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# Study of aquatic biodiversity and correlation with physical parameters of Jalangi river

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**ABSTRACT:** The present study is concerned to assess the present status of aquatic biodiversity and its correlation with few physical parameters of river Jalangi. The study shows more than 35 species of freshwater fishes, eight species of zooplanktons, four species of dragonflies and two species of damselflies, few species of mollusks, which reflects that the river Janangi is full of diversity with respect to flora and fauna. The river is full of eel grass. River Jalangi is also a habitat of water striders, few crab species and aquatic snakes. In few areas, pollution may affect the present ecological status of Jalangi River in near future. This preliminary study identifies the overall biodiversity status of Jalangi. However, more work in this direction is required to make complete database on floral and faunal diversity of this river.

**Keywords:** Aquatic; Flora; Fauna; Biodiversity; Jalangi River.

## 1. INTRODUCTION

River Jalangi of West Bengal flows through Nadia district in the direction North-East to South-West. The source of Jalangi river water is majorly river Bhairabs water and underground water, River Bhairab originated from the river Padma in Bangladesh. After leaving the Padma River the Jalangi makes the part of the north-western boundary of the Nadia district and flows some miles within the district, then after reaching Krishnanagar it flows to the westwards and falls into the Ganges near Nabadwip [1-7]. It flows over two districts and these are Murshidabad and Nadia. The Jalangi meets the river Bhagirathi near Nabadwip town (23.25'N, 88.22'E), Nadia. The river water flows from the direction of Bhairab to Bhagirathi. The river is enriched of aquatic flora and fauna [8]. More than 150 fishermen and their family in Nadia district are economically depended on this river [9, 10]. Since the entire biosphere within the river depends on the physico-chemical parameters and ion concentrations of the river water, in the present study we tried to identify the significant fauna present in the river.

## 2. MATERIALS AND METHODS

All the fishes and other fauna were identified at site using boat. Fishes were collected with the help of local fishermen. Number of fishermen collect fishes regularly as a part of their profession. All samples were collected within district Nadia, West Bengal. Elemental analysis (carbon, hydrogen, nitrogen, sulphur) were

carried out by 2400 Series II CHNS Organic Elemental Analyzer (PerkinElmer, USA) at Indian Association for the Cultivation of Science, Jadavpur, Kolkata, West Bengal, India. Analysis of physico-chemical parameters was carried out at environmental chemistry laboratory of Barrackpore Rastraguru Surendranath College with the help of PCSTestr 35 (Eutech Instruments). Sodium, potassium and calcium contents were measured by chloride titration method (Systronics Flame Photometer 128).

### 3. RESULTS

A total of thirty six species of fishes are identified in the Jalangi River. Local names of the fishes have been confirmed by local fishermen. Table 1 shows the list of fishes available at River Jalangi.

**Table 1.** List of fishes available at River Jalangi.

	Scientific Name	Common Name	Local Name
1.	<i>Channa punctata</i>	Spotted snakehead	Lata
2.	<i>Channa striata</i>	-	Shole
3.	<i>Channa marulius</i>	-	Gojar
4.	<i>Puntius sp.</i>	-	Punti
5.	<i>Danio sp.</i>	-	Techokha
6.	<i>Gudusia chapra</i>	-	Khoyra / Chapila
7.	<i>Labeo rohita</i>	Rohu	Rui
8.	<i>Labeo bata</i>	Bata	Bata
9.	<i>Catla catla</i>	Catla	Catla
10.	<i>Labeo calbasu</i>	Orange-fin labeo	Calbose
11.	<i>Oreochromis mossambicus</i>	Indian Tilapia	Tilapia
12.	<i>Oreochromis niloticus</i>	Nile tilapia	Nilotika
13.	<i>Coricassoborna</i>	Ganges river sprat	Kanchki
14.	<i>Anguilla bengalensis</i>	Indian mottled eel	Bine
15.	<i>Macrogonathus siamensis</i>	Peacock eel	Tora
16.	<i>Mustacembelus armatus</i>	Tire-track or Zig-zag eel	-
17.	<i>Colisa fasciata</i>	Banded gourami	Kholshe
18.	<i>Chela sp.</i>	-	Chela
19.	<i>Mystus sp.</i>	-	Tangra
20.	<i>Notopterus notopterus</i>	Bronze featherback	Foli/Folui
21.	<i>Chitala chitala</i>	Chital	-
22.	<i>Bagarius bagarius</i>	Dwarf goonch	Bagair
23.	<i>Amblypharyngodon mola</i>	Mola carplet	Mourala
24.	<i>Rhinomugil corsula</i>	Corsula	Khorsula
25.	<i>Monopterus cuchia</i>	-	Kuche
26.	<i>Bagarius bagariush</i>	Dwarf goonch	Bagair
27.	<i>Awaous grammepomus</i>	-	Bele
28.	<i>Wallago attu</i>	-	Boyal
29.	<i>Sperata aor</i>	Long-whiskered catfish	Aar
30.	<i>Ctenopharyngodon idella</i>	Grass carp	-
31.	<i>Hypophthalmichthys molitrix</i>	Silver carp	-
32.	<i>Puntius sarana</i>	Olive barb	Saralputi
33.	<i>Crossocheilus latius</i>	Gangetic latia	-
34.	<i>Heteropneustes fossilis</i>	-	Shingi
35.	<i>Clarias batrachus</i>	-	Magur
36.	<i>Anabas testudineus</i>	-	Koi

Three species of dragonflies such as Scarlet Skimmer (male and female), Ditch Jewel and Long-legged Marsh Glider were identified in the vicinity of Jalangi River. Two species of damselflies (Blue Riverdamsel and Coromandel Marsh Dart) were also documented (Table 2).

**Table 2.** List of dragonflies and damselflies available at River Jalangi.

	Dragonfly	Damselfly
1.	Scarlet Skimmer (male)	Blue Riverdamsel
2.	Scarlet Skimmer (female)	Coromandel Marsh Dart
3.	Ditch Jewel	
4.	Long-legged Marsh Glider	

A total of eight species of zooplanktons were identified in the collected water of Jalangi River, which include *Cypris sp.*, *Moina sp.*, *Daphnia sp.*, *Cyclops sp.*, *Bosmina sp.*, *Diaptomus sp.*, *Diaphanosoma sp.*, and *Nauplius larva*. Other aquatic fauna includes different species of mollusks (*Lamellidens marginalis*, *Corbicula striatella*, *Pila sp.*, *Turritella sp.*), crabs, snakes like checkered keelback and frogs.

The elemental analysis like carbon, nitrogen and sulphur content of thick nacre layer of pearl producing *Lamellidens marginalis* shows 13.13%, 0.74% and 0.13 % respectively and that of river-bed bottom soil are 0.97%, 0.02% and 0.11% respectively (Table 3).

**Table 3.** Elemental analysis of water from Jalangi River.

	Carbon %	Nitrogen %	Sulphur %
Thick nacre of <i>Lamellidens marginalis</i>	13.13	0.74	0.13
Jalangi bottom soil	0.97	0.02	0.11

#### 4. DISCUSSION

High level of diversity of fish has been observed in Jalangi River. More than thirty five numbers of fish species are present at river. Apart from huge diatoms present the river jalangi contain *Anabaena cylindrica*, *Anabaena azollae*, *Anabaenopsis sp.*, *Cladophora sp.*, *Spirogyra sp.*, *Ulothrix sp.*, *Stauroneis sp.*, *Nitzschia sp.*, *Nostoc sp.*, *Vaucheria sp.*, *Oscillatoria sp.*, *Pithophora sp.*, *Scytonema sp.*, *Lyngbya sp.*, *Oedogonium sp.*, *Chlorococcum sp.*, *Nitella alisma*, *Chara sp.* and *Gloeocapsa sp.*, etc. These algae provide huge amount of food and environment for growing a large number species of fishes present. *Azolla*, a water fern also serves as a major source of food for fishes [11, 12]. Eelgrass (*Vallisneria sp.*) available at Jalangi River is also a called tape grass. They grow under water and are consumed by many animals, including water birds. Eel grass grows in 4-6 ft. of water [13]. The long grass-like leaves are 3-4 ft. in length. They grow from creeping stems rooted in the river bottom. Submerged eelgrass meadows are inhabited by a variety of fish, including, of course, large and fat eels [14-16]. Peacock eel (local name: Tora) inhabit slow-moving, thickly vegetated area of rivers. They are nocturnal and will bury themselves during the day. They will emerge at night to feed on insect larvae, crustaceans etc. Indian mottled eel is valued for its food value. The mucus of this eel is used for the medicine for arthritis. Tire track eel (*Mastacembelus armatus*) is not a true eel at all; in fact it is an elongated freshwater fish. They are nocturnal in nature. Water striders (*Gerris sp.*) are also available in river Jalangi. They can walk on water surface. They often eat dead insects and also dwelling insects that drop into the water.

Species diversity inversely depends on salinity. The salinity of river water remains within 108 to 270 mg/liter [4]. Low salinity of river Jalangi indicates the presence of wide spectrum of fauna. River Jalangi contains significant amount of flora along with variety of algae. Main foods of fishes are algae. Floral diversity within the river provide huge amount of food reservoir to the fish community of the river. Approximately growth of one kilogram fish required about 100 kilogram of algae. Since huge fishes are present, number of birds like different types of kingfishers, cormorants etc. are found nearby, which is already reported [2, 8]. Those birds take small fishes as their main food source.

Though the level of pollution in the Jalangi River, and its effect on growth of fish is very low, the effect of pollution may show adversely on fish diversity of Jalangi River at future. It is thus recommended to take any step against careless disposal of waste water on the river. There are mainly agricultural and domestic effluents (waste water) which are mixed with the water of Jalangi. Oil releasing from boats has some little effect on the water of the Jalangi River. Some of the degraded or partially degraded particles, made from soil erosion, are mixed with the water of Jalangi.

The pH of Jalangi River ranges within 7.54 to 8.27 i.e. river water is slightly alkaline [17]. This is ideal for the growth of flora and mollusca. The calcium ion concentration remain 23 to 54.6 mg/liter in the river [5], which also favours the growth of mollusca. *Pila sp.* is main food of Asian openbill stork, which predominates the entire river. *Cladophora sp.* and *Nostochopsis sp.* are found over the surface of *Pila sp.* and *Turritella sp.* Cells of *Cladophora sp.* are often encrusted by calcium carbonate. The surface of *Pila sp.* and *Turritella sp.* provide sufficient source for calcium. Small fishes prefer *Cladophora sp.*, as food. Carnivorous plant *Utricularia sp.* (bladderworts) present in Jalangi, is the fastest moving carnivorous. They generally can feed daphnia, nematodes, mosquito larva, fish fry (juvenile fish).

*Lamellidens marginalis* is pearl producing mollusca present in the river Jalangi. Thick nacre of *Lamellidens marginalis*, available at Jalangi contain 13.13% carbon where as pearl contains mainly aragonite and calcite 82-92% ( $\text{CaCO}_3$ ), conchiolin 4-14% (consist of a complex set of proteins secreted by the epithelial tissues outside of mollusks) and water 2-4%. Commercial cultivation of *Lamellidens marginalis* for pearl may boost up economic growth of local fishermen. The CNS content of the bottom soil also correlates with the CNS content of nacre layer of *Lamellidens marginalis* (Table 3) as they are bottom dweller of Jalangi River. Most of the zooplanktons identified here specially *Daphnia*, *Bosmina*, *Diaphanosoma* are the food of the fish *Gudusia chapra* [18]. It must be noted that birds, frogs feed on main food on water striders. River Jalangi is also a habitat of few crab species along with Checkered Keelback snake. The present work proposed that extensive study is required to prepare a database on various sectors to improve the overall ecological status of Jalangi.

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**Conflict of Interest:** The authors declare that they have no conflict of interest.

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