

**ICTHYOFAUNAL DIVERSITY IN JAGANNATH UNIVERSITY NEW CAMPUS  
AREA, KERANIGANJ, DHAKA, BANGLADESH**

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**Abstract:** The study was carried out to know the ichthyofaunal diversity in Jagannath University new campus area from August 2020 to March 2021. A great variety of fish species were recorded from 15 diversified families. Among those, Cyprinidae was the most species-rich family, have 7 species. Total 29 fish species were identified; among them, the dominant order is Anabantiformes comprises of 9 species. Identified species mostly under least concern (20) category, *Channa marulius* (Hamilton, 1822) are the only endangered species, 1 species under vulnerable category, 4 species belong to near threatened. Three invasive species were recorded from this area, which is very alarming for native fish diversity. Gears and crafts were seen to: cast net, lift net, drag net, gill net, and chai, polo observed in the study area. Some pollution sources were also identified during the study period.

**Key words:** Fish fauna, Morphology, Fish Conservation, Wetland, Keraniganj

**INTRODUCTION**

Bangladesh is a huge delta formed by three rivers system Padma (Ganges), Jamuna (Brahmaputra), and the Meghna and this ecological characteristic is ideal for the development of fishery resources. There are approximately 46,99387 hectares of different inland water habitats with around 250 native freshwater fish species (IUCN, 2015). It is one of the world's major fish-producing nations. This industry greatly contributes to food security by delivering safe and high-quality animal protein. The fishing industry accounts for 3.52% of GDP and 26.37% of agricultural GDP. Fish and fishery goods account for 1.39 percent of overall export revenues (BER, 2020). Fish makes up 60% of Bangladesh's animal protein consumption, employing over 12% of its population and boosting economic development through exports. The country achieved self-sufficiency with each person consuming 62.58 g/day of fish, exceeding the desired level of 60 g/day (BBS, 2016). A vast part of inland water areas are floodplains that are under water a large time of the year and a good

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source of freshwater fish. These important habitats are constantly shrinking as a result of unplanned urbanization and several developmental activities.

The main causes of fish species loss include overfishing, quick extraction of fish seed and brood stock, destructive and uncontrolled fishing techniques, pollution, foreign species introduction, loss of aquatic habitat due to siltation, dam building, and other anthropogenic activities. Human actions are hastening the extinction of species. Aquatic animals are more vulnerable to extinction than mammals and birds. This kind of Losses have an impact on the entire ecosystem, depriving of important resources required to produce food, medicine, and industrial goods to human. The major threats to freshwater habitats have been recognized as runoff from agricultural and urban areas, alien species invasion, dam construction, and water diversion (Allan and Flecker 1993). One of the primary challenges to permit the sustainable use of natural resources is biodiversity and its conservation. Conserving diversity increases the chances of preserving minimal viable populations of uncommon and late-successional species. Maintaining biodiversity is crucial since it is not always easy to determine which particular species are critical to the sustainability of aquatic ecosystems.

A large part of the Keraniganj which is now the extended part of Dhaka city covered by Floodplains and shrinking more rapidly because of unplanned industrialization and urbanization. Dhaka city is located in the central part of Bangladesh, bounded by numerous rivers, including the Buriganga, Turag, Shitalakshya and Balu. These rivers are the lifeline of the city and are crucial for the livelihoods of millions of people living in and around Dhaka. The rivers also support a diverse range of aquatic life, including fish species. Some research has been carried out on the ichthyofaunal diversity of these rivers includes, Baki *et al.* (2017) reported 56 fish species under 20 families and 9 orders from Buriganga river, Bhouiyan *et al.* (2016) reported 71 species of fish under 25 families of 9 orders from Turag River and Miah *et al.* (2010) reported 20 species of fishes belonging to 18 genera, under 10 families from Shitalakshya river at Siddirgonj area, Narayangonj. The plans are to build a new campus for the Jagannath University at Tegharia in Keraniganj. This area is a Floodplain and is connected to the river Shitalakshya by a canal. In every monsoon, the water flow comes through the channel from the Shitalakshya river and this area is under water for about 8 months of the year. Like the others, the Floodplains of Jagannath University new campus area are rich in freshwater fish diversity. Some portion of the water bodies falls inside the acquainted land for the establishment of constructive work. There is no previous research on fish biodiversity, fishing gear, or fish availability in the water body of this region. Therefore, the current study was carried out to gather ichthyofaunal diversity

information and baseline data to reveal the present status of Jagannath University new campus area.

**MATERIAL AND METHODS**

*Study area and period:* Jagannath University new campus area is around 200 acres and is situated in Teghoria Union in Keraniganj (23° 39' 11.23" N, 90° 24' 7.89" E). Like the other parts of Keraniganj the land of Jagannath University new campus area is low lying area; for this reason, this area is underwater for about 8 months of the year (Fig. 1). This research work was a part of biodiversity assessment of Jagannath University New Campus Area. Fish samples were collected from August 2020 to March 2021.

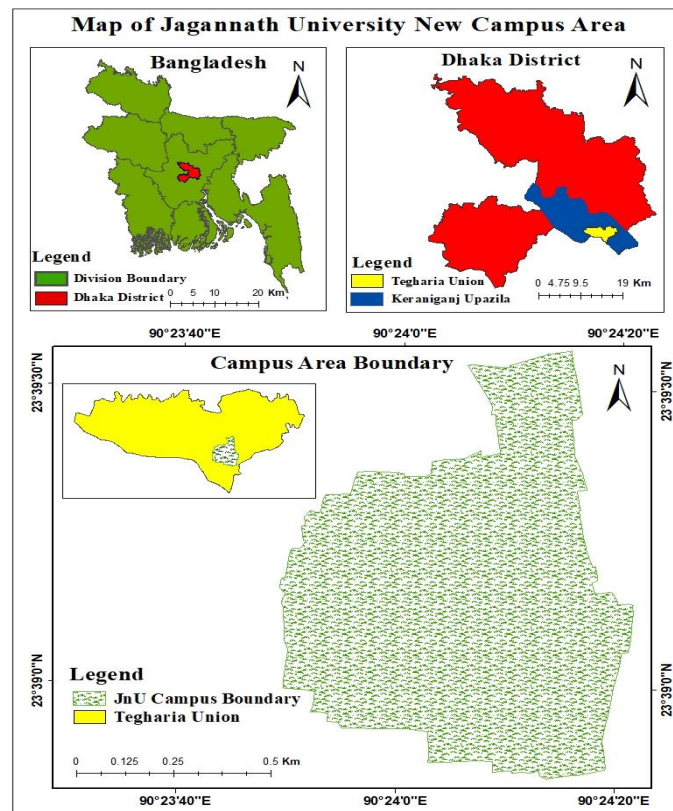


Fig.1: Study area

*Sample collection and identification methods:* Monthly basis survey was conducted for the collection of fish samples. Fish samples were collected by different types of net. After the collection, photographs were taken and preserved

in 10% formaldehyde. The fishes were brought to the fisheries laboratory, Department of Zoology, Jagannath University for taxonomic identification. The identification process was carried out utilizing the identification criteria provided by Talwar & Jhingran (1991), Safi and Quddus (2001), Rahman (2005), and Siddiqui et al. (2009). After the taxonomic identification, fish samples were finally preserved with fresh formaldehyde in Department of Zoology, Jagannath University. The status of identified species is determined by the help of Red Book of IUCN Bangladesh (2015). Estimation of observation status sightings per survey: very common (VC) 80-100%, common (C) 50-79%, fairly common (FC) 20-49% and few (F) 10-19% (Khan 2015).

### RESULTS AND DISCUSSION

Total 29 species of freshwater fish under 20 genera, 16 families and 9 orders were recorded. Among 29 species, *Channa marulius* (Hamilton, 1822) is only endangered species. Most species were under Least concern (20), 1 species under the vulnerable category, 4 species belonged to near threatened, and 3 species were not evaluated yet according to the IUCN Bangladesh red list 2015 (Table 1). The percentage distribution of fish species under respective orders represents that the Anabantiformes was the most dominant order accounting for 31.03% of all the number of species observed, followed by the Cypriniformes (27.59%); Ovalentaria, Siluriformes (10.35%); Cichliformes, Synbranchiformes (6.89%); Gobidiformes, Beloniformes (3.45%) (Figure 2).

A great variety of fish species were recorded from 8 orders, 15 diversified families during sampling comprises Anabantiformes 4 families, followed by Siluriformes (3), Cypriniformes and Synbranchiformes (2), Cichliformes, Gobiiformes, Beloniformes and Ovalentaria of each containing 1 respectively. Among those Cyprinidae was the most species-rich family, accounting for 7 species. Other noticeable families were Channidae (4 species), Ambassidae (3 species), Osphronemidae (3 species), Cichlidae (2 species) and other families were one species each (Figure 3). During the study, the highest number of fish species (16) was observed in March 2021 and the lowest number of fish species was observed in January 2021 (Fig. 4).

*Fishing gear and craft:* Different types of gears and crafts were observed during study. Cast nets, dip nets or lift nets, drag nets, gill nets were seen to use by local people to catch fishes. Crafts includes Chai (Box trap), Polo noticed during study. Local people often seen catching fishes by angling. There has been no previous study on the diversity of such wetlands surrounding Dhaka city, a study has been conducted on the fish species assemblage in Arial Beel, Munshiganj near the capital of Bangladesh. According to the study, 61 fish

**Table 1. Fish species recorded from the Jagannath University New Campus Area August 2020 to March 2021 (Note - VC: Very Common, C: Common, FC: Fairly common, Few: F, LC: Least Concern, NT: Near Threatened, VU: Vulnerable, EN: Endangered, \*Invasive species)**

Order	Family	Scientific Name	English Name	Local Name	National IUCN Status	Observation status
Anabantiformes	Channidae	<i>Channa marulius</i>	Great Snakehead	Gazar	EN	F
		<i>Channa striata</i>	Snakehead murrel	Shol	LC	FC
		<i>Channa orientalis</i>	Ceylon snakehead	Gachua, Raga, Chang	LC	FC
		<i>Channa punctata</i>	Spotted snakehead	Taki, Lati, Lata	LC	C
	Nandidae	<i>Nandus nandus</i>	Gangetic leaf fish	Meni	NT	FC
	Anabantidae	<i>Anabas testudineus</i>	Climbing perch	Koi	LC	C
	Osphronemidae	<i>Trichogaster fasciata</i>	Banded gourami	Khalisha	LC	C
		<i>Trichogaster lalius</i>	Dwarf gourami	Lal Khailasha, Boicha, Ranga Khailsha	LC	F
		<i>Trichopsis vittata</i>	Croaking gourami		LC	VC
	Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	Rohu	Rui	LC
<i>Cirrhinus cirrhosus</i>			Mrigal	Mrigal	NT	C
<i>Gibelion catla</i>			Catla	Catla	LC	VC
<i>Puntius sophore</i>			Pool barb	Punti	LC	VC
<i>Pethia conchonius</i>			Rosy barb	Kanchan Punti	LC	FC
<i>Pethia ticto</i>			Ticto barb	Tit Punti	LC	VC
<i>Esomus danrica</i>			Flying barb	Darkina	LC	VC
Cobitidae			<i>Lepidocephalichthys guntea</i>	Guntea loach	Gutum	LC
Siluriformes	Heteropneustidae	<i>Heteropneustes fossilis</i>	Stinging catfish	Singhi	LC	FC
	Bagridae	<i>Mystus tengara</i>	Tengara Catfish	Bajari Tengra	LC	C
	Loricariidae	<i>Hypostomus plecostomus*</i>	Suckermouth catfish		-	C
Ovalentaria	Ambassidae	<i>Chanda nama</i>	Elongate glass-perchlet	Chanda	LC	VC
		<i>Parambassis lala</i>	Highfin glassy perchlet	Lal Chanda	LC	C
		<i>Parambassis baculis</i>	Himalayan glassy perchlet	Chanda	NT	VC
Synbranchiformes	Synbranchidae	<i>Monopterusuchia</i>	Cuchia	Kuicha	VU	F

Order	Family	Scientific Name	English Name	Local Name	National IUCN Status	Observation status
	Mastacembelidae	<i>Macrognathus aculeatus</i>	Lesser spiny eel	Tara baim	NT	FC
Gobiiformes	Gobiidae	<i>Glossogobius giuris</i>	Tank goby	Bele, Bailla	LC	FC
Beloniformes	Belonidae	<i>Xenentodon cancila</i>	Freshwater garfish	Kaikka, kakila	LC	FC
Cichliformes	Cichlidae	<i>Oreochromis niloticus*</i>	Nile tilapia	Nilotica	-	VC
		<i>Oreochromis mossambicus*</i>	Mozambique tilapia	Tilapia	-	VC

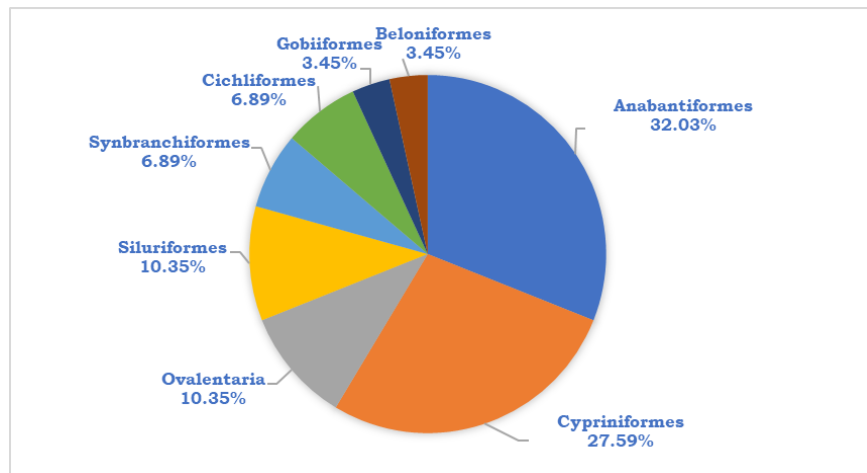


Fig. 2. Percentage of species according to the different order of fishes.

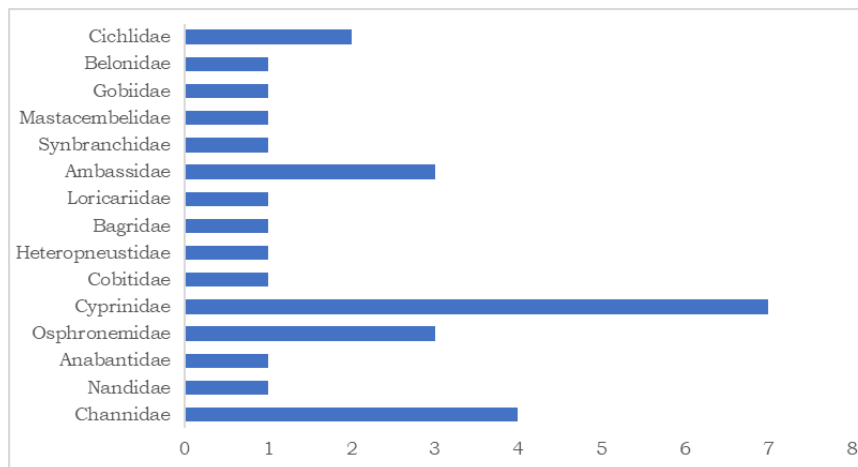


Fig. 3. Number of fish species according to Family

species were recorded under 9 orders, 26 families where Cypriniformes (48.02 %) was the most dominant order, other includes Perciformes (17.07 %); Siluriformes (15.96 %); Synbranchiformes (9.33 %); Clupeiformes (6.28 %); and others (3.35 %) (Roy *et al.*, 2022). But in this study, it is found that Anabantiformes is the dominant order (31.03%) in this study area that is almost similar types of habitats. It is noteworthy that both studies have unveiled a declining trend in wetland ecosystems, significantly impacting the richness of aquatic life, particularly the diversity of fish species.

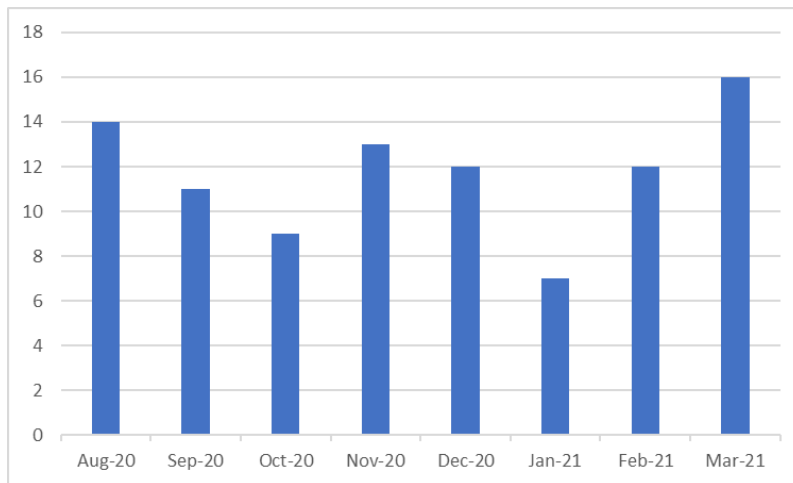


Fig. 4. Monthly observation of Fish species

**CONCLUSION**

During this study, three invasive species include *Hypostomus Plecostomus* (Linnaeus, 1758), *Oreochromis niloticus* (Linnaeus, 1758), *Oreochromis mossambicus* (W. K. H. Peters, 1852) were found, which creates a serious threat to native ichthyofaunal diversity. Evidence of plastic pollution was observed, which is a serious threat to the aquatic environment and its biodiversity. Besides, indiscriminate harvesting of fish during the dry season were noticed during this study, which is one reasons for the decline in fish diversity and abundance. Small and large development activities are being carried out in such wetlands, including this study area and will continue in the future; therefore, such development activities should be carried out by preserving adequate habitat for fish and other aquatic life otherwise, after a period of time, these fish and aquatic life will be extinct from this region. However, no previous study on the ichthyofaunal diversity of the Jagannath University New Campus Area in Keraniganj, which covered by vast Floodplains. However, our present study documents that there is still diversified fish fauna exists like the others

floodplain areas of Bangladesh, which is a very good indication for fisheries resources.

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