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A Check List on Macro Faunal Diversity of Bahuda Estuary, Odisha, East Coast of India

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Abstract The Present study was contribute a check list of Macrofaunal diversity of Bahuda estuary. The study indicated total number of 16 species of Mollusca were observed from Bahuda estuary, out of which 8 species were Gastropods and 8 species were Bivalves. Similarly, a total number of 10 species of Crustaceans were observed, out of which 3 species of Penaeidae family, 3 species of Ocypodidae family and 4 species of Protunidae family of order decapoda was observed. A total number of 25 species of fishes were observed having 6 orders comes under 18 families. The species diversity showed a wide range of higher Number of fish(615)followed by Molluscan (549), Crustacean(257) and Polychates (27) in different stations indicating a stable benthic community with moderate environmental parameters with less polluted waters.

Keywords Check List, Diversity, Bahuda, Estuary, India

1. Introduction

The Estuaries represent a special class of aquatic habitat, distinctly different from the open sea on one end and the fresh water bodies on the other. Estuarine fauna can also be considered under two principal divisions i.e. pelagic and benthic. Pelagic fauna includes plankton and nekton. The Benthic fauna includes the organism which lives near or inside the sea bottom. The benthic organisms contribute to a greater extent of total macrofaunal population forming an important role in nutrient cycles. The demersal fishery production potential of an aquatic ecosystem is virtually determined by the benthic animals living in close association with the bottom of estuaries[1]. Several works have been carried out on the macro faunal diversity across Indian coast few notable ones are[2,5]. In Odisha state is concern the macro faunal diversity was conducted by different researcher like the seasonal abundance and distribution of bottom fauna of the Chilika lake[6]. The study on phyto, macro and meio fauna of Chilika lake[7,8]. The study on ecology and fauna of Rushikulya estuary[9]. The meio benthos study of Rushikulya estuary was conducted[10]. The molluscs of Rushikulya estuary, east coast of India[11]. In Bahuda estuary little work has been done such as water quality and copepod distribution of Bahuda estuary, east coast of India[12,13]. This estuary having ecologically importance as the vulnerable species like Oyster i.e *Crassostrea madrasensis* available in 3 beds[14]. This estuary is situated in transitional zone of Odisah and Andhrapradesh boarder which is a minor estuary mainly used for the fishing and transportation purpose. The research organization like Chilika Developnent Authority, Institute of Minerals and Material Technology, Bhubaneswar on comops programme mainly concentrate on off shore of odisha coast and chilika lagoon. So much work has not been carried out from Bahuda estuary not that this estuary is not important from biological, biochemical and zeomorphological point of view. Off lat the Zoological survery of India, Calcutta, P.G Department of Marine Sciences under sap scheme are going to initiate biodiversity, zeomorphological study, water quality monitoring and environmental impact assessment study from this estuary. so in this juncture the present study is an attempt to study the check list on macro-faunal diversity of Bahuda estuary, Odisha, East Coast of India.

2. Materials and Methods

2.1. Study Area

The state Odisha covers a significant part of coastal lands of length about 480 km, which extends from Bahuda estuary on south to Digha on its north. Bahuda estuary is situated between 19° 3’ and 19° 10’ N and 84° 45’ and 84° 50’ E on the Odisha coast. It is one of the rivers of India which originates from Khondalit terrain of Eastern Ghats and opens in to the Bay of Bengal near Sonapur in Ganjam district of Odisha. The water way exhibit the feature of the typical tropical positive estuary a semi perennial river that drains into Bay of Bengal at Sonapur mouth. It is influenced by semi-diurnal tide and thus ingress and out gress of seawater occurs twice daily. The estuary basin near the mouth and

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head region is sand dominated, while its mid reaches s characterized by silt and clay dominated sediment. The samples were collected using from five selected stations (B1, B2,B3 B4 and B5) of 500 meter distance in the Bahuda estuary (Figure 1).

2.2. Methodology

The samples were collected on seasonal basis i.e. Pre-monsoon, Monsoon and Post-monsoon. The classification of the season is same as suggested by for this locality[15,16]. Molluscs of moderate size were handpicked, where as burrowing and sand dwelling faunal forms were sieved against mesh size of 0.5mm for macrobenthic study, sediment samples were collected using corer (15 cm length and 7 cm diameter) and Peterson grab (400 cm^2 area) respectively[17,18]. Gastropods found under the surface and cervices of rocks were picked up with forceps. Attached forms like oysters were collected using chised and hammer. The fish survey has been conducted from five selected stations on river with the help of local fishermen using gill net, cast net, scoop net, drag net, hook and line. The adult fishes, shellfishes and other animals were preserved in 10% neutral formalin and stored in polythene bottles for further studies. Molluscs specimen were then allowed to extend their contracted body parts and processed and narcotisation were done by sprinkling fine powders of $MgSO_4$ on the same filtered estuarine waters containing specimen. Then taxonomic identification were made for invertebrate as well as fishes using different standard literature like[19,26].

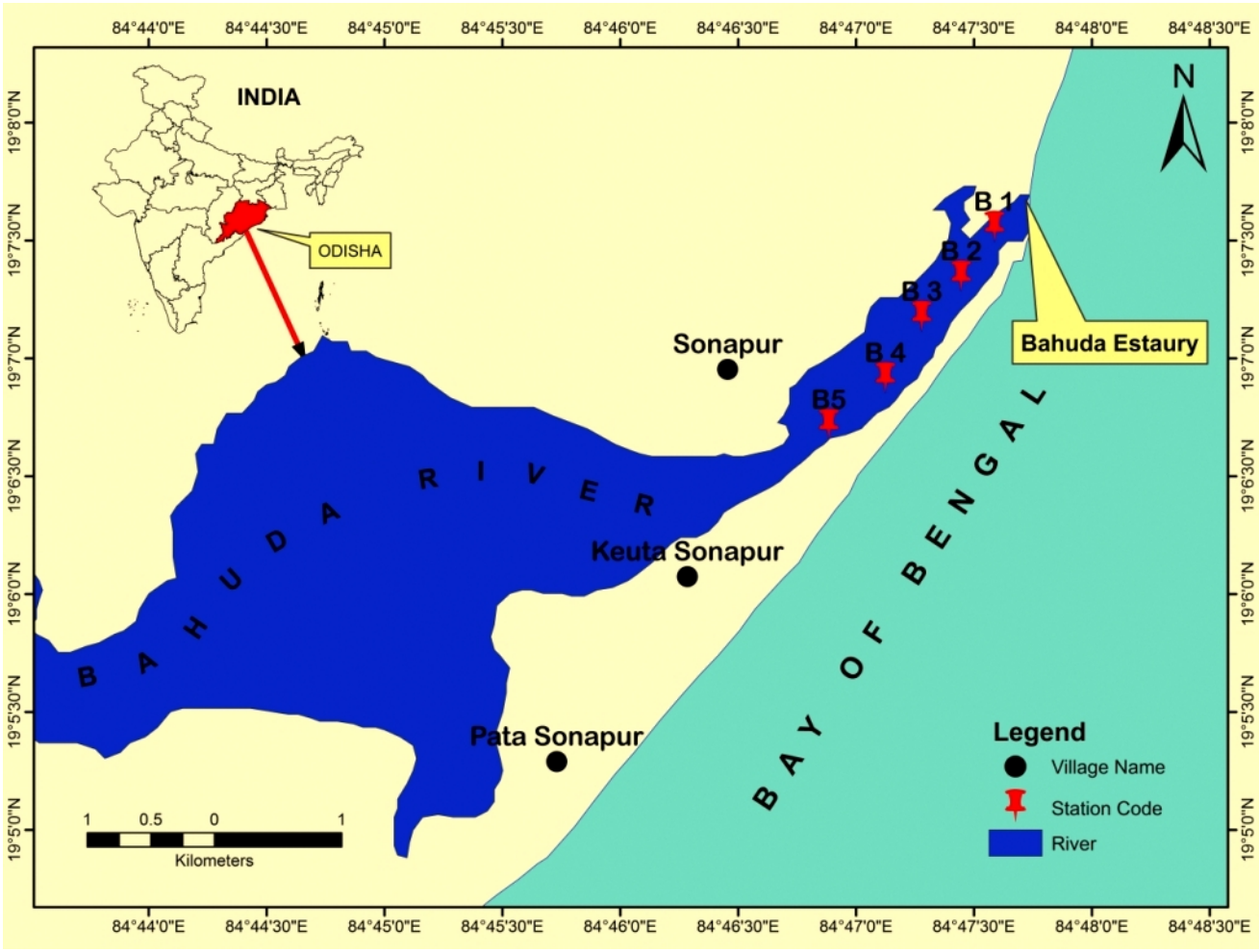

Figure 1. Maps showing the study area

3. Results and Discussion

The estuary is generally acts as breeding and nursery ground for most of the demersal and pelagic organism and act as most productive biome of world[27]. In the present study the important constituents of the estuarine macro fauna comprise molluscan, crustaceans, fishes and Polychates. The check list of molluscs, crustaceans and fishes are represented In (Table 1). The study indicated that In station B-1 highest number of molluscan found i.e 215 in number and it gradually decrease to upper stretch of the estuary ie in station B2-187, B3-82, B4-40 and B5-25 in number. The similar observations are found in estuaries of Hoogly-Matla, Mahanadi, Rushikulya,Vamsadhara and Nagabali[28,31]. In Crustacean diversity the station 1 having highest dominance of 107 in number of species which is Gradually decrease towards upstream station of station B2-73, B3-47,B 4-21 and B5-9. The present result is slightly agreement with the result of Hoogly-Matla,Mahanadi, Rushikulya,Vamsadhara and Nagabali estuary. The fish having highest dominance in station B-1 of 245 number in the estuary where as in B-2, B-3, B-4 and B-5 the dominance of fish species are 148,139,55 and 28 in number. The present result is in partial agreement with the above estuary which may be due to the environmental factor and sediment characteristic. Likewise the polychete diversity are very low in station B-2 and B-3 i.e 1 and 2 in number where as high diversity found in B4 and B5 i.e 11 and 13 in number and totally absent in station 1 and this result is not agreement with the above estuarine result as it is minor estuary and free from the pollution except the agricultural run up.[32]

In present study the station-1 i.e. B1 having highest dominance of molluscan,crustacean, fishes which may be due to intrusion of saline water in high tide in estuarine zone and the salinity gradually decrease in upper stretch where dominance of species also gradually decreases in station B-4 and B-5 which is supporting the earlier observation[33,36]. Sediment also act as significant role in abundance of species diversity of the estuary as in estuarine zone the sediment is sand dominated and in upper stretch the sediment is clay dominated where the dominance of species is very less ie station B-3 to B-5 (Table 1) collaborating earlier finding and wider niche[37].

Table 1. Checklist of Macorfauna observed in study area of Bahuda Estuary

Group	**Species**	**B-1**	**B-2**	**B-3**	**B-4**	**B-5**
Gastropoda	*Umbonium vestiarium* (Linnaeus,1758)	10	8	4	2	0
Gastropoda	*Cerithidea cingulata* (Gmelin,1791)	15	20	10	5	6
Gastropoda	*Telescopium telescopium* (Linnaeus,1758)	22	15	12	10	7
Gastropoda	*Bursa rana* (Linnaeus,1758)	10	12	1	0	0
Gastropoda	*Nassarius spp* (Linnaeus,1758)	5	4	1	1	0
Gastropoda	*Bullia vittata* (Linnaeus,1758)	23	32	1	0	0
Gastropoda	*Oliva oliva* (Linnaeus,1758)	20	12	7	3	3
Gastropoda	*Olivancillaria gibbosa* (Born,1778)	15	10	4	2	3
Bivalvia	*Murex troschelli* (Lischhke ,1868)	15	20	5	4	0
Bivalvia	*Anadara rhombea* (Born ,1778)	5	3	2	0	0
Bivalvia	*Perna viridis* (Linnaeus, 1758)	5	4	3	0	0
Bivalvia	*Crassostrea cuttackensis* (Newton and Smith, 1912)	4	2	2	2	0
Bivalvia	*Siliqua radiata* (Linnaeus, 1758)	14	12	4	1	1
Bivalvia	*Donax scortum* (Linnaeus ,1758)	20	10	12	4	2
Bivalvia	*Sunetta scripta* (Linnaeus, 1758)	10	8	4	0	0
Bivalvia	*Meretrix meretrix* (Linnaeus, 1758)	22	15	10	6	3
Sub total		**215**	**187**	**82**	**40**	**25**
Group	**Species**	**B-1**	**B-2**	**B-3**	**B-4**	**B-5**
Penaeidae	*Penaeus monodon* (Fabricus ,1798)	30	15	10	5	0
Penaeidae	*Penaeus indicus* (H.M Edwards ,1837)	20	10	10	4	2
Penaeidae	*Penaeus semisulcatus* (DeHaan ,1844)	15	5	5	0	0
Ocypodidae	*Ocypode macrocera* (H.Milne Edwards ,1852)	4	3	2	1	0
Ocypodidae	*Ocypode platytarsis* (H.Milne Edwards ,1852)	2	4	2	0	0
Ocypodidae	*Uca annulipes* (H. Milne Edwards ,1837)	4	7	2	1	2
Portunidae	*Scylla serrata* (Forskal ,1775)	2	1	2	0	0
Portunidae	*Portunus pelagicus* (Linnaeus ,1758)	15	10	5	5	5
Portunidae	*Portunus sanguinolentus* (Herbest ,1783)	5	8	1	1	0
Portunidae	*Charybdis amboinensis* (leene,1938)	10	10	8	4	0
Sub total		**107**	**73**	**47**	**21**	**9**
Group	**Species**	**B-1**	**B-2**	**B-3**	**B-4**	**B-5**
Clupeiformes	*Anchoviella indica* (van Hasselt,1823)	20	10	15	10	1

Clupeiformes	*Thryssa kammlensis* (Bleeker,1849)	25	20	15	0	0
Clupeiformes	*Thryssa setirostris* (Broussonet,1782)	15	15	10	5	0
Clupeiformes	*Dussumieria acuta* (valenciennes,1847)	10	8	2	0	0
Clupeiformes	*Nematolosusnasus* (Bloch,1795)	0	2	2	0	0
Mugiliformes	*Mugil cephalus* (Linnaeus,1758)	20	0	40	5	5
Mugiliformes	*Rhinomugil corsula* (Hamilton-Buchanan,1882)	8	6	6	0	0
Mugiliformes	*Liza Parsia*(Hamilton,1822)	21	3	8	10	2
Perciformes	*Johnius dussumieri* (cuvier,1830)	10	4	2	0	0
Perciformes	*Johnius* (Kathala) *axiliaris* (cuvier,1830)	4	4	2	0	0
Perciformes	*Lutjanus johni* (Bloch,1792)	4	4	0	0	0
Perciformes	*Lutjanus russelli* (Bleeker,1849)	2	2	0	0	0
Perciformes	*Leiognathus dussumieri* (valenciennes,1835)	5	7	2	0	0
Perciformes	*Secutor ruconius* (Hamilton - Buchanan,1822)	5	4	2	0	0
Perciformes	*Epineplelus merra* (Bloch,1793)	3	3	0	0	0
Perciformes	*Kishinoella tonggol* (Bleeker,1851)	5	3	0	0	0
Peciformes	Lates calcarifer (Bloch,1790)	10	6	2	0	0
Tetradontiformes	*Lagocephalus inermis* (Temminck and Schlegal,1850)	3	0	0	0	0
Tetradontiformes	*Therapon jarbua* (Forskal,1755)	8	4	0	0	0
Tetradontiformes	*Rastrelliger kanagurta* (Cuvier,1816)	40	20	20	0	0
Tetradontiformes	*Chelonodon patoca* (Hamilton - Buchanan,1822)	8	8	3	0	0
Siluriformes	*Mystus gulio* (Hamilton - Buchanan,1822)	15	10	5	15	12
Siluriformes	*Mystus vittatus* (Bloch,1794)	1	2	2	0	0
Siluriformes	*Arius arius* (Hamilton - Buchanan,1822)	1	0	1	0	0
Cyprinodontiformes	*Tricanthusbiaculeatus* (Bloch,1795)	2	3	0	10	8
Sub total		**245**	**148**	**139**	**55**	**28**
Group	**Species**					
polychaeta	Nereis	0	0	0	2	3
	Nepthys	0	0	0	3	4
	Goniada	0	1	0	3	2
	Sabella	0	0	2	3	4
Sub total			1	2	11	13
	Molluscan		549			
	Crustacean		257			
	Fish		615			
	polychaeta		27			
Grand total			**1448**			

4. Conclusions

The macrofauna diversity of Bahuda estuary is more diverse as compared to other estuaries along the east coast of India there were 615 number of individual fish species followed by mollusca 549 , crustacean 257 and polychate 27 in number. This estuary is very fertile but not polluted. The spatial and temporal variation of diversity index of this estuary is highly essential. Therefore a long term research is needed to quantify the distribution and abundance of benthic organism over a long period of time.

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