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## A preliminary survey of freshwater mollusca (gastropoda and bivalva) and distribution in the river Brahmaputra, Mymensingh, Bangladesh

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### Abstract

The present studies the molluscan fauna from twelve sampling stations within two sites of River Brahmaputra in Mymensingh, Bangladesh. Survey was carried out from December 2011 to November 2012. During survey period we have collected mollusca by hand packing from the study area and identified a total of 15 species. Altogether 15 species (10 gastropod and 5 bivalve species) were recorded during the study period. Among gastropoda *Melanoides tuberculata* (Muller), *Indoplanorbis exustus* (Deshayes) and *Bellamya begalensis* were most dominant species recorded from all stations and in Bivalve specie *Lamellidens marginalis* were found at ten stations out of twelve. Three types of habitat (Muddy, Sandy and low vegetation) also observed in the River. The study revealed that the molluscan community could be explored for possible use as biomonitors in the River Brahmaputra.

**Keywords:** Brahmaputra River, Mollusca, Gastropod, Bivalve, Bangladesh

### 1. Introduction

Freshwater mollusca populations have been declining for decades and are among the most seriously impacted aquatic animal's worldwide <sup>[1, 13]</sup>. Most freshwater mollusca prefer well-oxygenated water and a constant flow of shallow water <sup>[3, 7]</sup>. Biological monitoring of rivers using benthic macro invertebrates is accepted as a useful tool for the assessment of water quality <sup>[4, 12]</sup>. Freshwater ecosystems throughout the world are threatened by human activities that directly alter system hydrology, such as construction of physical barriers to flow, water extraction, and filling or draining of shallow habitats. The 1996 IUCN *Red List of Threatened Animals* lists 12 bivalves and 216 gastropods as extinct and 114 bivalves and 806 gastropods as threatened, for a total of 228 extinct and 920 threatened terrestrial, freshwater and marine molluscs. Water pollution, including siltation, is endemic to almost all inhabited parts of the world and is consistently ranked as one of the major threats to freshwater ecosystems <sup>[10]</sup>. The taxonomy of snails is based upon both conchological and anatomical characters, and for their identification the same characters are used. However, most studies have investigated streams and relatively small rivers and there is a pressing need to obtain biological information on the large rivers many of which are under pressure due to population growth and urbanization <sup>[8]</sup>.

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Freshwater mollusca have been affected by both extrinsic factors such as habitat destruction, land-use practices, water pollution, reduction or loss of host plant and/or organism like fish or substrates and intrinsic characters such as growth and reproduction, which evolve in close relation with habitats [6, 8, 9, 10]. Molluscas, particularly gastropods and bivalves were among the earliest taxa used to investigate patterns of diversity. Today, bivalves and gastropods are important marine fisheries, with U.S. oysters alone accounting for over \$111,000,000 in 2011 catch revenue [11]. Structurally Molluscs are a heterogeneous group of animals with different structural form such as slugs, mussels, octopuses and snails. However, there are exceptions to the importance of calcium. For example, several species of British freshwater gastropods require high calcium concentrations [2]. The present study provides for the old Brahmaputra River. The river Brahmaputra entered through the northern part of

Bangladesh and eastern part is known as old Brahmaputra Nod. Freshwater molluscs (gastropod and bivalve) are found in Brahmaputra River of freshwater habitats and exhibit complex ecological river basin, all of which underscore their use as proxies for understanding our changing freshwater diversity.

## 2. Materials and Method

### 2.1 Study site

The study was conducted from Balur Ghat (90°25'26" E and 24°44'56"N) to Isha Khan Lake (90°20'12"E and 24°40'50"N) in the Brahmaputra River. Survey was carried out from December 2011 to November 2012. Two surveys used to be conducted per month. Study site were divided A and B site in the Brahmaputra river. Sampling sites were selected based on their distribution, extent of shoal habitat with depth less than one meter, and accessibility.

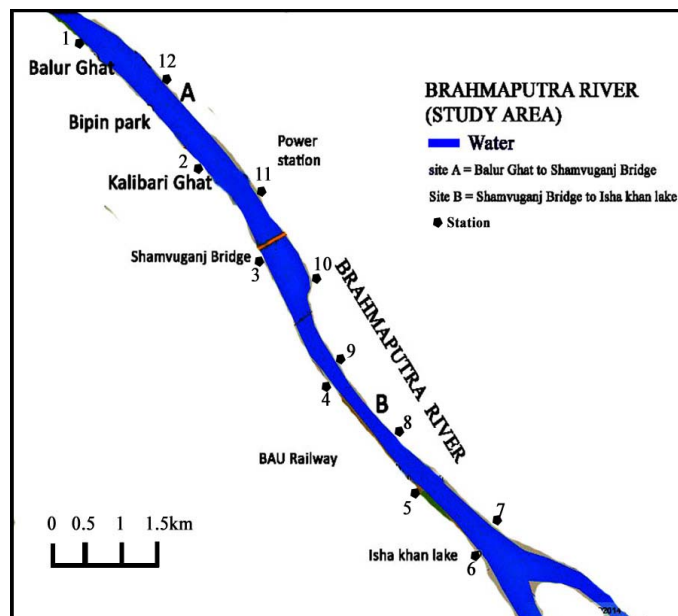


Fig 1: Study area of freshwater Mollusca in Bramaputra River, Mymensingh

### 2.2 Collection of Mollusca

Specimens were collected by hand picking from the dry areas. All samples were transported to fisheries laboratory, Department of Zoology, Jagannath University, Dhaka. And specimens were preserved in 95% ethanol. Collections were made at approximately 10 km intervals from Balur Ghat to Isha Khan Lake of river Brahmaputra.

### 2.3 Identification

Species were identified based upon morphological characteristics of the shell and the taxa recognized by encyclopedia volume 17.

### 2.4 Identification of Gastropods

The shell characters such as shape, spire length and shape, mouth opening, opercular shape, umbilicus shape and size, color and ornamentation of the shell are used mainly for the identification of gastropods apart from the internal characters of which the important one is radula.

### 2.5 Identification of Bivalves

The bivalves are identified mainly based on the shell morphology. The shell comprises of two valves. If the valves are similar, the shell is said to be equivalve (clams, mussels). The outer surface may be striated or ribbed. The two valves are held together by an elastic ligament, which leaves a scar on the hinge.

### 3. Results and Discussion

During to the study period a total of 15 freshwater mollusk species belonging to 7 families, 11 genus, and 5 orders under 2 classes have been identified in Brahmaputra River and highlighting the regions and species that require further conservation actions (Table-1) (figure 2). The total 11 Gastropod species

(Table 1) belonging to 5 families, 8 genus and 3 orders and 5 bivalve species belonging to 2 families, 3 genus and 2 orders have been identified in bank of the Brahmaputra River. All of these habitats (sandy, mud and low vegetation) can be found in the different site of river Brahmaputra.

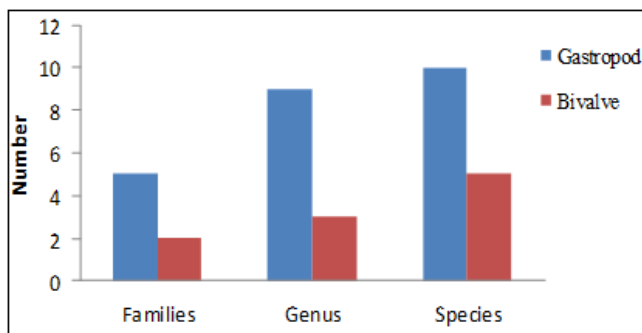


Fig 2: Taxonomic identification of molluscan species in bank of the Brathmaputra River

Table 1: Freshwater mollusca in Brahmaputra River, Mymensingh

Class & Order	Family	Scientific Name	English Name	Local Name	Site	Habit at
<b>Gastropod</b>						
Stylommatophora	Ariophantidae	<i>Macrochlamys sequax</i>	Disk Snail	Chakti Shamuk	A, B	LV
Mesogastropoda	Pilidae	<i>Pila globosa</i>	Common Apple-snail	Shamuk	A, B	F, M
		<i>Pila virens</i>	Apple-snail	Bara Shamuk	A, B	F, M
	Viviparidae	<i>Bellamya begalensis</i>	River Snail	Guli Shamuk	A,B	S
		<i>Bellamya crassa</i>	Pond Snail	Guli Shamuk	A, B	S
	Thiaridae	<i>Melanoides tuberculata</i>	Screw Snail	Pachano Shamuk	A, B	S
		<i>Sulcospira variabilis</i>			B	S, F
		<i>Brotia costula</i>	Brotia Snail	Lomba Shamuk	A, B	M
Basommatophora	Lymnaeidae	<i>Lymnaea luteola</i>	Lymneid Snail	Shamuk	A, B	S
		<i>Indoplanorbis exustus</i>	Ram's Horn Snail	Gari	A, B	S, M
<b>Bivalve</b>						
Unionoida	Unionidae	<i>Lamellidens corrianus</i>	Fresh water Mussel	Jhinuk	A, B	S, M
		<i>Lamellidens jenkinsianus</i>	Fresh water Mussel	Jhinuk	A, B	S, M
		<i>Lamellidens marginalis</i>	Fresh water Mussel	Jhinuk	A, B	S, M
		<i>Parreysia corrugata</i>	Fresh water Mussel	Gol Jhinuk	A, B	S, M
Veneroida	Sphaeriidae	<i>Sphaerium striatinum</i>	striated fingernail	Shakto Chilon	A, B	M

Location: A= Balur Ghat to Shamvuganj Bridge, B= Shamvuganj Bridge to Isha khan lake

Habitat: Freshwater = F, Muddy=M, Low Vegetation=LV, Sandy=S

Among the gastropod species, *Melanoides tuberculata* (Muller) and *Indoplanorbis exustus* (Deshayes) were the most ubiquitous, being present in all 12 sampling stations. *Bellamyia bengalensis* also had a fairly wide distribution, as they were recorded at 4, 6, 9 and 10 stations, respectively. While *Bellamyia crassa* and *Brotia costula* were recorded at 7, 8, 9 and 11 stations, *Macrochlamys sequax* found on 10 station, *Lymnaea luteola* in 5 and 12 stations, *Pila globosa* found in 2, 6 and 9 stations (figure 1). The Bivalve fauna was less rich with five species only. Of those, *Lamellidens jenkinsianus* and *Lamellidens marginalis* were the most common were being found in 2 sites of the stations 4, 5, 6, 8, 10, 11 and 12. *Parreysia corrugata* was encountered on 10 and 11 stations and *Lamellidens corrianus* (Lea) on 4, 5, 6 and 7 stations. *Sphaerium striatinum* was recorded from 3, 4, 5, 6, 8 and 11 stations (Table 1) (figure 1). Monthly and seasonal fluctuations in densities of freshwater snails were recorded in six different sites at Qena Governorate Upper Egypt during the period of March 2009 February 2010, the study revealed the occurrence of 13 species of freshwater snails belonging to 9 families of class Gastropoda [5].

#### 4. Conclusions

Freshwater molluscs ability to filter water, cycle nutrients, and provide habitat for invertebrates is necessary for the survival of the water body. Future research needs to continue to look at the habitat locations of the different species of freshwater mollusca in the Brahmaputra River.

#### 5. Acknowledgements

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#### 6. References

1. Bogan, A.E. Freshwater bivalve extinctions (Mollusca: Unionoida): a search for causes. American Zoologist 1993; 33(6):599-609.
2. Briers RA. Range size and environmental calcium requirements of British freshwater gastropods. Global Ecol Biogeogr 2003; 12: 47-51.

3. COSWIC. COSWIC assessment and status report on the Rocky mountain ridged mussel *Gonidea angulata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 2003; Vi + 29 pp. (www.sararegistry.gc.ca/status/status\_e.cfm).
4. Hellawell J. M.. Biological Indicators of Freshwater Pollution and Environmental Management. London: Elsevier Applied Science Publishers. 1986.
5. Mohamed A. Hussein, Ahmad H. Obuid-Allah, Ama A. Mahmoud, Heba M. Fangary. Population dynamics of freshwater snails (Mollusca: Gastropoda) at Qena Governorate, Upper Egypt. Acad. J. Biolog. Sci., 2011; 3(1): 11 -22
6. Stearns S.C. The evolution of life histories. Oxford University Press, Oxford. 1992.
7. Strayer DL, Hattala K, Kahnle. A Effects of an invasive bivalve (*Dreissena polymorpha*) on fish populations in the Hudson River estuary. Can J Fish Aquat Sci 2004; 61:924–941
8. Petts G.E, Moller H, Roux AL. Historical change in Large Alluvial Rivers. Western Europe. Wiley, Chichester 1993.
9. Primack RB. Essentials of Conservation Biology, Third Edition. Sinauer Associates, Sunderland, MA 2002.
10. Richter BD, Baumgartner JV, Wigington R, Braun DP. How much water does a river need? Freshwater Biology 1997; 37: 231–249.
11. NOAA Commercial Fisheries, 2011 Annual Commercial Landing Statistics, www.st.nmfs.noaa.gov/st1/commercial/landings/annual\_landings.html, Last accessed November 2, 2011.
12. Rosenberg DM, Resh VH. Freshwater Bio monitoring and Benthic Macroinvertebrates. New York: Chapman & Hall 1993.
13. Williams JD, Warren Jr. ML, Cummings KS, Harris JL, Neves RJ. Conservation status of freshwater mussels of the United States and Canada. Fisheries 1993; 18(9): 6-22.

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