

CHECKLIST OF FISH DIVERSITY OF PATAN WETLAND, MURSHIDABAD, WEST BENGAL

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Abstract

Wetlands are amongst the most productive ecosystems on the Earth. Wetlands are recognized for providing habitat, food, and protection to many different species of animals and also for their valuable role as nurseries for a wide variety of species of fish and shellfish. West Bengal has rich freshwater fish genetic resources constituting about 28.34% to the freshwater fish diversity of India. 'Patan Beel', an relatively unexplored wetland of North-West Murshidabad, West Bengal, India is located between latitude 24° 2' 4" North to 24° 3' 20" North and longitude 88° 1' 18" East to 88° 0' 15" East. The approximately 3000 bighas of Patan Beel contains forested area, some human habitation, and low but cultivable land. The area is unique in flora and fauna composition. An inventory of wetlands of any region is a pre-requisite for their conservation and management. Fishes are the keystone species which determine the distribution and abundance of other organism in the ecosystem they represent and are good indicators of water quality and health of the ecosystem. Knowledge of the species composition and distribution patterns of fishes is fundamental for conservation and management of native fish fauna. In this present investigation a checklist of the fish diversity of Patan Beel is prepared. This checklist should be considered as a working document and several additional species are likely to be added with additional survey work.

Keywords: Patan Beel, Murshidabad, fish diversity, checklist,

Introduction:

Wetlands are amongst the most productive ecosystems on the Earth [1]. Wetlands are recognized for providing habitat, food, and protection to many different species of animals (e.g. fish, birds, mammals, reptiles, and invertebrates), and also for their valuable role as nurseries for a wide variety of species of fish and shellfish, including endangered and commercially important species. As a result, wetlands are recognized as a vital ecosystem for fish.

Fishes usually represent an important biological component in freshwater wetlands, playing crucial roles in energy flow between lower and higher trophic levels [2], in top-down controls via predation [3], as important groups sustaining high biological diversity [4] and as valuable fishery resources for local human populations [5].

India is an exceptional hotspot of freshwater fish diversity with a high degree of endemism contributing to the World's biological resources [6, 7]. West Bengal has rich freshwater fish genetic resources constituting about 28.34% to the freshwater fish diversity of India [8]. Freshwater fishes of West Bengal revealed existence of 109 ornamental fishes, 92 food fishes and 66 were ornamental or food fishes. Out of the 267 freshwater fishes, 17.97% are under threatened or near threatened categories [9]. Knowledge of the species composition and distribution patterns of fishes is fundamental for conservation and management of native fish fauna [10].

Wetlands are the areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six meters [11]. Wetlands are one of the crucial natural resources. Wetlands are areas of land that are either temporarily or permanently covered by water. This means that a wetland is neither truly aquatic nor terrestrial; it is possible that wetlands can be both at the same time depending on seasonal variability. Fresh water wetlands are called Boars, Beels, Jheels, Ox-bow lakes and Floodplain [12].

Wetland health in recent times:

Biodiversity enumeration of such wetlands, especially in terms of ecologically sensitive species of both flora and is important for estimating the general health as well as development of proper conservation plans for the entire ecosystem. India, with its varying topography and climatic regimes, supports diverse and unique wetland habitats [13]. Only 26 of these numerous wetlands in India have been designated as Ramsar Sites [14]. However, many other wetlands which perform potentially valuable functions are continued to be ignored in the policy process. As a result many freshwater wetlands ecosystems are threatened and many are already degraded and lost due to urbanization, population growth, and increased economic activities [15]. The negative economic, social, and environmental consequences of declining water quality in wetlands are also an issue of concern for India. The problem of deteriorating water quality is particularly more alarming in the case of small water bodies such as lakes, tanks and ponds. In the past, these water sources performed several economic (fisheries, livestock and forestry), social (water supply), and ecological functions (groundwater recharge, nutrient recycling, and biodiversity maintenance). Despite all these benefits, many decision-makers and even many of the 'primary stakeholders' think of them as 'wastelands'.

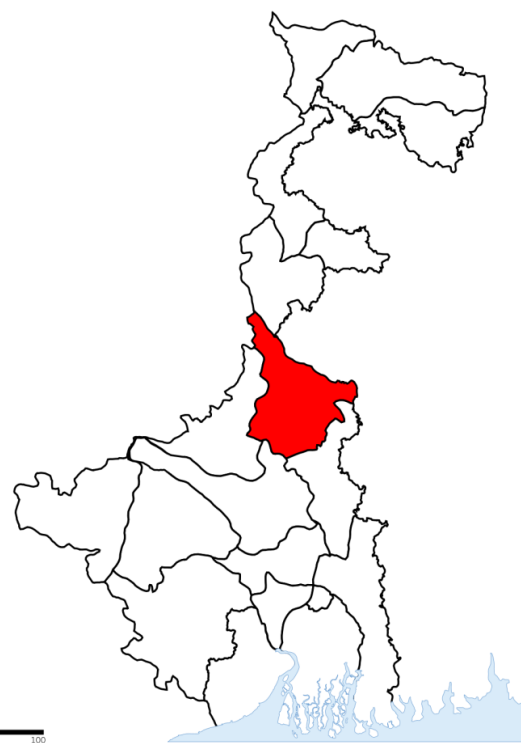
Due to indiscriminate killing of fries, fingerlings and gravid fish, the population is under heavy pressure. Killing of gravid fishes causes heavy loss of eggs per day during the breeding season [16]. Agricultural activities also become the most dangerous practice as it causes harm to the fish fauna. They used artificial fertilizers, insecticides and pesticides for agricultural purpose that causes water pollution so fish face a greater risk of extinction.

Importance of Fish diversity in wetlands:

An inventory of wetlands of any region is a pre-requisite for their conservation and management. Fishes are the keystone species which determine the distribution and abundance of other organism in the ecosystem they represent and are good indicators of water quality and health of the ecosystem [17]. Loss of fish species diversity determines the severity of habitat degradation of an aquatic ecosystem [18]. To conserve and manage wetland resources, it is important to have inventory of wetlands and their catchment areas. The ability to store and analyze the data is essential. The documentation of available fish species and evaluation of their present status is utmost necessity for proper implementation of further conservation measures [19].

Materials and Methods:**Study site:****Murshidabad district, West Bengal:**

Among the Indian states, West Bengal has second largest areas under wetlands mainly associated with the Ganga covering 8, 43,221 hac area comprising about 9 percent of the total area under wetlands in India [20]. Murshidabad is a district of West Bengal in Eastern India (Fig. 1, 2).

**Fig. 1. Location Map of West Bengal****Fig. 2. Location Map of Murshidabad district**

The district Murshidabad has its own heritage and great historical back ground. The district is divided into two parts by the river Bhagirathi, namely 'rarh' and 'bagri'. Although the western tract or the 'rarh' is slightly high and undulating than the eastern tract 'bagri', the land is interspersed with numerous swamps and paleo-channels. The greatest elevation in the western boundary is near the border of the Birbhum district, i.e. Khargram, Burwan, Nabagram and Sagardighi block (Fig. 3). After Green Revolution, the farmers of Murshidabad district highly adopted the Boro paddy cultivation with the initiation of intensive irrigation practice by means of deep tube well and shallow deep tube well. As a result, there is a gradual lowering of water table over the district, which becomes the serious threat for the wetland water regime [21].

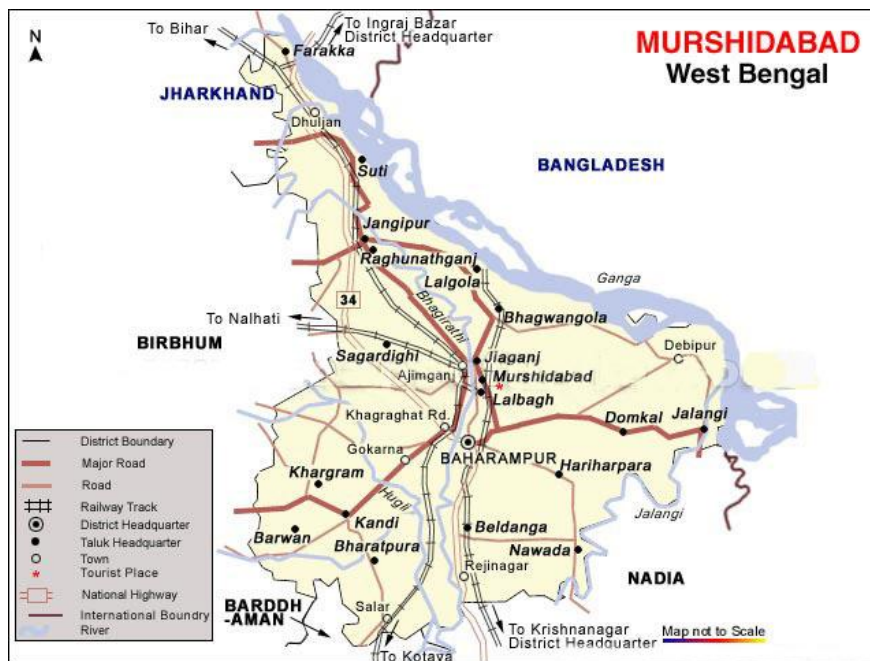


Fig. 3. Map of Murshidabad district

Patan wetland:

Patan wetland, popularly known as 'Patan er Beel' in Bengali, is situated in the Khargram block of Kandi subdivision under Murshidabad district, West Bengal, India. It covers an area of 3000 bigha, provides a unique habitat to aquatic flora and fauna. 'Patan er Beel' is an relatively unexplored wetland of North-West Murshidabad, located between latitude $24^{\circ} 2' 4''$ North to $24^{\circ} 3' 20''$ North and longitude $88^{\circ} 1' 18''$ East to $88^{\circ} 0' 15''$ East (Fig. 4, 5). This perennial wetland is a habitat of large populations of resident and migrant water birds, fish, amphibian, reptiles and mammals and native aquatic plants. Migratory birds from China, Russia, Central Asia and Tibet come to Patan Wetland in winter.

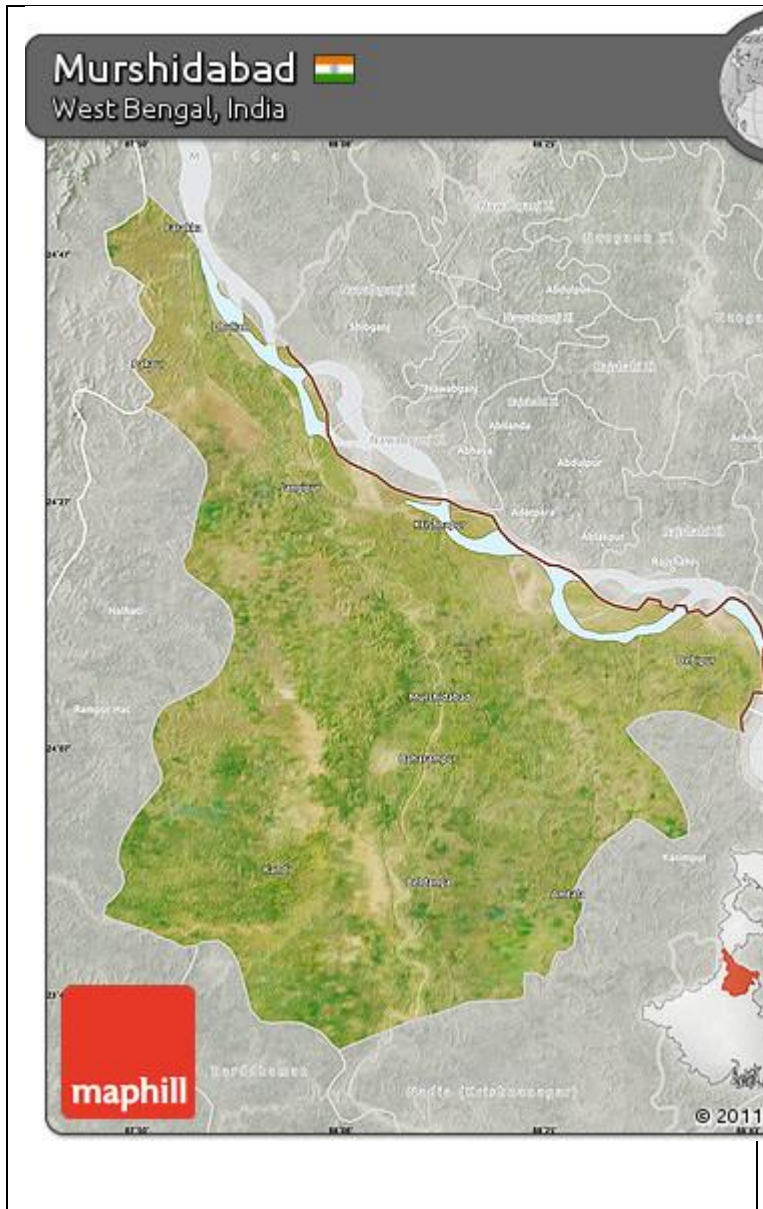


Fig. 4. Satellite Image of Murshidabad district.

Source: <http://www.maphill.com>



Fig. 5. Satellite Image of Patan wetland locally known as

'Patan er Beel'.

Threats to Patan wetland:

During monsoon, the Patan wetland gets inundated. Through gradual sedimentation, the basin is becoming shallower leading to the growth of reeds and sedges. This results in providing enough food and shelter for fish and other aquatic fauna. Fertilizers are used in the agricultural crop field

around the 'Patan er Bill', which are drained into the wetland by rain that promoted rich growth of macrophytes thus contributing to the process of eutrophication. In the past century most of the rim lands of the beel remained as wasteland which was mainly used for extensive grazing in the dry season.

In Murshidabad, this Patan wetland is important fishing ground. Due to over exploitation, indiscriminate destructive fishing practices, soil erosion, pollution from domestic and agrochemical wastes, some species of fish have become rare and some are reported to be extinct from this area. But information about the fish diversity in this wetland is scanty. In the present investigation documentation of the fish diversity of Patan Beel is conducted.

15 consecutive surveys were executed from November 2012–March 2015. Fishes were collected from the fishermen and photographed. The fish were preserved for further identification.

Result:

54 species of fish were found from the Patan wetland over 15 consecutive surveys during November 2012 – March 2015. The name of the fish species are listed below in Table 1 along with their status. The fish were categorized into two major categories on the basis of occurrence viz. Abundant (A) and Rare (R). There were only five cases of very rare (VR) occurrence of a species viz. *Channa gachua*, *Glossogobius giuris giuris*, *Labeo bata*, *Nandus nandus* and *Ompok pabda*.

Table 1: List of Fish species found in Patan wetland, Murshidabad, West Bengal.

NAME OF THE FISH SPECIES	LOCAL NAME (IN BENGALI)	STATUS
1. <i>Acanthopotis botia</i>	Balichata	R
2. <i>Anabus testudineus</i>	Koi	A
3. <i>Aplocheilus panchax</i>	Tin Chok	R
4. <i>Badis badis</i>	Botol Koi, Bhutu Mach	A
5. <i>Catla catla</i>	Katla	A
6. <i>Chanda nama</i>	Kath Chada	A
7. <i>Chanda ranga</i>	Gol Chada	A
8. <i>Channa gachua</i>	Chang	VR
9. <i>Channa marulius</i>	Shal	R
10. <i>Channa punctatus</i>	Sati, Lata	R
11. <i>Channa striatus</i>	Shol	A
12. <i>Chela laubaca</i>	Chela	A
13. <i>Cirrhinus mrigala</i>	Mrigale	A

14. <i>Cirrhinus reba</i>	Riag, Raikhor	A
15. <i>Clarias batrachus</i>	Magur	A
16. <i>Colisa fasciata</i>	Pata Kholse	A
17. <i>Colisa lalius</i>	Lal Kholse, Guri Kholse	A
18. <i>Eleotris fusca</i>	Lal Bele, Bhut Bele	R
19. <i>Esomus danricus</i>	Darke	R
20. <i>Eutropiichthys vacha</i>	Bacha	R
21. <i>Gagata gagata</i>	Paloa Tangra	R
22. <i>Glossogobius giuris giuris</i>	Bele	VR
23. <i>Gudusia chapra</i>	Khaira	A
24. <i>Heteropneustes fossilis</i>	Singi	R
25. <i>Labeo bata</i>	Bata	VR
26. <i>Labeo calbasu</i>	Kalibaus	R
27. <i>Labeo rohita</i>	Rui	A
28. <i>Lepidocephalus guntia</i>	Puin, Gunte	A
29. <i>Macrognathus aculeatus</i>	Naya Guchi, Pakal	A
30. <i>Mastacembelus armatus</i>	Guchi, Pakal	R
31. <i>Mastacembelus pancalus</i>	Choto Guchi	A
32. <i>Monopterusuchia</i>	Bamuch	R
33. <i>Mystus cavasius</i>	Paloa Tengra, Nodir Tengra	R
34. <i>Mystus vittatus</i>	Kele Taloa Tengra	A
35. <i>Nandus nandus</i>	Vyada, Nydos	VR
36. <i>Nematolosa sp (Chapilla)</i>	Chapilla	A
37. <i>Nimaichilus botia</i>	Puin, Balichata	R
38. <i>Notopterus chitala</i>	Chital	R
39. <i>Notopterus notopterus</i>	Foli	A
40. <i>Ompok pabda</i>	Desi Pabta	VR
41. <i>Osteobrama cotio cotio</i>	Bojonmuri	R
42. <i>Puntius javanica</i>	Japani Puti	A
43. <i>Puntius sarana sarana</i>	Sar Puti	R

44. <i>Puntius sophore</i>	Puti	A
45. <i>Puntius terio</i>	Puti	A
46. <i>Puntius ticto</i>	Titputi	A
47. <i>Rita rita</i>	Ritha	R
48. <i>Salmostoma bacaila</i>	Kacki, Sonakhori, Mahalla, Bhatmach	R
49. <i>Setipinna fasa</i>	Fasa	R
50. <i>Silonia silodia</i>	Silone	R
51. <i>Sparata aor</i>	Aar	R
52. <i>Tetraodon cutcutia</i>	Tyapa	R
53. <i>Wallago attu</i>	Boal	VR
54. <i>Xenentodon cancila</i>	Kakla	R

A = Abundant, R = Rare, VR=Very Rare

Discussion:

Patan Beel is a still relatively unexplored wetland with respect to its huge bio-resources. But it is observed that Due to many anthropogenic factors this ecosystem and its components are declining due several factors some of which are threatening in nature. As in other wetlands one of the major threats to Patan Beel is overexploitation of its fish resources. It is currently estimated that there are about 300 fishermen involved in fishing. The majority of fishermen use gill nets between 1 to 2 inch mesh sizes. As in Bangladesh the fishermen also use small boat for transport of nets and related material. They usually use ‘bua jal’ (small lift net), sieve net (used in ‘kata’ fishing), ‘dharma jal’ and cast net to catch fishes [22]. Few years ago large number of prawns was available to this Patan Beel but in recent times prawns are considered as an extinct species with respect to this Patan Beel. *Nandus nandus*, *Wallago attu*, *Labeo bata*, *Glossogobius giuris* *guiris*, *Ompok pabda* are on the verge of extinction in Patan Beel. *Rita rita*, *Setipinna fasa* and *Salmostoma bacaila* are rivirine in origin. Patan Beel does not have any connection with any river. Probably they were carried by flood water from any river. Astonishingly, **Patan Beel fauna do not contain any Exotic Fish**. The pisciculture or Fishery in western Murshidabad is very rare, the soil type and topography is different from Eastern Murshidabad. Thus there is no “invasion of exotic species” as found from this investigation. **Patan Beel may be used as “Fish Sanctuary” in future.**

The huge wetland is now facing problem of survival. The local people make plot of land for the cultivation of various crops (mainly rice, jute, sugarcane) in the lake by filling up the shallow part of the lake, as a result the habitat area for the biotic fauna and flora is gradually being reduced. Water pollution of Patan Beel is a vital problem. Excessive use of pesticides and chemical fertilizer in the surrounding agricultural field go to the lake water through rain, so the lake water polluted. The water pollution has a great harmful impact on flora and fauna of this wet-land, so the biodiversity of the lake reduced. Probable source of large-scale pollution could

be the waste from the rice mills and the molasses factory nearby which is poured regularly and directly into Patan Beel.

Conclusion:

India is signatory to Ramsar Convention on Wetlands and has drafted Wetland (Conservation and Management) Rules in 2010 but still no significant progress has been made on the conservation and wise use of wetlands. An inventory of wetlands of any region is a pre-requisite for their conservation and management. This checklist of Patan Beel should be considered as a working document and several additional species are likely to be added with additional survey work.

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