RESEARCH ARTICLE

DIVERSITY AND DISTRIBUTION OF MOLLUSCS IN SUBARNAREKHA RIVER, INDIA WITH EMPHASIS ON IDENTIFYING INDICATOR SPECIES

Hirulal Pakhira and *Susanta Kumar Chakraborty

Department of Zoology, Vidyasagar University, Midnapore, India – 721102

ABSTRACT

The diversity and distribution of molluscs have been studied in different stretches of Subarnarekha River-Estuary (upstream, middle stream and downstream) during the period of July 2012 to June, 2014. A total of 23 species of molluscs belonging to 16 genera under 13 families were recorded. Out of all recorded species, 9 species were found to inhabit in freshwater habitats, 14 species preferred to reside in saline environment while 4 species were encountered both in freshwater and brackish water zones. Binary distribution and similarity index have revealed the relationships not only among different molluscan species but also on their mode of preference of habitats, especially against environmental stresses vis-a-vis their power of tolerance and sensitivity as indicator species.

Citation: Hirulal Pakhira and Susanta Kumar Chakraborty, 2016. "Diversity and distribution of molluscs in subarnarekha river, india with emphasis on identifying indicator species", *International Journal of Current Research*, 8, (11), 42162-42164.

INTRODUCTION

Biodiversity being one of the important life supporting systems on earth, serves so many benefits to human being in respect of both economy and ecology (Chakraborty, 2003). Molluscs are mostly microbenthic organisms which are also found attached with floating vegetations in the fresh water bodies as peryphyton organisms. The faunastic survey of molluscs in any ecosystem provides crucial information about ecology and food chains of that ecosystem (Khalua *et al*., 2003). Besides, molluscs are now being used as important faunal components for biomonitoring (Gupta *et al*., 2015). They prove immensely beneficial both economically and medicinally (Wosu, 2003). Molluscs being an important faunal components in the trophic interactions and in transferring the energy in the aquatic ecosystem.Besides, soft bodies of the mollusca are being used as bait for fishing purposes. Molluscan shells are also used for making knife handles, preparation of buttons, useful in the decoration as door curtains and manufacturing of poultry food (Waghmare *et al*., 2012). Although molluscs are common components of the benthic communities, understanding their role in the aquatic ecosystems and their contribution to biomass production is deficient (Supian and Ikhwanuddin, 2002). Realising the ecological importance of this phylum, the present work was undertaken to study the diversity and distribution of the molluscan fauna of Subarnarekha river, a transboundary

Corresponding author: Susanta Kumar Chakraborty,
Department of Zoology, Vidyasagar University, Midnapore, India – 721102.

river traversing through the states of Jharkhand, Odissha and West Bengal ultimately ending to Bay of Bengal. Samplings have been made from 5 sampling sites covering the upstream (study site 1 and 2), middle stream (study site –3and study site – 4) and downstream (Study site-5) ($23^0 37'84"$N to $21^0 35'48"$ and $85^0 86'14"$ to $87^0 27'17"$). Further, the such kind of base line information are supposed to contribute for an effective and holistic ecological assessment of the riverine environment.

MATERIALS AND METHODS

A. Selection of study sites

Study of molluscan fauna was carried out along different stretches of Subarnarekha River during July, 2012 to June, 2014. The first study site, Muri (S1) is located in the border of Jharkhand and West Bengal states, characterised by scarcity of water flow coupled with hard rocky exposed bottom soil which are also subjected to the inflow of industrial waste water from Aditya Birla Industry at Muri. The second study site (S2) Ghatshila is also situated in Jharkhand District and is endowed with rocky bottom sediment contaminated by the effluents of Indian Copper Mining Industry at Ghatshila. The third study site (S3), Gopiballavpur is located in Midnapore West district of West Bengal having sandy bottom in the middle stream of this river and also experience the contaminated water flow from the upstream. The fourth study site (S4) Sonakonia located at the border of Odisha and West Bengal states, is also with sandy river basin in the middle stream of the

Subarnarekha River. The fifth study site (S5) Talsari is located in Odisha where Subarnarekha river meets with Bay of Bengal exhibiting brakish water environment.

B. Collection and Identification of Molluscs

The collection of molluscan fauna has been done at bimonthly intervals of every season - premonsoon, monsoon and postmonsoon, using necessary appliances such as shovels, specimen's bottles, forceps and scalpels. The collected organisms were cleaned and fixed in 5% Formalin Solution. For the identification of fauna standard literature was consulted (Subharao, 1989; Ramakrishna and Dey, 2007).

DISCUSSION

Distinct seasonal variations with regard to the occurrence of molluscan species collected from five different study sites of Subarnarekha River were observed. The maximum occurrence of molluscs at study site – S5 was supposed to be due to the intermingling of two ecosystems - freshwater and marine water, as revealed in other ecotones of the world (Bugenyi, 2001). In contrast, molluscan diversity at S1 and S2 were because of the discharge of industrial effluents from the major industries located at the upstream of this river. Besides, differential occurrences of molluscan species in different study

Table 1. Occurrence of distribution molluscan species in five selected study sites (study site S1 – S5) of Subarnarekha river

S.No.	Family	Species	Study sites (S1, S2, S3, S4 and S5)				
			S1	S2	S3	S4	S5
1	Viviparidae	*Bellamya bengalensis* (Lamarck,1822)	+	+	+	+	+
2		*Bellamya dissimilis* (Muller 1774)	-	-	+	+	-
3	Thiaridae	*Tarebia granifera* (Lamarck, 1822)	+	+	+	-	-
4		*Thiara scabra* (Muller, 1774)	+	+	+	+	+
5		*Thiara lineate* (Gray)	-	+	+	+	-
6	Lymnaeidae	*Lymanea acuminate* (Lamarck,1822)	+	+	+	-	-
7		*Lymanea luteola* (Lamarck,1822)	-	+	+	+	-
8	Unionidae	*Lamellidens corrianus* (Lea, 1834)	-	-	+	+	-
9		*Lamellidens marginalis* (Lamarck, 1819)	+	+	+	+	-
10	Corbuculidae	*Corbicula peninsularis* (Prashad 1928)	-	-	-	+	+
11		*Corbicula striatella* (Deshayes, 1854)	-	-	-	+	+
12	Assimineidae	*Assiminea brevicula* (Pfeiffer)	-	-	-	-	+
13	Littorinidae	*Littorina (Littoraria) melanostoma* Gray	-	-	-	-	+
14	Potamididae	*Telescopium telescopium*(Linnaeus)	-	-	-	-	+
15		*Cerithidea (Cerithideopsis) cingulata* (Gmelin)	-	-	-	-	+
16		*Cerithidea abtusa* (Lamarck)	-	-	-	-	+
17	Naticidae	*Natica tigrina* (Roeding)	-	-	-	-	+
18	Onchidiidae	*Onchidium tigrinum* (Stoliczka)	-	-	-	-	+
19	Arcidae	*Anadara granosa* (Linnaeus)	-	-	-	-	+
20	Mytilidae	*Perna viridis* (Linnaeus)	-	-	-	-	+
21		*Modiolus undulates* (Dunker)	-	-	-	-	+
22		*Modiolus striatulus* (Hanley)	-	-	-	-	+
23	Veneridae	*Meretrix meretrix* (Linnaeus)	-	-	-	-	+

Table 2. Similarity indices among different study sites (S1 – S5) based on the distribution of molluscan species

	S1	S2	S3	S4	S5
S1		83.33	71.43	42.85	19.04
S2			87.50	62.50	17.39
S3				77.77	16.00
S4					30.00
S5					

RESULTS

A total of 23 species of molluscs belonging to 13 different families were recorded. Out of 23 species, 9 species were found from study sites – S1 to S4 along the fresh water dominated stretches of this river and the rest 14 species were recorded from brackish water at study site – S5. Interestingly, 4 species under 3 families were recorded both from fresh water and brackish water zones (Table - 1). Therefore, out of five study sites, the study site –S5 was found to harbour maximum number of species (16) followed by study sites – S3, S4, S2 and S1. The analysis of Similarity Index has depicted maximum similarities (87.50) in between study sites – S2 &S3 followed by S1 & S2 whereas least similarity tended to exist in between study sites – S3 & S5 (Table - 2).

sites enjoying varied ecological set ups have thrown light with regard to their role as biomonitor.

The 4 species viz- *Bellamya bengalensis* (Lamarck,1822), *Thiara scabra* (Muller, 1774), *Corbicula peninsularis* (Prashad 1928) and *Corbicula striatella* (Deshayes, 1854) occurring in all study sites have appeared to be the tolerant bioindicator species while species having restricted distribution can be considered as sensitive indicator species.

Acknowledgement

REFERENCES

Bugenyi, F.W.B. 2001. Tropical freshwater ecotones: their formation, functions and use. *Hvdrobiologia,* 458.pp.33-43.

Chakraborty, S.K. 2003. Biodiversity and Conservation. *In: Mukhopadhyay AD (ed) Perspectivesand Issues in Environmental Studies*, Publ. By Vidyasagar University, pp 267–286.

Gupta, K, Nandy, A., Banerjee, A. and Talapatra, S. N. 2015. Biomonitoring of river Ganga bank by identifying mollusc species as an indicator. *International Letters of Natural Sciences*, 37 pp 71-77.

Khalua, R., Chakravarty, G. and Chakraborty, S. K. 2003. Annotated list of Molluscs from the coastal tract of Midnapore District, West Bengal, India. *Journal of Marine Biological Association of India*. 45(2).pp 245-249.

Ramakrishna and Dey, A. 2007. Handbook on Indian Freshwater Molluscs, *Zoological Survey of India*. Pp399.

Subba Rao, N.B. 1989. Freshwater Molluscs of India. *Handbook Zoological Survey of India,* Calcutta XXIII. Pp 1-289.

Supian Z. and Ikhwanuddin AM. 2002. Population dynamics of freshwater molluscs (Gastropod: *Melanoides tuberculata*) in Crocker Range Park, Sabah. *ASEAN Rev. Biodiv. Environ. Conserv. (ARBEC),* pp. 1-9.

Waghmare P.K., Rao K.R. and Shaikh T.A. 2012. A Correlation between Freshwater Molluscan Diversity with Bhima River Pollution Near Pandharpur, Maharastra, *India. Trends In Life*, 1(3) Pp.38-42.

Wosu, LO. 2003. Commercial snail farming in West-Africa - A guide. *Ap Express Publishers,* NSukka-Nigeria.

****