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Fishes of the river Padma, Bangladesh: Current trend and conservation status

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Abstract

The Padma River is one of the longest rivers and it is believed to be an important spawning and feeding ground for riverine fish species of Bangladesh. This study was conducted from February 2013 to January 2014 and with a view to revealing the diversity of fish fauna in the river. A total of 71 species were recorded belonging to 10 orders, 26 families and 54 genera. The most dominant fish order was Cypriniformes contributing 28 species in 16 genera. Cyprinidae was most dominant family contributing 23 species in 16 genera. Four alien species were found. Twenty eight species have been considered threatened by IUCN Bangladesh. These fishes were belonging to the following categories, Vulnerable (13%), Endangered (18%) and Critically Endangered (8%). Comparing the results with the previous findings, it was revealed that the species diversity have declined in the Padma River over time. Considering all the findings it is concluded that the Padma River could be considered a refuge for conservation of threatened freshwater fishes of Bangladesh. The conservation efforts should ensure minimization of anthropogenic impacts, especially the fishing pressure and introduction of alien invasive species.

Keywords: Padma River, riverine fish, threatened fish, population trend, conservation

INTRODUCTION

Bangladesh is fortunate enough in having extensive and huge freshwater resources scattered all over the country in the form of rivers, ponds, ditches, *beels*, lakes, *haors*, *baors*, floodplains and canals. Along with potential water resources, Bangladesh is also rich in the diversity of various fish species and other important aquatic species. Hence it is ranked third in fish biodiversity in Asia behind China and India, with approximately 800 species of fresh, brackish and marine waters (Hussain and Mazid 2001). Bangladesh has predominantly four major river systems- (I) The Brahmaputra-Jamuna (II) The Ganges-Padma (III) The Surma-Meghna and (IV) The Chittagong Region river system. The fishes are the most diverse and most abundant vertebrate in world and about 40% of them live in freshwater (Ghorbani *et al.* 2013). Bangladesh is rich in her fish fauna supporting at least 265 freshwater fin fish species (Rahman 2005). The Padma River is one of the longest and major freshwater rivers in Bangladesh and believed to an important feeding and breeding ground for many riverine fishes of the country. A large amount of fishes along with other fisheries organisms (e.g. prawn) are harvested each year from this river reflecting the richness of water bodies of Bangladesh. But, at present time loss of aquatic biodiversity from natural water bodies is a crucial problem in Bangladesh (Galib *et al.* 2009 and 2013a; Imteazzaman and Galib 2013; Chaki *et al.* 2014; Mohsin *et al.* 2013 and 2014).

Available research efforts have suggested that fish diversity of many large and renowned water bodies of the country including the mighty Padma is at stake (Galib *et al.* 2009 and 2013a; Mohsin and Haque 2009; Rahman *et al.* 2012; Imteazzaman and Galib 2013; Mohsin *et al.* 2013). Already a total of 54 species of fishes of Bangladesh have been declared threatened in the Redlist database by IUCN in Bangladesh (IUCN Bangladesh 2000).

But this became antiquated and there is need for updated list to understand the present status and to commence necessary management to improve the status of fishes. Water body specific biodiversity research will be of great help in this aspect.

Though few research works have been conducted in river Padma and the researchers have listed available fish species in the river (Hossain and Haque 2005; Bhuiyan *et al.* 2008; Rahman *et al.* 2012; Mohsin *et al.* 2013). All these efforts, except for Mohsin *et al.* (2013), were made to make a list of available fish species and no statistical data were presented regarding recorded fish species. So it is quite impossible to understand the existing status of fishes in the river Padma. Moreover, in some of these researches, some controversial results were also presented. As for example, according to Rahman *et al.* (2012) species like *Labeo nandina* and *Batasio tengara* (locally called Nandil and Tengra respectively) were available in Padma in recent years, which are believed to be extinct in water bodies of Bangladesh (Hossain 2014). So there is a need for in depth research rather than simple detection of species available. However, in our paper we tried to reveal existing fish species in the river Padma with present conservation status in Bangladesh.

METHODOLOGY

Sampling site and duration: The current study was conducted in the Padma River (lower part of the Ganges River) of Rajshahi district of Bangladesh. Sampling spots were Bulanpur Ghat, Rajpara and Shahapur Ghatin Rajshahi City Corporation area. This survey was carried out for a period of one year from January to December, 2013.

Sampling framework: Weekly field survey was carried out with the help of professional fishermen in the sampling spots. Traditional fishing gear, the seine net was used for sampling of fishes. The length and width of the seine net was 50 m and 5 m respectively and the mesh size was 2 cm. The fishing nets were operated early in the morning (3.00 to 6.00 am) and in the evening (5.00 to 8.00 pm).

Fish specimen collection and identification: Specimens of recorded fish were collected, preserved (rare species only) and identified based on the morphometric and meristics characters following (Rahman 1989 and 2005; Talwar and Jhingran 1991). The specimens were preserved in 10% buffered formalin solution in leveled plastic jars.

***Determination of conservation status and population trend*:** The global conservation status and population trend were determined following the database of IUCN (2015); whereas, the local conservation status was based on IUCN Bangladesh (2000).

Data analysis: Collected data were analyzed by computer software Microsoft Excel 2007.

RESULTS AND DISCUSSION

Diversity of Fish Species: Seventy one species were recorded in the river Padma belonging to 10 orders, 26 families and 54 genera. The most dominant fish order was Cypriniformes contributing 23 species in 16 genera followed by Siluriformes contributing 17 species in 14 genera and so on (Table 1). Cyprinidae was the most dominant family contributing 20 species in 14 genera. Of the available species, 4 were exotic and all were popular aquaculture species in Bangladesh (Table 1).

Global conservation status: Nearly one third (72%) of the total fish species were belonging to Least Concern category of IUCN. There were 13% species whose global conservation status was Not Assessed by the IUCN (Figure 1).

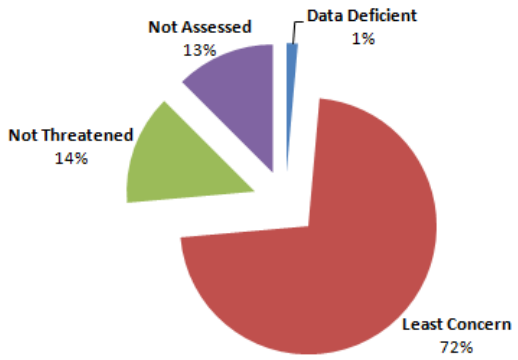

Figure 1: Global conservation status of fishes of the Padma River

Local conservation status: A total of 28 fish species have been recorded from the present study which considered threatened to extinct in Bangladesh by IUCN Bangladesh (2000). These fishes were belonging to following categories, Vulnerable, Endangered and Critically Endangered contributing 13%, 18% and 8% respectively of the total fish species recorded. No management for the conservation of threatened fish species in the river was found. More than half of the total fish species in the river were Not Threatened in Bangladesh (Figure 2).

Global population trend: Population trend of more than half of the total fish species of Padma River was found Unknown (51%). Almost a quarter of the total fish species were of Declining status (Figure 3). Fishes were also belonging to two other categories- Stable and Not Assessed.

Table 1: Fish species of the Padma River, their conservation status and global population trend

Taxonomic position and species	*Conservation status*		*Global Population trend*
	Global	*Local*	
Beloniformes			
Belonidae (Needle fish)			
Xenentodon cancila (Hamilton, 1822)	LC	NO	UN
Anguilliformes			
Ophichthidae (Snake eels)			
Pisodonophis cancrivorus (Richardson, 1848)	NA	NO	NA
Clupeiformes			
Clupeidae (Herrings)			
Gudusia chapra (Hamilton, 1822)	LC	NO	DE
Corica soborna (Hamilton, 1822)	LC	NO	UN
Gonialosa manmina (Hamilton, 1822)	LC	NO	UN
Tenualosa ilisha (Hamilton, 1822)	LC	NO	DE
Engraulidae (Anchovies)			
Setipinna phasa (Hamilton, 1822)	LC	NO	DE
Setipinna taty (Valenciennes, 1848)	NA	NO	NA
Cypriniformes			
Cyprinidae (Minnows and Carps)			
Cirrhinus reba (Hamilton, 1822)	LC	VU	ST
Cirrhinus mrigala (Hamilton, 1822)	LC	NO	ST
Osteobrama cotio (Hamilton, 1822)	LC	EN	UN
Esomus danricus (Hamilton, 1822)	LC	DD	ST
Amblypharyngodon mola (Hamilton, 1822)	LC	NO	ST
Aspidoparia morar (Hamilton, 1822)	LC	DD	UN
Aspidoparia jaya (Hamilton, 1822)	LC	DD	DE
Puntius sarana (Hamilton, 1822)	LC	CR	UN
Puntius sophore (Hamilton, 1822)	LC	NO	UN
Puntius ticto (Hamilton, 1822)	LC	VU	UN
Puntius chola (Hamilton, 1822)	LC	NO	UN
Salmophasia phulo (Hamilton, 1822)	LC	NO	UN
Salmophasia bacaila (Hamilton, 1822)	LC	NO	ST
Labeo bata (Hamilton, 1822)	LC	EN	UN
Labeo rohita (Hamilton, 1822)	LC	NO	UN
Labeo calbasu (Hamilton, 1822)	LC	EN	UN
Catla catla (Hamilton, 1822)	LC	NO	UN
Hypophthalmichthys molitrix (Valenciennes, 1844)	NT	EX	DE
Aristichthys nobilis (Richardson, 1845)	NT	EX	DE
Ctenopharyngodon idella (Valenciennes, 1844)	NT	EX	DE
Cobitidae (Loaches)			
*Botia dario (*Hamilton, 1822)	LC	EN	UN
*Botia lohachata (*Hamilton, 1822)	NA	EN	NA
Lepidocephalus guntea (Hamilton, 1822)	LC	NO	ST
Perciformes			
Ambassidae/Chandidae (Glassfishes)			
Chanda nama Hamilton, 1822	LC	VU	DE
Parambassis ranga (Hamilton, 1822)	LC	VU	ST
Parambassis lala (Hamilton, 1822)	NA	DD	NA

Table 1: Continued.

Taxonomic position and species	*Conservation status*		*Population trend*
	Global	*Local*	
Anabantidae (Climbing Gouramies)			
Anabas testudineus (Bloch, 1792)	DD	NO	UN
Cichlidae (Cichlids)			
Oreochromis mossambicus (Peters, 1852)	NT	EX	UN
Gobiidae (Gobies)			
Glossogobius giuris (Hamilton, 1822)	LC	NO	UN
Osphronemidae (Gouramies)			
Trichogaster fasciata (Hamilton, 1822)	LC	NO	UN
Trichogaster lalius (Hamilton, 1822)	LC	NO	UN
Sciaenidae (Drums or Croakers)			
Otolithoides pama (Hamilton, 1822)	NA	NO	NA
Nandidae (Asian Leaffishes)			
Badis badis (Hamilton, 1822)	LC	EN	UN
Nandus nandus (Hamilton, 1822)	LC	VU	UN
Channidae (Snakeheads)			
Channa punctata (Bloch, 1793)	LC	NO	UN
Channa orientalis Bloch & Schneider, 1801	NA	VU	NA
Channa striata (Bloch, 1793)	LC	NO	UN
Channa marulius (Hamilton, 1822)	LC	EN	UN
Mastacembelidae (Spiny Eels)			
Mastacembelus pancalus Hamilton, 1822	NA	NO	NA
Mastacembelus armatus (Lacepede, 1800)	LC	EN	UN
Macrognathus aculeatus (Bloch, 1786)	NA	VU	NA
Mugiliformes			
Mugilidae (Mullets)			
Rhinomugil corsula (Hamilton, 1822)	LC	NO	UN
Siluriformes			
Bagridae (Bagrid Catfishes)			
Sperata seenghala (Sykes, 1839)	LC	EN	UN
Sperata aor (Hamilton, 1822)	LC	VU	ST
Mystus tengara (Hamilton, 1822)	LC	NO	UN
Mystus vittatus (Bloch 1794)	LC	NO	DE
Rita rita (Hamilton, 1822)	LC	CR	DE
Clariidae (Airbreathing Catfishes)			
Clarias batrachus (Linnaeus, 1758)	LC	NO	UN
Heteropneustidae (Airsac Catfishes)			
Heteropneustes fossilis (Bloch, 1794)	LC	NO	ST
Pangasiidae (Shark Catfishes)			
Pangasius pangasius (Hamilton, 1822)	LC	CR	DE
Schilbeidae (Schilbeid Catfishes)			
Ailia coila (Hamilton, 1822)	NT	NO	DE
Eutropiichthys vacha (Hamilton, 1822)	LC	CR	DE
Clupisoma garua (Hamilton, 1822)	LC	CR	DE
Pseudeutropius artherinoides	NA	NO	NA
Silonia silondia (Hamilton, 1822)	LC	EN	UN

Table 1: Continued.

Taxonomic position and species	*Conservation status*		*Population trend*
	Global	*Local*	
Siluridae (Sheatfishes)			
Ompok pabda (Hamilton, 1822)	NT	EN	DE
Ompok bimaculatus (Hamilton, 1822)	NT	EN	UN
Wallago attu (Bloch & Schneider, 1801)	NT	NO	DE
Sisoridae (Sisorid Catfishes)			
Bagarius bagarius (Hamilton, 1822)	NT	CR	DE
Osteoglossiformes			
Notopteridae (Featherfin Knifefishes)			
Chitala chitala (Hamilton, 1822)	NT	EN	UN
Notopterus notopterus (Pallas, 1769)	LC	VU	UN
Cyprinodontiformes			
Aplocheilidae (Asian Rivulines)			
Aplocheilus panchax (Hamilton, 1822)	LC	NO	UN
Tetraodontiformes			
Tetraodontidae (Puffers)			
Tetraodon cutcutia Hamilton, 1822	LC	NO	UN

Global conservation status: DD, Data Deficient; LC, Least Concern, NT, Not Threatened
Local conservation status: CR, Critically Endangered; DD, Data Deficient; EN, Endangered; EX, Exotic; NO, Not Threatened; VU, Vulnerable
Population trend: DE, Declining; NA, Not Assessed; ST, Stable; UN, Unknown

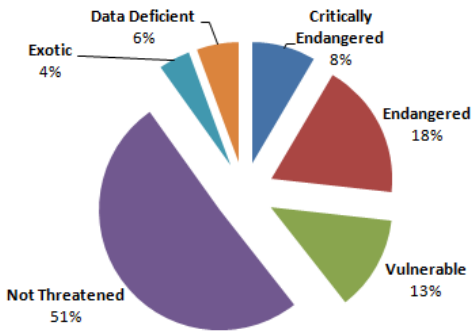

Figure 2: Local conservation status of fishes of the Padma River

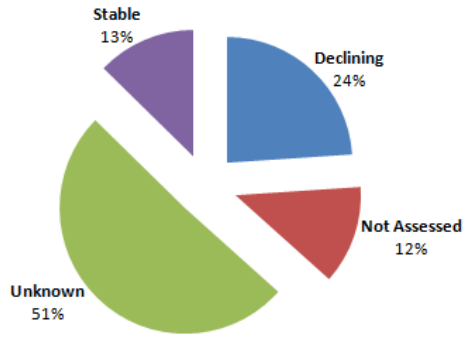

Figure 3: Global population trend of fishes of the Padma River

DISCUSSION

Like Mohsin *et al.* (2013), marked decline in number of available fish species in the river Padma was also revealed from the present study as Islam and Hossain (1983) recorded 110 fish species whereas only 71 species are recorded in the present study. This reduction in the number of fish species is a common trend in Bangladesh and reflects the current scenario of water bodies of country. Reduction in number and abundance of fish species was mainly due to anthropogenic impacts, especially the fishing pressure, destruction of natural habitats by constructing roads and so on which were also noted by Mohsin *et al.* (2013). Bhuiyan *et al.* (2008) reported 73 species of fish which also indicates that number of fish species decreasing in course of time in the Padma River. In another study by Samad *et al.* (2010), a total of 57 small indigenous fish species have been reported from the river Padma.

Fish species are found in the Padma River was found higher than that of many water bodies outside Bangladesh, especially the neighbor country India (Paunikar *et al.* 2012; Alexandar and Siva Sankar 2013; Reddy 2013). Mohsin *et. al.* (2013) recorded 69 fish species however maximum number of recorded fish species was also found lower than that of Rahman *et al.* (2012) who mentioned that 80 fin fish species were available in the Padma River. They reported existence of *Labeo nandina* and *Batasio tengara* in river but these two

species were not found in the present study and same findings were also reported by Mohsin *et al.* (2013). This variation in results might be due to variation in sampling procedure followed in the study, as Rahman *et al.* (2012) surveyed various fish landing centers adjacent to the Padma River where fishes from many other sources are landed. Furthermore, it is not a reliable method to study biodiversity by studying fish landing centers or markets (Mohsin *et al.* 2013).

Majority (72%) of the total fish species of the Padma River were belonging to Least Concern category of IUCN. Chaki *et al.* (2014) reported 84.43% of total fishes of the Atrai RIver were belonging to the same category. A considerable portion (13%) of the total fish species was present whose conservation status was Not Assessed which is much higher than that the findings of Chaki *et al.* (2014).

Global population trend of more than half of the total fish species of Padma River was found Unknown which is very similar to the findings of Chaki *et al.* (2015). Almost a quarter of the total fish species were of Declining status. Similar result was also mentioned by Chaki *et al.* (2014) in their study in the Atrai River.

A considerable number of fish species recorded in the present study are considered threatened to extinct fish in freshwater of Bangladesh; and the proportion was more than half of the total threatened fish species (54) of country (IUCN Bangladesh 2000). A large portion of fish species were belonging threatened categories indicates degradation in fish abundance and its diversity in the Padma River. Similar comment was also made by Mohsin *et al.* (2013). The present status in the Padma River is similar to others water bodies of Bangladesh (Galib *et al.* 2009 and 2013a; Imteazzaman and Galib 2013). No implementation of conservation method was also observed indicates less or no attention by the appropriate authority.

Nowadays, stocking of exotic species into open or semi-open waters became a common practice. Community based fisheries management system has great influence on occurrence of alien species in natural waters (Mohsin *et al.* 2009). Presence of alien fish species is a potential threat to indigenous species. This is because of that the alien species are responsible for undermining the production of native species (Ahmed and Hambrey 2005). Alien fish like tilapia (*O. mossambicus*) can multiply rapidly and takes less time to establish itself in a body of water. This species was also reported from other natural water bodies of the country during rainy seasons only (Galib *et al.* 2009; Imteazzaman and Galib 2013) but it is found round the year in the Padma River. Extreme care need to be ensured to avoid the negative impact of this species in the Padma River.

Occurrence of silver carp, *H. molitrix*, in the open and semi-open waters of Bangladesh is a common phenomenon. This species is the most commonly consumed fish in rural Bangladesh (Galib *et al.* 2013b). Apart from the regular fresh consumption, silver carp harvested from the Chalan Beel is also dried under the sun (Samad *et al.* 2009). Escape of introduced species from aquaculture ponds or other water bodies is the sole reason for this incidence. Regular monitoring of impacts of non-native species to the indigenous fish species is essential otherwise their population could multiply at the expense of native species. However, it is the most desirable to prevent the introduction of alien species (Imteazzaman and Galib 2013; Önsoy *et al.* 2011).

CONCLUSION

Anthropogenic effects were much higher in the study area especially fishing pressure and presence of alien species. Effective and rapid management are essential regarding presence of exotic species. A major part of the total fishes were considered threatened species in Bangladesh. Thus, the studied river can be considered a refuge for conservation of threatened freshwater fishes of Bangladesh. The conservation efforts should ensure that the current status of fish fauna is maintained by minimizing anthropogenic impacts, especially the fishing pressure and introduction of alien invasive species.

REFERENCES

Ahmed KKU and Hambrey JB (2005) Studies on the fish catch efficiency of different types of fishing gear in Kaptai Reservoir, Bangladesh. Lakes & Reservoirs: Research and Management, 10: 221-234. DOI: 10.1111/j.1440-1770.2005.00280.x

Alexandar R and Siva Sankar R (2013) Diversity of fish fauna and their threats in Ousteri Lake, Puducherry, India. World Journal of Zoology 8(2): 154-158. DOI: 10.5829/idosi.wjz.2013.8.2.66155

Bhuiyan SS, Joadder MAR and Bhuiyan AS (2008) Occurrence of fishes and non-fin fishes of the River Padma near Rajshahi, Bangladesh. University Journal of Zoology Rajshahi University 27: 99-100.

Chaki N, Jahan S, Fahad MFH, Galib SM and Mohsin ABM (2014) Environment and fish fauna of the Atrai River: global and local conservation perspective. Journal of Fisheries 2(3): 163-172. DOI: 10.17017/jfish.v2i3.2014.46

Galib SM, Naser SMA, Mohsin ABM, Chaki N and Fahad FH (2013a) Fish diversity of the River Choto Jamuna, Bangladesh: Present status and conservation needs. International Journal of Biodiversity and Conservation 5(6): 389-395. DOI: 10.5897/IJBC 2013.0552

Galib SM, Naser SMA, Mohsin ABM, Chaki N and Fahad MFH (2013) Choice of fishes for consumption by the rural people of Bangladesh. Trends in Fisheries Research 2(1): 20-23

Galib SM, Samad MA, Mohsin ABM, Flowra FA and Alam MT (2009) Present status of fishes in the Chalan Beel- the largest beel (wetland) of Bangladesh. International Journal of Animal and Fisheries Science 2(3): 214-218.

Ghorbani R, Abbasi F, Molaei M and Naeimi A (2013) Identification and distribution of fish fauna in Kaboodval Stream (Golestan Province, Iran). World Journal of Fish and Marine Sciences 5(5): 467-473. DOI: 10.5829/idosi.wjfms.2013.05.05.73142.

Hossain MA and Haque MA (2005) Fish species composition in the River Padma near Rajshahi. Journal of Life Earth Science 1(1): 35-42.

Hossain MAR (2014). Habitat and fish diversity: Bangladesh perspective, pp 1-26. In: Wahab, MA, Shah MS, Hossain MAR, Barman BK and Hoq ME (eds.), Advances in Fisheries Research in Bangladesh: I. Proc. of 5th Fisheries Conference & Research Fair 2012. 18-19 January 2012, Bangladesh Agricultural Research Council, Dhaka, Bangladesh Fisheries Research Forum, Dhaka, Bangladesh. 246 pp.

Hussain MG and Mazid MA (2001) Genetic improvement and conservation of carp species in Bangladesh. Bangladesh Fisheries Research Institute and International Center for Living Aquatic Resources Management.

Imteazzaman AM and Galib SM (2013) Fish fauna of Halti Beel, Bangladesh. International Journal of Current Research 5(1): 187-190.

Islam MS and Hossain MA (1983) An account of the fishes of the Padma near Rajshahi. Rajshahi Fisheries Bulletin 1(2): 1-31.

IUCN (2015) The IUCN Red List of Threatened Species. Version 2015.2. <www.iucnredlist.org>. Downloaded on 01 July 2015.

IUCN Bangladesh (2000) Red book of threatened fishes of Bangladesh. IUCN- The world conservation Union. 116 pp.

Mohsin ABM and Haque ME (2009) Diversity of fishes of Mahananda River at Chapai Nawabganj district. Research Journal of Biological Sciences 4(7): 828-831.

Mohsin ABM, Haque SMM, Galib SM, Fahad MFH, Chaki N, Islam MN and Rahman MM (2013) Seasonal abundance of fin fishes in the Padma River at Rajshahi district, Bangladesh. World Journal of Fish and Marine Sciences 5(6): 680-685. DOI: 10.5829/idosi.wjfms.2013.05.05.75109

Mohsin ABM, Hasan MM and Galib SM (2009) Fish diversity of community based fisheries managed oxbow lake (Bookbhara Baor) in Jessore, Bangladesh. Journal of Science Foundation 7(1): 121-125.

Mohsin ABM, Yeasmin F, Galib SM, Alam B and Haque SMM (2014) Fish fauna of the Andharmanik River in Patuakhali, Bangladesh. Middle-East Journal of Scientific Research 21(5): 802-807. DOI: 10.5829/ idosi.mejsr.2014.21.05.8415

Önsoy B, Filiz H, Tarkan AS, Bilge G and Tarkan AN (2011) Occurrence of non-native fishes in a small man-made lake (Lake Ula, Muðla): Past, present, future perspectives. Turkish Journal of Fisheries and Aquatic Sciences 11: 209-215. DOI: 10.4194/trjfas. 2011.0205.

Paunikar S, Tiple A, Jadhav SS and Talmale SS (2012) Studies on ichthyofaunal diversity of Gour River, Jabalpur, Madhya Pradesh, Central India. World Journal of Fish and Marine Sciences 4(4): 356-359. DOI: 10.5829/idosi.wjfms.2012.04.04.6388

Rahman AKA (1989) Freshwater fishes of Bangladesh, first edition. Zoological Society of Bangladesh, Department of Zoology, University of Dhaka, Dhaka-1000. 364 pp.

Rahman AKA (2005) Freshwater fishes of Bangladesh, second edition. Zoological Society of Bangladesh, Department of Zoology, University of Dhaka, Dhaka-1000. 263 pp.

Rahman MM, Hossain MY, Ahamed F, Fatematuzzhura, Subba 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. doi: 10.5829/idosi.wjz.2012.7.4.6634.

Reddy YA, Sadasivaiah B, Rajakullaiswamy K, Indira P and Pullaiah T (2013) Ichthyofauna of Thummalapalle Uranium Mining area, Andhra Pradesh, India. World Journal of Zoology 8(1): 62-66. DOI: 10.5829/idosi.wjz.2013.8.1.6685

Samad MA, Asaduzzaman M, Galib SM, Kamal MM and Haque MR (2010) Availability and Consumer Preference of Small Indigenous Species (SIS) of the River Padma at Rajshahi, Bangladesh. International Journal of BioResearch 1(5): 27-31.

Samad MA, Galib SM and Flowra FA (2009) Fish Drying in Chalan Beel Areas. Bangladesh Journal of Scientific and Industrial Research 44(4): 461-466. DOI: 10.3329/bjsir.v44i4.4599

Talwar PK and Jhingran AG (1991) In land fishes of India and adjacent countries, Vol. 1 and 2. Oxford & IBH Publishing Company Pvt. Ltd, New Delhi, India. 1158 pp.