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ECOLOGY AND MACROBENTHIC FAUNAL DIVERSITY OF SOME FLOODPLAIN WETLANDS OF RIVER GANGA IN WEST BENGAL

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INTRODUCTION

Floodplain wetlands of West Bengal, locally known as beels, offer diverse ecological attributes and diversified faunal elements of which macrozoobenthic communities of some floodplain wetlands of river Ganga located in the districts of Malda, Murshidabad and Nadia in West Bengal have been investigated and reported in the present communication. It may be mentioned that although some reports (Mandal and Moitra, 1975; Sarkar, 1989, 1992; Mukherjee and Nandi, 2004; Banerjee and Banerjee, 2005) are available regarding benthos from freshwater wetlands of West Bengal, but very little is known on the benthic fauna of floodplain lakes of lower Ganga river basin of West Bengal, and hence the present study. Studies on faunal resources of wetlands in West Bengal mostly pertain to southern part of West Bengal (De *et al.*, 1989; Ghosh, 1990; Nandi *et al.*, 1993, 1999, 2001a, b, 2005, 2007; Mukherjee and Nandi, 2004).

MATERIALS AND METHODS

Study Area :

Six floodplain wetlands of Ganga river basin in West Bengal, two from each of Malda, Murshidabad and Nadia districts, were selected from rural and urban environments (Table 1) for survey work. The geographical locations of these wetlands are shown in the Fig. 1 The brief descriptions of six selected wetlands are as follows :

Golbaka—Haripur beel (GHB), Malda : This wetland is located at about 50 km north west of Malda town, and is situated near Ratua. The total area of the wetland is about 30 ha which is moderately infested with marginal macrophytes.

Barasagar Dighi (BSD), Malda : This wetland is situated near Sadhullapur at about 22 km northeast of Malda town with water area covering about 83 ha. It is infested with low growth of macrophytes.

Sagardighi (SD), Murshidabad : This wetland with a water area of about 149.8 ha is located at about 25 km northwest of Berhampur. It is highly infested with aquatic weeds.

Bhandardaha beel (BD), Murshidabad : It has the water area of about 330 ha. It is located at about 32 km southeast of Berhampur town. This wetland is also highly infested with macrophytes during the course of investigation.

Hasadanga beel (HD), Nadia : This wetland is shallow and located at about 30 km southeast of Krishnanagar Sadar. It is situated in between northwest of Jalangi river and southwest of Bhagirathi river. The water area is about 66.65 ha, which is mainly infested with water hyacinth at its margin.

Haarkhali beel (HK), Nadia : This wetland is situated near Puratan Sambhunagar at about 18 km east of Krishnanagar, in between Jalangi and Churni rivers with an approximate water area of 250 acre and highly infested with weeds.

Table-1. Physiographic features of the selected wetlands

Parameter	BSD	GHB	SD	BD	HD	HK
Water area (ha)	83	30	149.8	330	66.65	101.21
Water depth (m)	0.9-1.8	1.2-2.7	1.2-3.0	2.0-6.5	0.9-2.4	0.7-1.5
Temp. (°C)						
Summer	41-43	41-43	43	43	40-42	40-42
Winter	4-9	4-9	7-9	7-9	9-12	9-12
Rainfall (mm)	1652-1919	1652-1919	1255-1471	1255-1224	1172-1224	1172-1224
Landscape type	Semi urban	Rural	Semi urban	Rural	Rural	Rural
Fishery type	Semi-intensive	Traditional	Traditional	Traditional	No fishery	Traditional
Macrophyte cover (%)	10	25	55	40	35	70
River connection	Nil	Yes	Nil	Nil	Yes	Yes

METHODS

The surveys were conduted during 2004 and 2005. Physico-chemical parameters of the water were measured in the field and in the laboratory, chiefly following standard methods of APHA (1998) and Mukherji and Nandi (2004). The qualitative benthic samplings were done with the aid of a box-type sampler and sieve.

RESULTS AND DISCUSSION

The physiographic features of selected wetlands, physico-chemical parameters of water of the wetlands and the benthic faunal elements inhabiting the selected wetlands are presented in Tables 1, 2 and 3. These include seven water parameters (Table-2) and 29 benthic species belonging to 3 phyla, representing 19 families under 7 major groups/classes (Table 3). It is evident from the Table-2 that the water in all these selected floodplain wetlands is alkaline with poor to moderate dissolved oxygen to support aquatic life. From Table-3 it is, however, revealed that gastropod molluscan macrobenthos representing 12 species belonging to 5 families dominate these wetlands over the other benthic ommunities *viz.*, annelids (5 species), insects (7 species), crustaceans (3 species), etc. Among the selected wetlands, Barasagardighi of Malda district represents the highest macrozoobenthic diversity harbouring 21 species under 16 families. The lowest macrobenthic diversity of 13 species under 9 families was observed in the Hasadanga beel of Nadia district.

Recent studies on macrobenthic diversity of wetlands in West Bengal have revealed that Mukherji and Nandi (2004) reported 29 species of benthic invertebrates from Rabindra Sarovar and also 29 species from Subhas Sarovar, while Mandal and Moitra (1975) recorded 21 macrobenthic species in a pond at Burdwan, West Bengal. Sarkar (1989) encountered 19 macrozoobenthic species in a pond at Sonamukhi in Bankura district, West Bengal and also reported 13 species in a lentic pond of Calcutta (Sarkar, 1992). In all 18 species of aquatic invertebrates have been recorded from Malda, Murshidabad and Nadia districts (O' Malley, 1990; Distrit Gazetters). It seems floodplain wetlands of these districts are less rich in diversity of benthic fauna in comparison to Rabindra Sarovar and Subhas Sarovar, representing 29 species each. However, monthly intensive or at least seasonal surveys are needed to ascertain the actual richness of benthic species occurring in these wetlands.

Table-2. Physio-chemical parameters of the slected wetlands in premonsoon season

Parameter	Malda		Murshidabad	Nadia	
	BSD	GHB	SD	HD	HK
Air Temperature (°C)	31	35	28.5	31	34.5
Water Temp (°C)	34	36	30	33.5	37
DO (mg/1)	3.9	6.4	3.0	3.5	7.8
pH	8.4	9.1	9.52	9.15	9.09
Total Alk (mg/1)	440.44	320.32	100.1	220.22	120.12
Transparency (cm)	34	22	26	114.5	25.5
Conductivity (mS/cm)	1.81	2.06	1.11	1.96	2.78
TDS (mg/1)	107	124	70	116	166

Table-3. List of macrozoobenthos collected from the wetlands of Malda, Murshidabad and Nadia districts

Sl No.	Groups/Species	Malda		Murshidabad		Nadia	
		BSD	GSB	SD	BD	HD	HK
Phylum **ANNELIDA**							
Class **OLIGOCHAETA**							
	Family **TUBIFICIDAE**						
1.	*Branchiura sowerbyi* Bedd.	+	–	–	–	–	–
2.	*Limnodrilus hoffmeisteri* Claparede	+	–	–	–	–	–
3.	*Tubifex tubifex* (Miller)	+	–	–	–	–	+
Class **HIRUDINEA**							
	Family **GLOSSOPHONIDAE**						
4.	*Hemiclepsis marginata marginata* Muller	+	+	–	–	–	–
	Family **HIRUDIDAE**						
5.	*Hirudinaria manillensis* (Lesson)	+	+	+	+	+	+
Phylum **ARTHROPODA**							
Class **CRUSTACEA**							
	Order **DECAPODA**						
	Family **PALAEMONIDAE**						

Sl No.	Groups/Species	Malda		Murshidabad		Nadia	
		BSD	GSB	SD	BD	HD	HK
6.	*Macrobrachium* sp.	+	+	+	+	–	–
	Family **GECARCINIDAE**						
7.	*Sartoriana spinigera* (Wood Mason)	+	–	–	–	+	–
	Order **CHONCHOSTRACA**						
	Family?						
8.	Undetermined species	+	–	+	–	+	+
Class **INSECTA**							
	Order **EPHEMEROPTERA**						
	Family **BAETIDAE**						
9.	*Cloeon* sp.	–	+	–	–	–	–
	Order **ODONATA**						
	Family?						
10.	Damselfly larvae	+	+	+	–	–	+
	Family?						
11.	Dragonfly larvae	–	–	+	–	+	+
	Order **HEMIPTERA**						
	Family **BELOSTOMIDAE**						
12.	*Diplonychus annulatus* (Fabricius)	+	–	+	+	+	+
	Order **COLEOPTERA**						
	Family **HYDROPHILIDAE**						
13.	*Helochares* sp.	–	–	+	+	–	–
14.	*Sternolophus rufipes* (fabricius)	–	–	+	+	–	–
	Order **DIPTERA**						
	Family **CHIRONOMIDAE**						
15.	Chironomid larvae	+	–	–	–	–	–

Sl No.	Groups/Species	Malda		Murshidabad		Nadia	
		BSD	GSB	SD	BD	HD	HK
Phylum **MOLLUSCA**							
Class **GASTROPODA**							
	Family **BITHYNIDAE**						
16.	*Digoniostoma cerameopoma* (Benson)	+	+	+	+	+	+
17.	*Digoniostoma pulchella*	+	+	+	+	–	+
18.	*Gabbia orcula* (Nevill)	+	+	+	+	+	+
	Family **LYMNAEDAE**						
19.	*Lymnaea accuminata* (Lamarck)	+	+	–	+	+	+
20.	*Lymnaea luteola* (Lamarck)	–	–	–	+	+	–
	Family **PILIDAE**						
21.	*Pila globosa* (Swainson)	+	+	+	+	+	+
	Family **PLANORBIDAE**						
22.	*Gyraulus convexiusculus* (Hutton)	+	+	+	+	+	+
23.	*Gyraulus labiatur* (Benson)	–	+	–	–	+	+
24.	*Indoplanorbis exustus* (Deshayes)	–	+	+	–	+	+
	Family **THIARIDAE**						
25.	*Brotia costula* (Rafinesque)	–	+	–	–	–	–
26.	*Thiara lineata* (Gray)	+	+	–	+	–	–
27.	*Tarebia tuberculata* (Mueller)	+	–	–	–	–	–
Class **BIVALVIA**							
	Family **VIVIPARIDAE**						
28.	*Bellamya bengalensis* (Lamarck)	+	+	+	+	–	+
	Family **UNIONIDAE**						
29.	*Lamellidens marginalis* (Lamarck)	+	–	–	–	–	–
Total number of species		**21**	**16**	**15**	**14**	**13**	**16**

SUMMARY

A total of 29 species of macrozoobenthos belonging to seven major groups/classes under 3 phyla have been reported from six freshwater floodplain wetlands of Malda, Murshidabad and Nadia districts of West Bengal. Of the 6 selected wetlands, Barasagardighi of Malda district represents the highest diversity of 21 species under 16 families.

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