatic snakehead	<i>Channa orientalis</i>	LA LC
58		Taki	Spotted snakehead	<i>Channa punctatus</i>	A LC
59		Shoal	Snakehead murrel	<i>Channa striatus</i>	LA LC
Synbranchiformes					
60	Mastacembelida	BoroBaim	Zig-zag eel	<i>Mastacembelus armatus</i>	LA EN
61	e	Guchi	Barred spiny eel	<i>Macrognathus pancalus</i>	A LC
62		Tara Baim	Lesser spiny eel	<i>Macrognathus aculeatus</i>	A NT
63	Synbranchidae	Kuchia	Mud eel	<i>Monopterus cuchia</i>	VR VU
Tetraodontiformes					
64	Tetraodontidae	Potka	Ocellatedpufferfish	<i>Tetraodon cutcutia</i>	R LC
Shellfish species: Decapoda					
65	Palaemonidae	Golda	Prawn	<i>Macrobrachium rosenbergii</i>	LA LC
66		Sadaicha	Prawn	<i>Macrobrachium sp.</i>	A LC
67		Kaloicha	Monsoon river prawn	<i>Macrobrachium malcolmsonii</i>	LA LC
Anguiliformes					
68	Anguillidae	Bamosh	Indian Longfin Eel	<i>Anguilla bengalensis</i>	VR VU

A: available, LA: less available, R: rare, VR: very rare, CR: critically endangered, EN: endangered, VU: vulnerable, NT: near threatened, LC: least concern and EX: exotic species

During the study period, 2 exotic fish species namely *Hypophthalmichthys molitrix* and *Ctenopharynx godonidella* belonging to family Cypriniformes were identified from Halir haor. Three exotic fish species were reported from Hakaluki haor (Iqbal et al., 2015). Moreover, 5 exotic fish species were also found in Dekhar haor (Roy et al., 2019). Since these species are popular in aquaculture of Bangladesh, and most probably, during heavy flood they escaped from adjacent aquaculture ponds (Galib et al., 2013). In order to avoid potential negative impacts on indigenous species, consideration should be given to these non-indigenous species (Galib et al., 2013).

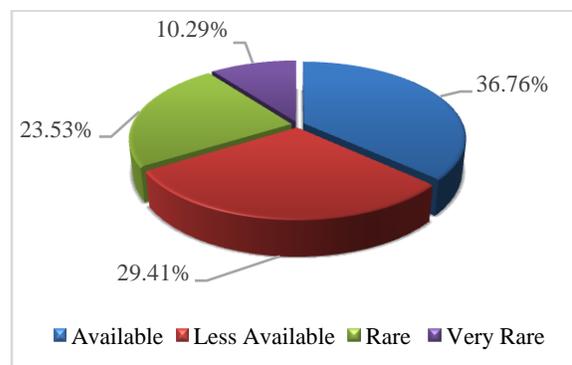


Figure 3: Percentage of fish diversity in the Halir haor

According to the respondents, 16 species were found rare (23.53%) and 7 species were very rare (10.29%) in Halir *haor* based on availability status. On the other hand, 25 species were found available (36.76%) and 20 species were less available (29.41%) (Figure 3). More or less similar results were documented from Dekhar *haor* (Roy et al., 2019, Pandit et al., 2015) and wetlands of Sylhet district (Islam et al., 2015).

During this study period highest numbers of species (51) were recorded in the month of January. Next to January, 46 species were recorded in the month of December and 36 species were recorded in May. The lowest of 22 species were recorded in the month of July (Figure 4). In the month of June and July the lowest number of species was recorded because heavy rainfall makes the water level high for fishing. Fishermen of Halir *haor* mainly harvest fish throughout the year except February to April due to diminution of water level and the *haor* converted in the agricultural land. The maximum number of fish species was recorded during winter season (November to January). This is because, water depth reduced to minimum due to lack of sufficient rainfall this time allowing fishermen to employ their fishing gears more effectively (Iqbal et al. 2015; Nath and Deka 2012).

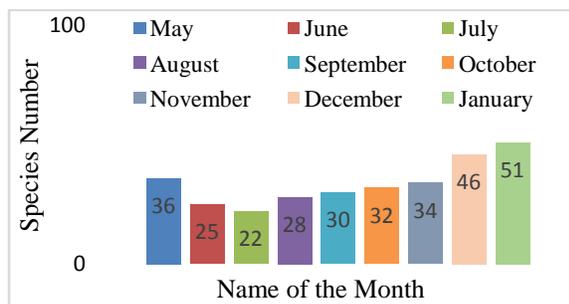


Figure 4: Monthly variation of fish species availability in Halir *haor*

According to IUCN (2015), there are 253 species of inland freshwater fishes; among those 9 species are critically endangered (CR), 30 species are endangered (EN), 25 species are vulnerable (VU), 27 species are near threatened (NT) and 122 species are least concern (LC), and the rest 40

species are considered data deficient (DD) throughout the country.

In Halir *haor*, a total of 20 species were recorded as threatened (IUCN, 2015). Among them 3 critically endangered, 9 endangered and 8 vulnerable (Figure 5) representing 11.76%, 13.24%, and 4.41%, respectively. Meanwhile, least concern (LC) species and near threatened species (NT) constitutes 51.47% and 16.18% of the total population (Figure 6).

Das et al. (2017) recorded 28 threatened species in Ratargul Freshwater Swamp Forest. Twenty four threatened species were found in the Dekhar *haor* (Pandit et al., 2015). In Hakaluki *haor* 14.46% vulnerable, 21.69% endangered and 13.25% critically endangered species were recorded (Iqbal et al., 2015).

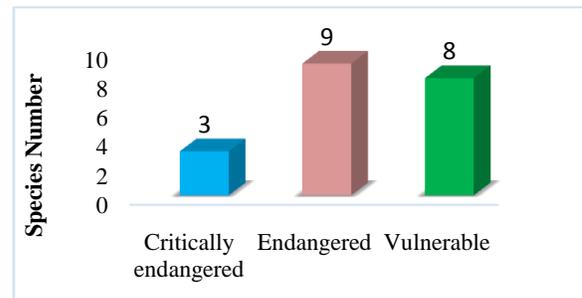


Figure 5: Present status of threatened fish species in Halir *haor*

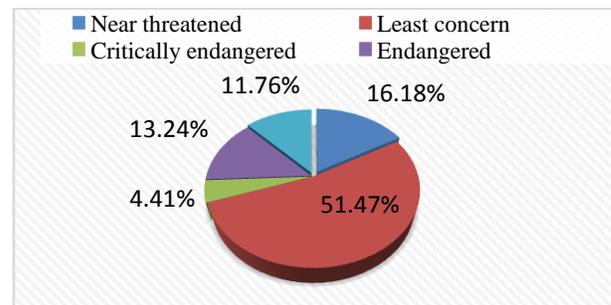


Figure 6: Percentage of threatened fish species in Halir *haor*

In the present study, it was observed that several reasons are responsible for reducing fish species availability in Halir *haor* including destruction of natural habitats, over exploitation of fish and juveniles, harvesting fish during breeding season, water pollution caused by domestic wastes,

climate change and use of pesticides and agrochemicals. As 29.41% of fish species were threatened, so the proper steps should have to take for the protection and conservation of these valuable fisheries resources. Restriction on fishing prior to breeding season, controlled discharge of domestic wastes, banning the use of fine-meshed net, establishment of fish sanctuary, arranging training program for fishermen to increase awareness can be done for protection of fish diversity in Halir *haor*.

CONCLUSION

The present study revealed a total of 68 fish species in Halir *haor* where 29.41% fish species were threatened. The study also indicated that loss of biodiversity is alarming and recommended some management measures. Abundance of threatened fish species (29.41%) among the total catch strongly reflecting its potentiality to an excellent site for natural conservation. However, government and non-government organizations should take some important step to carry out further studies, improve the natural habitat as well as increasing people awareness to conserve biodiversity in the Halir *haor*.

REFERENCES

- Alam MB, Islam MA, Marine SS, Rashid A, Hossain MA and Rashid H (2014). Growth performances of gift tilapia (*Oreochromis niloticus*) in cage culture at the old Brahmaputra river using different densities, Journal of Sylhet Agricultural University, 1(2): 265-271.
- BHWDB (2011). Bangladesh *Haor* and Wetland Development Board. 2011. Ministry of Water Resources, Government of the People's Republic of Bangladesh, Dhaka.
- BHWDB (2012). Bangladesh *Haor* and Wetland Development Board. 2012. Master Plan of *Haor* Areas: Volume 1, Summary Report. Ministry of Water Resources, Government of the People's Republic of Bangladesh. 18pp.
- CNRS, Center for Natural Resource Studies (2004). Management of Aquatic Ecosystems through Community Husbandry Feasibility Report on MACH (Management of Aquatic Ecosystems through Community Husbandry) Outreach Program. 10 pp.
- Das SK, Roy NC and Hossain MA (2017). Diversity of indigenous fish species in Ratargul Freshwater Swamp Forest, Bangladesh, International Journal of Scientific Research in Environmental Science, 5:0028-0035.
- Gain D, Mahfuj MSE, Sultana S and Mistri NA (2015). A Preliminary Study on Fish Fauna of the Passur River in Bangladesh, International Journal of Biological Sciences, 7(7):346-353.
- Galib SM, Naser SMA and Mohsin ABM (2013). Fish biodiversity of river chotojauuna, Bangladesh: present status and conservation needs, International Journal of Biological Sciences, 5(6):389-395.
- Hossain MY, Rahman MM, Jewel MAS, Ahmed ZF, Ahamed F, Fulanda B and Ohtomi J (2012). Conditions and form-factor of the five threatened fishes from the Jamuna (Brahmaputra River Distributary) River, northern Bangladesh, Sains Malaysiana, 41(6):671-678.
- Hossain MAR (2014). An Overview of Fisheries Sector of Bangladesh, Research in Agriculture, Livestock and Fisheries, 1(1):109-126.
- Huda ATMN, Shah MS, Hasanuzzaman AFM and Azam MR (2009). An Investigation on the Ichthyofauna of the Gorai-Modhumati River System, Bangladesh Journal of Zoology, 37(1):11-24.
- Iqbal DMM, Nasren S, Mamun MAA and Hossain MM (2015). Fish assemblage including threatened species in Hakaluki *haor*, Sylhet, Bangladesh, Journal of Aquaculture In The Tropics, 30(3-4):233-246.
- Islam MA, Islam MZ, Barman SK, Morshed F and Marine SS (2015). Study on present status of fish biodiversity in wetlands of Sylhet District, Bangladesh, Agriculture, Forestry and Fisheries, 4(6): 296-299.
- IUCN B (2015). Red list of Bangladesh, Volume 5: Freshwater Fishes. IUCN, International Union for Conservation of Nature, Bangladesh country office, Dhaka, Bangladesh. pp. 29.
- Mahalder B and Mustafa MG (2013). Introduction to Fish Species Diversity: Sunamganj *Haor* Region within CBRMP's Working Area. Community Based Resource Management Project-LGED, Worldfish, Dhaka, Bangladesh. 75pp.
- Mazumder SK, Das SK, Ghaffar MA, Rahman MH, Majumder MK and Basak LR (2016). Role of co management in wetland productivity: a case study from Hail *haor* in Bangladesh. International Journal of Biological Sciences, 9(3):466-482.
- Nath B and Deca C (2012). A Study on Fish Diversity, Conservation Status and Anthropogenic Stress of Chandubi Tectonic Lake, Assam, India.
- Pandit D, Kunda M, Harun-Al-Rashid A, Sufian MA and Mazumder SK (2015). Present Status of Fish Biodiversity in Dekhar Haor, Bangladesh: a Case

- Study, World Journal of Fish and Marine Sciences,7(4):278-287.
- Rahman AKA (2005). Freshwater fishes of Bangladesh, 2nd edition, Zoological Society of Bangladesh, Department of Zoology, University of Dhaka, Dhaka-1000. 255-256 pp.
- Rahman MM, Hossain MY, Ahamed F, Fatematuzzhura, Subha BR, Abdallah EM and Ohtomi J (2012). Biodiversity in the Padma Distributary of the Ganges River, Northwestern Bangladesh: Recommendations for Conservation, World Journal of Zoology,7(4):328-337.
- Roy KC (2010). Fish Biodiversity and the Livelihoods of the Fishing Community in PagnarHaor under JamalganjUpazila in Sunamganj District. MS Thesis. Dept. Aqua. BAU, Mymensingh. pp. 33-59.
- Roy NC, Sen RC and Chowdhury MA (2019). Consequences of climate change on fish diversity in Dekhar *Haor* Bangladesh, International Journal of Fisheries and Aquatic Studies,7:118-124.
- Talwar PK and Jhingran AG (1991). Inland Fishes of India and Adjacent Countries, (A. A. Balkema, Rotterdam, Netherlands); Vol. 2.