

## Present status and decreasing causes of shellfish diversity of Passur river, Sundarban, Bangladesh

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**Abstract.** The objective of this study was to know the present status and decreasing causes of shellfish diversity in the Passur river of Sundarban, Bangladesh. The study was conducted over a period of five months from October 2011 to February 2012 on the Chandpai range of the Passur river, Sundarban, Bangladesh. A total of 14 shellfish species of three orders and 7 families were identified. On the basis of availability the species were categorized in four statuses that obtained as available (50%), less available (22%), rare (14%) and very rare (14%). Results of the study identified two species as very rare which may extinct near future resulting declination of the shellfish diversity. Few man made decline causes like water pollution, fishing in the sanctuaries, use of set bag and drag net to catch prawn and shrimp fry were observed as major threats for the diversity of shellfishes. The present work recommends preventing water pollution, increasing fishermen's awareness, implementation of fisheries laws and reduction of using set bag and shore drag net to save the shellfish diversity of this important river of Sundarban, Bangladesh. Besides, counter and random survey is recommended to cross check the shellfish status for their proper management and conservation.

**Key Words:** shrimp, lobster, inland fishery, Passur river, fisheries resources, conservation.

**Introduction.** The Sundarban forest is the largest continuous productive mangrove wetland ecosystem in the world. It is a home to an estimated 234 species of flora and more than 300 species of fish, including 237 species of finfish, 38 species of shellfish and 34 species of mollusks to enrich the ecosystem (Rahaman et al 2014). Numerous species (estimated to be 400) are known to use mangrove swamps as nursery grounds (Gundermann & Popper 1984; Lowe-McConnell 1975). The Sundarban delta provides physiologically suitable environment with respect to temperature, salinity and other physico-chemical parameters. Further, many commercial estuarine fishes grow to maturity there and make up a large part of the near-shore fishery of the northern Bay of Bengal. Other fishes and prawns that spend most of their lives in freshwater descend annually to the estuary for spawning. Therefore, many marine and freshwater prawn and fish require this environment to complete their lifecycle. The plant and vegetation of Sundarbans Reserve Forest (SRF) provide food and shelter for fish, shellfishes, mollusks, and others aquatic organisms. The entire Sundarbans and its surrounding areas of brackish and marine water are also used as breeding, nursery and feeding habitats by fishes, mollusks and shellfishes (Muhibullah et al 2005).

Fresh water biodiversity are in a state of critically endangered due to the climate change and habitat destruction. Degradation of stream and riverine ecosystem causes ultimate destruction to the structure and function of stream biota (Stoddard et al 2006). This problem is more acute in a developing country like Bangladesh. From the ecological point of view, fish and shellfish are very important not only because of their economic value, but also because of sensitivity to ecological changes and represent a wide range of

tolerance at community level (Pielou 1966). There is an increasing concern about the effects of major natural or human perturbations on aquatic ecosystems. It should be noted that knowledge of freshwater biodiversity is incomplete. There are about 700 rivers in Bangladesh, but relatively little is known about the fisheries biodiversity and distribution, though during the last century and last decades some studies (Chowdhury et al 2010; Hossain et al 2007; Bhuiyan 1964; Hossain 1970; Bhuiyan et al 1992; Doha 1973; Rahman 1989; Islam & Hossain 1983; Kamal 2000) were made. So, extensive researches are required to prepare a database of shellfish fauna aiming to contribute a better knowledge of the fisheries diversity in these rivers.

Passur river and its canal plays a vital role as a nursery ground for a lots of shellfishes mainly fresh water giant prawn (*Macrobrachium rosenbergii*), tiger shrimp (*Penaeus monodon*) and mud crab (*Scylla serrata*). But the shellfish diversity of this river has been little studied. For this reason, the objectives of this study were to assess the present status and decreasing causes of shellfish diversity in Passur river of Sundarban, Bangladesh. The results will facilitate further studies on this fauna by interested researchers.

**Material and Method.** The present study was conducted over a period of five months from October 2011 to February 2012 on the Passur river which is in the middle part of the Sundarban (polyhaline zone) of Bangladesh and is connected with the Garai-Madhumati river through Atarabanki and Nabaganga rivers. The total length of the study area is about 20.71 km. Five sampling points, namely, Dhangmari, Karamjal, Chandpai, Joymoni and Harbaria, were selected at the middle of the river and river-canal meeting places (Table 1 and Figure 1). Specimens were collected fortnightly during daytime from the nearby fishermen and identified directly at the five selected points during the study period. Immediately photographs were taken earlier to preservation since formalin decolorizes the shellfishes color on long preservation.

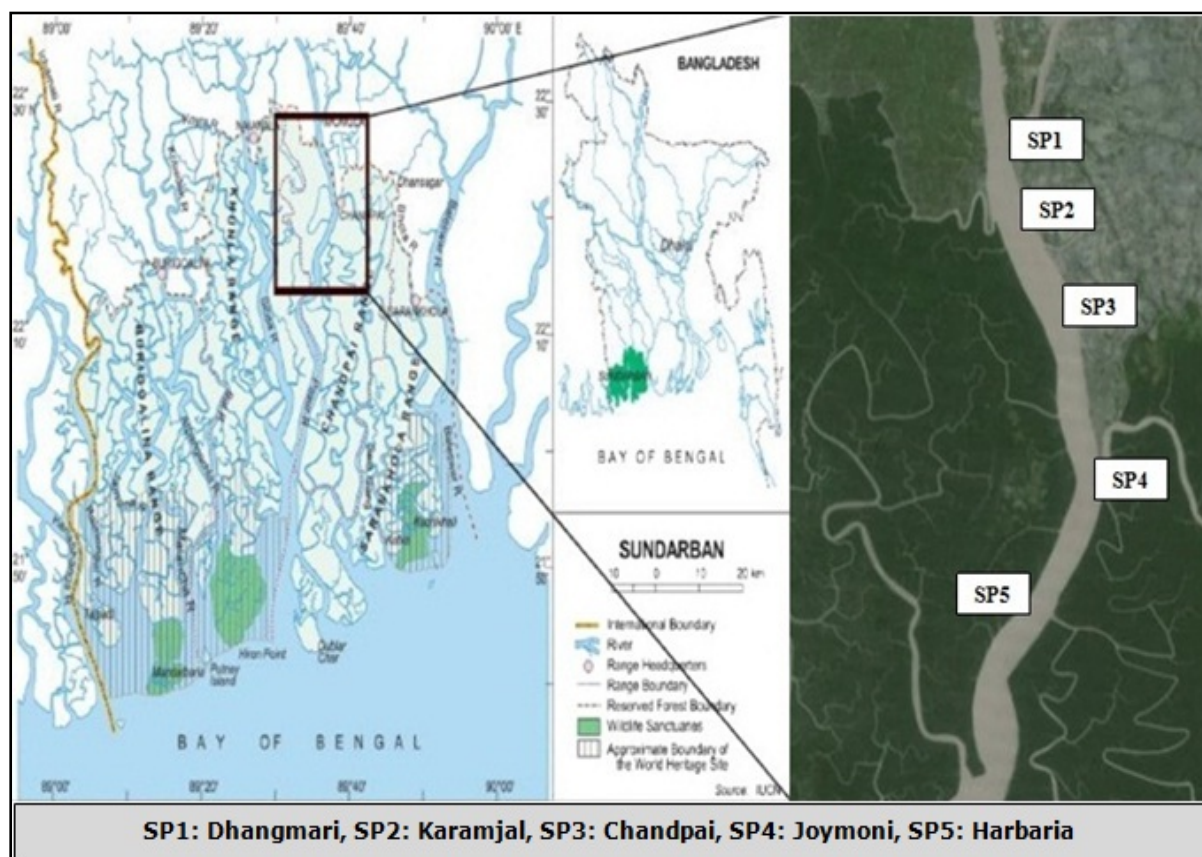


Figure 1. Map of the Sundarban and location of the study points in Passur river system, Bangladesh.

Table 1

## Geographical location of study areas during sampling

<i>River</i>	<i>Sampling points</i>	<i>Latitude</i>	<i>Longitude</i>
Passur	Dhangmari	22° 43' 94.14" N	89° 58' 55.66" E
	Karamjal	22° 25' 54.98" N	89° 35' 57.85" E
	Chandpai	22° 35' 23.11" N	89° 63' 52.15" E
	Joymoni	22° 20' 51.35" N	89° 37' 49.65" E
	Harbaria	22° 17' 57.59" N	89° 36' 17.67" E

Samples were preserved in 10% formalin to save from spoilage (Simon & Mazlan 2010). The specimens were identified to the species level according to Talwar & Jhingran (1991) and Rahman (2005). The species were then categorized in four statuses on the basis of interview and catch records of 180 fishermen as follows: Available (A): species observed throughout the year; Less Available (LA): species observed infrequently; Rare (R): species observed periodically; and Very Rare (VR): species observed fortuitously.

**Results and Discussion.** A total of 14 shellfish species comprising three orders and seven families were observed in the Passur river (Table 2). The family wise percentage analysis of the shellfish species showed the highest occurrence belongs to the family Palaemonidae (43%), followed by Penaeidae (22%), Alpheidae (7%), Grapsidae (7%), Portunidae (7%), Squillidae (7%) and Limulidae (7%) (Figure 2). The observed species were categorized in four statuses and obtained as available (50%), less available (22%), rare (14%) and very rare (14%) (Figure 3).

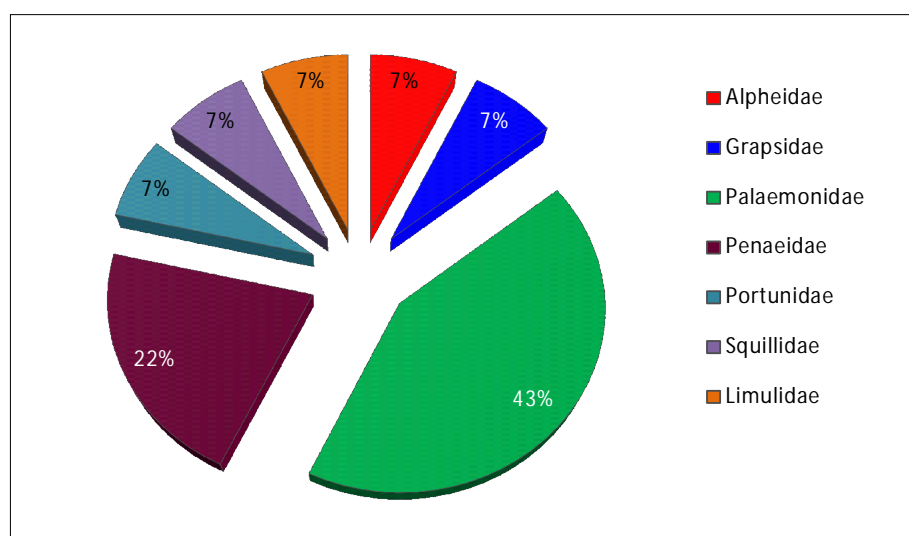


Figure 2. Percentage composition of shellfish in different families from the Passur river, Sundarban, Bangladesh.

The study findings represent the present status of shellfishes on five sampling points of Passur river, however, this is almost representing the declining trends of riverine shellfishes of Bangladesh. The status of shellfish in the rivers of Sundarban was much appreciable before six to seven years. Hoq (2008) reported fifteen species belonging to seven families of shellfish from the rivers of Sundarban during his 2 years study. The findings obtained from this study clearly indicated the declining trends of shellfishes in Sundarban waters in particular Passur river of Bangladesh.

During the study period man made causes were found significant as decline causes of shellfish species in the Passur River which is in agreement with Rahman et al (2010). It is observed that hundreds of fishermen are catching prawn and shrimp larvae with set bag net in both side of the river bank. Besides hundreds of men and women are dragging pull net along the shore to catch the fingerlings of prawn and shrimp. The study

also found lots of big mechanized boat, oil tanker and cargo are passing through the narrow channel of Passur river as well as through the recently declared sanctuaries of this river.

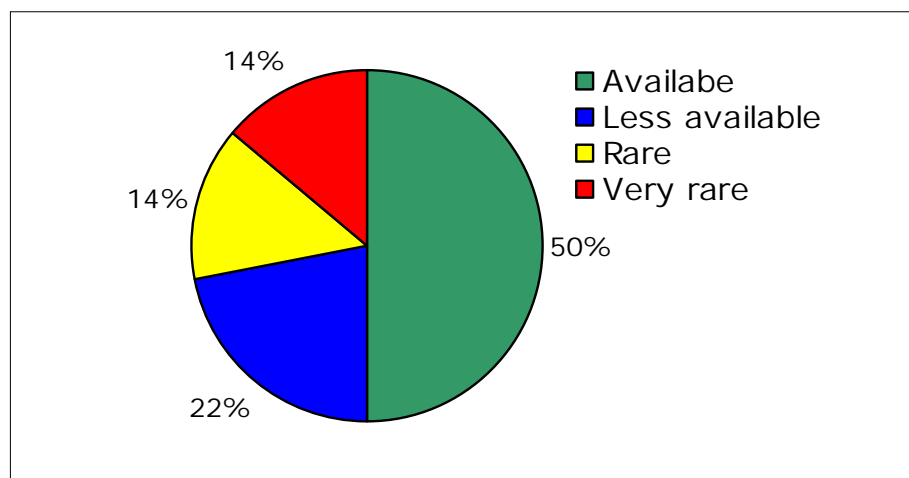


Figure 3. Percentage composition of shellfishes in relation to the total catch from Passur river, Sundarban, Bangladesh.

Table 2  
Status of shellfishes of the river Passur in relation to the total catch

Family (No. of species)	Species name with availability	Local Name	English/ Common Name
<i>Order Decapoda (12 species)</i>			
Alpheidae (1)	<i>Alpheus euphrosyne</i> (de Man, 1897) (R)	Pinna Chingri	Nymph snapping shrimp
Grapsidae (1)	<i>Episesarma chengtongense</i> (Serène & Soh, 1967) (A)	Kakra	Pinkfingered vinegar crab
Palaemonidae (6)	<i>Exopalaemon styliferus</i> (H. Milne Edwards, 1840) (A)	Motka Chingri	Roshma prawn
	<i>Leptocarpus fluminicola</i> (Kemp, 1917) (A)	Choto Chingri	Ganges delta prawn
	<i>Macrobrachium dayanum</i> (Henderson, 1893) (R)	Kathali chingri	Kaira river prawn
	<i>Macrobrachium rosenbergii</i> (De Man, 1879) (A)	Golda Chingri	Giant freshwater prawn
	<i>Macrobrachium rude</i> (Heller, 1862) (LA)	Goda Chingri	Hairy river prawn
	<i>Macrobrachium villosimanus</i> (Tiwari, 1949) (LA)	Boishakhi	Dimua river prawn
Penaeidae (3)	<i>Metapaeneus monoceros</i> (Fabricius, 1798) (A)	Harina Chingri	Speckled shrimp
	<i>Penaeus indicus</i> (H. Milne Edwards, 1837) (LA)	Chaka Chingri	Indian white prawn
	<i>Penaeus monodon</i> (Fabricius, 1798) (A)	Bagda Chingri	Giant tiger prawn
Portunidae (1)	<i>Scylla serrata</i> (Forskål, 1775) (A)	Kakra	Mud crab
<i>Order Stomatopoda (1 species)</i>			
Squillidae (1)	<i>Oratosquilla perpersa</i> (Kemp, 1911) (VR)	Lobstar	Mantis shrimp
<i>Order Xiphosura (1 species)</i>			
Limulidae (1)	<i>Carcinoscorpius rotundicauda</i> (Latreille, 1802) (VR)	Raj Kakra	Mangrove horseshoe crab

Note: A = Available, LA = Less available, R = Rare, VR = Very rare.

As a result various chemical wastages and human waste as well are continuously mixing with the water thus polluting the water quality of the river which extremely affects the spawning, nursing and grazing grounds of fish and shellfish species of this important river of Sundarban. The river bank erosion and water wave created by these vessels consequently destroy the entire ecosystem of the Passur river. Moreover, it is also observed that over fishing, degradation of breeding grounds, the capture of brood fish, indiscriminate killing of fingerlings, pollution etc. affected the survival and existence of

the shellfish fauna and resulting the decreasing of fish diversity. The result of the present study newly includes two more species (*Oratosquilla perpersa* and *Carcinoscorpius rotundicauda*) as very rare status of the Passur river which may extinct in the coming future.

**Conclusions.** The study is a preliminary attempt to assess the shellfish diversity on a particular point of Passur river, Khulna Bangladesh. The result of the study may not be the actual status of the shellfish diversity of the river as a whole. However, some recommendations like preventing water pollution, ensuring water flow, awareness of the fishermen, implementation of fisheries laws and declaration of fish sanctuary have been coming out to save the fish diversity of the study area. Besides, counter and random survey are recommended to cross check the shellfish status for their proper management and conservation.

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