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Seasonal availability of crabs and their distribution in Digha coast

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ARTICLE INFO	ABSTRACT
<p>Article history</p> <p>Received 10 October 2015 Accepted 11 December 2015</p> <hr/> <p>Keywords: <i>Digha coast;</i> <i>Distribution of crabs;</i> <i>Seasonal abundance and diversity</i></p>	<p>Digha coast is the most popular sea side in the West Bengal renowned for its extended beaches which support varieties of animal life. The present study emphasizes on the composition, distribution and abundance of different crabs in the entire Digha coast including Talsari of Jaleswar district, Odisha. The actual study period was in middle of January to the end of June, 2014. The total species were found to be 34 belonging to 9 families, out of which 28 species were collected in summer and the rest was collected in winter. The populations of commercially important marshy crabs are gradually declining day by day due to indiscriminate fishing of berried females and different anthropogenic activities of the coast. The most dominated family was Ocypodidae and Portunidae and the leading species of crabs includes <i>Scylla serrata</i>, <i>S. tranquebarica</i>, <i>Portunus pelagicus</i> and <i>P. sanguinolentus</i>. In last few years, the local peoples have tried to convert marshy areas to aquaculture ponds for achieving higher production of tiger shrimp. Consequently, habitat as well as breeding places of these crabs reduces day by day. Simultaneously, the discharged effluents from the shrimp farms are also causes serious threat to the crab population. From our observations it has been revealed that maximum crabs were found in summer and less abundance during winter.</p>

INTRODUCTION

India has a variety of natural coastal ecosystems. The eastern coast is low lying with lagoons, marshes, beaches and deltas while the western coast is dominated by rocky shores. Among 2600 marine crabs *Scylla serrata*, *S. tranquebarica*, *Portunus pelagicus* and *P. sanguinolentus* is the leading species of Digha coast of Purba Medinipur district. It is an established fact that the world population swells at an alarming rate year after year, and over half of the same is believed to suffer from malnutrition. At the present rate of population explosion it is likely that the global population may up from the present level of 5 billion to about 8 billion by the close of the present century [1]. The food from land is so limited that it may not be able to satisfy even the basic requirement of the ever increasing population. One of the alternatives to overcome this problem of food shortage is to tap the vast resources of the ocean which could nourish the human population many times more than its present level. According to FAO fishery Statistics the world fish production in 1990 amounted to about 97 million tonnes of which 95.8 million tonnes have come from the sea. Crustaceans comprising of prawns, lobsters and crabs accounted for about 4.4% of this, which are the most highly valuable commodities by virtue of their pivotal role in the seafood industry of the world. In India, the marine fishery is mostly export oriented and among the seafood items exported from the country, the crustaceans account for about 45 % in terms of volume and 75% in terms of value. According to the latest export figure, this amounts to about 14,000 million rupees annually [2].

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Among edible crustaceans crabs occupy the third rank, the first and second positions being given to prawns and lobsters on account of their demand in the overseas markets. Crab meat is considered as a delicacy in many parts of the world and within the country it is an important source of protein rich food for the less affluent society of coastal areas. Besides its immense nutritive value, the crab meat also carries many therapeutic properties. Crab shells are rich source of chitin and its chitosan content which have numerous industrial and medicinal applications, particularly in the manufacture of artificial fabrics, printing inks; photographic emulsions adhesive cosmetics, dialyzers and anticoagulants [3-5]. Faunal Diversity in Prawns and Crabs in Digha and Adjacent Coast in West Bengal with Notes on the Relationship of Their Abundance with Physico chemical Parameters were studied by Chatterjee, et al. [6]. It is estimated that the world export earnings from chitin would be about 200 crores dollars by the end of 2000 AD [7]. A perusal of fishery statistics for the past few years would reveal that the annual crab production of the world ranged between 0.8 million tonnes and 1.1 million tonnes with an average annual production rate of about 0.9 million tonnes [8]. During 1990, the crab production accounted for 50% of the total world crustacean landing [8]. Many workers have pointed out the possibility of tapping underexploited stocks of crabs in the tropical and subtropical countries, which have been often hidden by inadequate catch statistics [9,10]. The seas around India are blessed with a rich fauna of brachyuran crabs as could be evident from the several faunistic reports published over the past hundred years or more. This includes a number of edible crabs which support sustenance fishery throughout the Indian coasts [11,12]. In most areas of the coast the crabs are taken as incidental catches, while an intensive fishery is restricted to only selected centres [13]. The average annual crab landing from the marine sector during 1980- 1990 amounted to 22,000 tonnes which form 8.4% of the total crustacean landing. Bulk of this catch is utilized for local consumption in the

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coastal areas. This forms only about 50 % of the potential crab resources of 44,000 tonnes [11] for the Indian seas including brackish water sector.

MATERIALS AND METHODS

Sites of the Study:

The study of availability of crabs in Digha coast was carried out in the part of Bay of Bengal which was located in the Purba Medinipur district of West Bengal, India and this area lies between Latitude - 21°36" North and Longitude - 87°30" East. It was carried out from the Mouth of the Subarnarekha river to old Digha extended up to Mohana. The entire length of study area is about 5-6 km including Talsari delta located at Jaleswar district of Orissa state, India. This area is placed between spring-tide and neap-tide level and characterized by shallow and swampy muddy environment. Digha coasts muddy and sandy beaches provide a suitable habitat for breeding of horseshoe crab and its hosts [14]. Besides these, the samples were collected from the deep sea area through mechanized fishing vessels. The probable distance is about 70 – 80 km from the shore line and depth was about 30 – 40 m. The study area has shown in the Fig-1.

(Model No. Cyber-shot-G) DSC-H70 (10x optical zoom and 16.1 Megapixels and 25 mm wide angle lens) from marshy and swampy areas. Few crabs were collected from the deep-sea zone through deep sea fishing and were kept in 10 % Formalin solutions in a container. Some of the crabs inhabited in the marshy areas of the shore line where tidal flows travel at regular interval. So these crabs were very much sensitive for their self protection and photographs has been taken very consciously in the early morning by awaiting 40-45 minutes. Moreover, collected samples (Deep sea fishing) were brought to the departmental laboratory and washed by clean water for proper identification. The specimens were identified through the method developed by Sakai [15], Setharamalingam and Ajmal Khan [16].

RESULTS AND DISCUSSION

In winter season *Portunus latipes*, *Scylla serrata*, *Ocypode macrocera*, *Charybdis lucifera*, *Ocypode quadrata*, *Limulus polyphemus*, *Calappa lophos*, *Dromia dromia* etc were observed in beach side. The species of *Ocypode pallidula* and *Coenobita clypeatus* were identified at the onset of summer. In the summer the coastal belt of Digha is abundant with *Uca annulipes*, *Uca triangularis*, *Uca splendid*, *Grapsus grapsus*, *Uca crassipes*, *Uca tetragon*, *Pachygrapsus crassipes*, *Uca typhoni*, *Portunus gracilanamus*, *Uca perplexa*, *Uca vocans*, *Uca forcipata*, *Uca rosea*, *Uca demani*, *Uca lactea*, *Uca paradussumieri*, *Portunus pelagicus*, *Coenobita clypeatus* etc. There are several crabs were identified in the deep sea fishing, which includes- *Portunus pelagicus*, *Portunus gracilanamus*, *Portunus argentatus*, *Trapezia tigrina*, *Charybdis feriatus*, *Thalamita prymna*, *Charybdis acutifrons*, *Portunus sanguinolentus*.

DISCUSSION

During the observation period i.e. January to June, 2014; 34 species belonging to 9 genera were identified in Digha and Talsari beach which are enlisted in Table-1. The recorded dominated family was Ocypodidae and Portunidae followed by Grapsidae, Calappide, Chaybdae, Dromidae, Limulidae, Trapeziidae and Coenobitidae (Table-2). Most of the crab species were edible having high market demand in our country as well as abroad and contribute lion share in the Indian economy. Moreover, crabs of swampy, muddy, sandy and deep water area play a vital role in recycling the nutrients to enhance soil fertility. The majority of crabs were distributed in the rooted area of *Avicennia* and *Rhizophora* plants inhabited in the intertidal zones of Digha and Talsari coast. The *Avicennia marina* shows an interesting behavior during the tidal flow by making a burrow in the beach area. The huge amount of grayish, blackish ghost crabs (small to medium size) were available in the intertidal zone. But these species were not found in swampy intertidal zone. The ghost crab moves very fast towards their destination. They have comparatively longer legs than other crabs. The legs lie horizontally and parallel with the land. This is only one species having pinkish color compound eyes. The ghost crabs avoid overcrowded places and preferred peaceful areas for their shelter. So, the density of crabs gradually increases towards the Talsari from New Digha due to noiseless environment (Low visitors movement). The crabs enter into the burrow during high tide and immediately active in their routine work. The depth of the burrows varied from 1.0-1.5 m from the surface and the diameter of the mouth from 8 to 16 cm. During high tide the burrows are flooded with sea water [17].

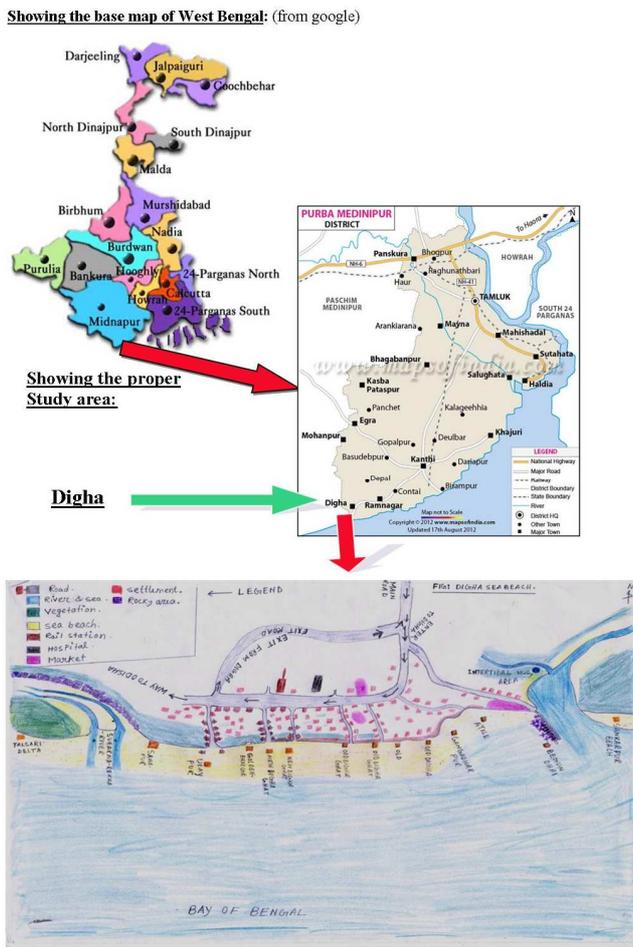


Fig- 1: Digha and Talsari beach

The experiment was carried out during middle of January to the end of the June, 2014 at every alternative week. The sample crabs were collected by two methods. The first one is the direct catching or collection of crabs from sea water and another method is photo capture using digital camera

Table-1: Abundance of crab population in different areas and season:

Date of sample collection	Scientific name	Season	
11.01. 2014	<i>Portunus latipes</i>	Winter (On Beach)	
	<i>Scylla serrata</i>		
12. 01. 2014	<i>Ocypode macrocera.</i>		
18. 01. 2014	<i>Charybdis lucifera</i>		
	<i>Ocypode quadrata</i>		
	<i>Limulus polyphemus</i>		
25. 01. 2014	<i>Calappa lophos</i>		
26. 01. 2014	<i>Dromia dromia</i>		
23. 03. 2014, 24. 03. 2014 and 25.03. 2014	<i>Ocypode pallidula</i>		onset of Summer
05. 04. 2014 and 06. 04. 2014	<i>Coenobita clypeatus</i>		Summer (Digha mohana)
06. 04. 2014	<i>Uca annulipes</i>		
08. 04. 2014,	<i>Uca crassipes</i>		
09. 04. 2014 and	<i>Uca splendid</i>		
10. 04. 2014	<i>Grapsus grapsus</i>		
	<i>Uca triangularis</i>		
16 - 18. 04. 2014	<i>Pachygrapsus crassipes</i>		
	<i>Uca tetragon</i>		
	<i>Uca typhoni</i>		
23-26.04. 2014	<i>Coenobita clypeatus</i>		
	<i>Uca perplexa</i>		
	<i>Uca vocans</i>		
	<i>Uca forcipata</i>		
	<i>Uca rosea</i>		
	<i>Uca demani</i>		
	<i>Uca lacteal</i>		
02- 08. 05. 2014	<i>Uca paradussumieri</i>		
26. 06. 2014	<i>Portunus pelagicus</i>	Deep-sea fishing crab	
	<i>Portunus gracilanamus</i>		
	<i>Portunus argentatus</i>		
	<i>Portunus sanguinolentus</i>		
	<i>Charybdis feriatius</i>		
	<i>Thalamita prymna</i>		
	<i>Charybdis acutifrons</i>		
	<i>Trapezia tigrina</i>		

Table-2: Quantities of different crab species corresponding to their families in different seasons

Family name	Number of species	Winter	Summer
Portunidae	08	2	6
Ocypodidae	16	3	13
Grapsidae	2	--	2
Calappidae	2	--	2
Limulidae	1	--	1
Coenobitidae	1	--	1
Dromiidae	1	1	--
Trpeziidae	1	--	1
Chaybdae	2	--	2

Available crabs of Digha and Talsari beach: (January- June, 2014)



Fig-2: Available crabs of Digha and Talsari beach (January- June, 2014)

Moreover, *Uca* species were found in the Mohana area (Shallow and muddy intertidal zone) round the year, but they do not travel to the sandy beach. All kinds of species exhibit similar characteristics, but they differ in their size and color. This species are not considered as edible due to

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their small size (1-2 inches). Some of them are toxic but few species are non-toxic having medicinal importance. The smaller number of crabs like, *Grapsus* sp, *Scylla* sp etc. found in the rocky beach and the majority of them are lives in deep sea water, such as- *Calappa* sp, *Portunus* sp, *Limulus* sp etc. In Ocypodidae family 13 species of crabs were found in summer and three species in winter where as in Portunidae family 6 species of this family were observed in summer and two species from winter.

CONCLUSION

To restore and conserve the crab diversity in their natural habitat following corrective measures should be considered:

1. A single female crab can produce more than seven million eggs in one breeding season, so try to minimize their capture during breeding season.

2. Berried crabs should be immediately released back to the sea whenever caught by gears.
3. Juveniles and undersize crabs should not be harvested.
4. Fishing of edible crabs should be strictly banned during their peak breeding season.
5. Awareness should be created among the local people and fisherman regarding the depletion of the crab through organising seminar and workshop at different level.
6. Extension programme of crab conservation should be carried out through media.
7. Waste water released into the Bay of Bengal should be restricted and it will be treated well before its discharge.

To maintain the instant crab population sea ranching programme should be launched.

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