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Brachyuran Crabs Diversity of Mahi and Dhadhar Estuaries, Gujarat, India

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Abstract

Gujarat has got two gulfs, the gulf of Kachchh and gulf of Khambhat. The biodiversity of gulf of Kachchh is studied well. There are several studies citing faunal diversity for gulf of Kachchh but in case of gulf of Khambhat very less work has been carried out, especially on brachyuran crab taxa. In view of the significance of the mangrove habitat, in present study we selected three stations with different habitat specifications as non-mangrove site, restored mangrove site and natural mangrove site. Total 14 species of brachyuran crabs were recorded belonging to 11 genera and 9 families. Crabs belonging to family ocypodidae and macrophthalmidae were most dominant with 6 species. The other major outcome of the study was that maximum diversity was found at natural mangrove site with 13 species, followed by restored mangrove site with 10 species and least diversity was recorded at non-mangrove site with 9 species.

Keywords: Brachyuran crabs, mangroves, mud flats, estuary, gulf of Khambhat.

Introduction

Checklist of biodiversity of an area plays significant role in the conservation of the species and habitat. It provides a better way for different kind of research studies like bio geography, biodiversity and environment monitoring activities which on the other hand provide crucial information for policy makers in the designing of better conservation strategies[1]. Marine ecosystem is most diverse ecosystem in the world and special attention and information is required to understand its processes and function because it provides shelter to diverse and unique floral and faunal community. Crustaceans are the important part of macro benthic fauna as especially the infra order brachyura. Brachyura harbors rich diversity and total 5000 species belonging to 700 genera have been identified worldwide[2].

Gujarat state harbors the longest coastline in the country and it has two gulfs, Gulf of Kachchh and Gulf of Khambhat. The ecosystem diversity is very rich in Gulf of Khambhat comprising of mangroves, estuaries, creeks and vast intertidal mud flats. The estuarine region of Mahi is covered by mudflats while the Dhadhar estuarine region is covered by mangrove forest. The marine biodiversity of Gujarat state is studied well but the brachyuran crab fauna of the state is least studied. Chhapgar[3] had studied the brachyuran crab diversity of the state and identified 45 species of brachyuran crabs but the study was mostly focused on Gulf of Kachchh. Total 19 different species of brachyuran crabs were identified from the mangrove forest areas of Gulf of Kachchh[4]. The brachyuran crab fauna of Saurashtra coast is also studied well and 25 species of brachyuran crabs have been reported[5]. As far as the brachyuran crab fauna of Gulf of Khambhat is concerned except the work on lower estuarine region of Mahi estuary[6,7] no particular report is available. So to fulfill the lacunae regarding the information on brachyuran crab fauna of the area, present study was carried out.

Material and Methods

In the present study three different study sites were selected along the Mahi and Dhadhar estuarine region. One study site named Kamboi (22°12'54.0" N and 72°36'36.9"E) is located at the mouth of Mahi estuary while other two study sites named Nada (21°54'38.60"N and 72°34'43.30"E) and Gandhar (21°54'02.9"N and 72°37'35.0") are located in Dhadhar estuarine region (figure 1). All the study sites represent different kinds of marine ecosystems like mudflats and mangroves. The Mahi estuarine region is covered by mudflat habitat and no mangrove cover is observed while the Dhadhar estuarine region represents the mangrove habitat. Natural mangrove habitat is observed at Nada while the mangrove vegetation observed in Ghandhar was restored 15 years back. *Avicinia marina* is the dominant mangrove species observed in the Dhadhar estuarine region. The local people residing near both the estuaries use this region for different purposes like fisheries, mangrove seed collection, fodder for live stock, mudskipper and crab collection etc.

All the study sites were searched randomly for crab collection. Hand picking method was adopted for the collection of crab while for burrowing crabs, diluted formalin was poured in the burrow and when the crab comes out of burrow it was collected. All the collected specimens were preserved in 10% formalin for further identification purpose. The preserved specimens were identified to the species level using different identification keys available in the published literature[3,8,9]. For the further conformation about the identification of the species, all the specimens were examined and compared with the photos and

information available on Marine Species Identification Portal Website and NIO marine fauna information website[10]. The latest scientific names and classification of the species were adopted WORMS website. All the specimens of different crab species were deposited in invertebrate section of Zoology Museum, Department of Zoology, The M. S. university of Baroda, Vadodara, Gujarat, India.

Results and Discussion

In the present study, total 14 species were recorded belonging to 11 genera and 9 families (table 1). The number of species recorded for different families varies in numbers. Three species were recorded from families like macropthelmidae and ocypodidae each. Two species were recorded from family grapsidae while rest of the families like dotillidae, matutidae, portunidae, varunidae, sesarmidae and gecarcinidae contribute single species each. Except families like varunidae and dotillidae, all the families were recorded from each study sites. Crab species like *Uca (Austruca) lacteal annulipes*, *Uca (Tubuca) dussumieri*, *Ashtoret lunaris*, *Scylla serrata*, *Parasesarma plicatum*, *Macropthelmus (Venitus) dentipes*, *Macrophthalmus (Mareotis) depressus*, *Cardisoma carnifex* were reported from all three study sites which make them the most common species of the area. Few species of crabs like *Uca (Gelasimus) vocans*, *Grapsus intermedius*, *Macrophthalmus dilatatus* were reported from two study sites while crab species like *Dotilla internedia*, *Metaplax indica*, *Metapograpsus messor* were reported from single site only. Amongst 11 genera reported, six genera harbor a single species while genera like *Uca* and *Macropthelmus* contributed three species each.

In the present study maximum numbers of crab species were reported from Nada (13 species) which supports dense and natural mangrove habitat. In case of family wise crab diversity of Nada study site, maximum numbers of crab species were reported from families like ocypodidae (3 species), macropthelmidae (3 species) and sesarmidae (2 species) which are typically found in mangrove habitat. The mangrove cover observed at Gandhar was sparse as compare to mangrove cover of Nada. The Ghandhar mangroves were restored 15 years back still it support excellent crab diversity. Total 10 different species belonging to 7 genera and 7 families were recorded from Gandhar. Kamboi study site has typical mudflat habitat and it supports 10 different crab species belonging to 7 genera and 7 families.

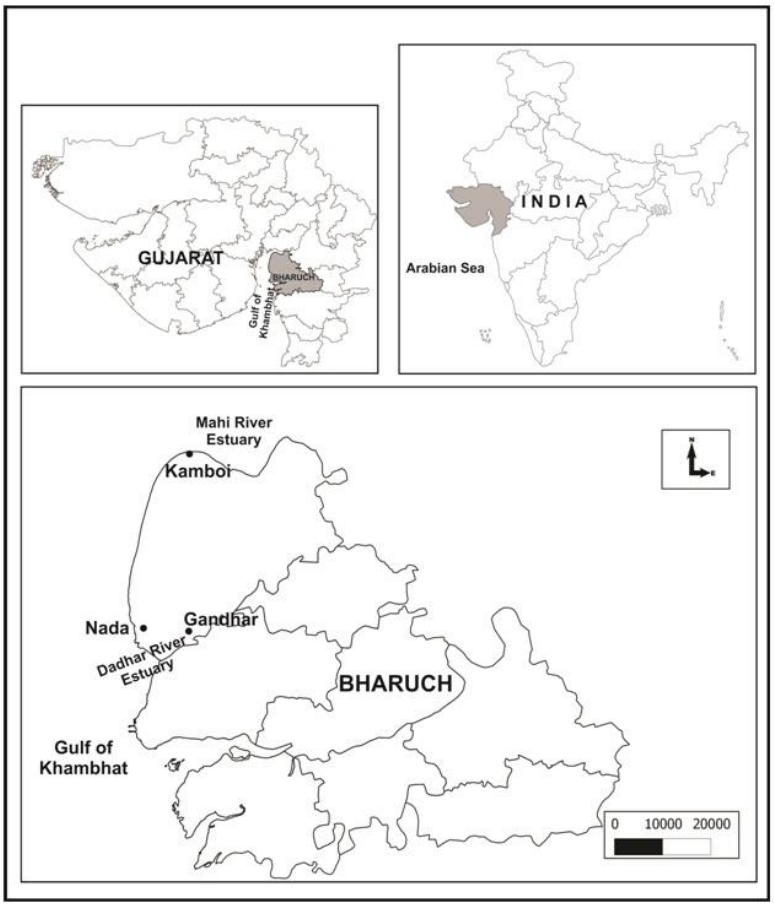

Figure-1
Map of study area

Table-1
Checklist of Brachyuran crabs recorded from Gulf of Khambhat

Species	Kamboi	Nada	Gandhar
Ocypodidae			
Uca (Austruca) lacteal annulipes	+	+	+
Uca (Tubuca) dussumieri	+	+	+
Uca (Gelasimus) vocans		+	+
Dotillidae			
Dotilla intermedia	+		
Matutidae			
Ashtoret lunaris	+	+	+
Portunidae			
Scylla serrata	+	+	+
Varunidae			
Metaplax indica		+	
Grapsidae			
Grapsus intermedius		+	+
Metapograpsus messor		+	
Sesarmidae			
Parasesarma plicatum	+	+	+
Macrophthalmidae			
Macropthelmus (Venitus) dentipes	+	+	+
Macrophthalmus (Mareotis) depressus	+	+	+
Macrophthalmus dilatatus	+	+	
Gecarcinidae			
Cardisoma carnifex	+	+	+
	10	**13**	**10**

The mangrove forests have been studied well for the brachyuran crab diversity. Priyadrashini et al.[11] have reported six species brachyuran crab from Negombo estuary which is quite less compare to the present study. Tan and Ng[12] have reported 100 different species of brachyuran crabs from mangrove forest of Malaysia and Singapore. In India, the Pondicherry and Pichavaram mangroves were studied well for brachyuran crab diversity and total 15 and 23 species of brachyuran crabs were reported from these sites, respectively[13,14].

Conclusion

The mangrove forests are considered as an important part of coastal ecosystems because of their high productivity and because they also provides shelter to different kinds of animal communities[15]. Crabs play important role in the maintenance of mangrove ecosystems[16] and conserve nutrients for the growth of mangrove forest[17]. Smith et al.[18] have reported that reduction into the crab abundance has direct relation with the heavy metal deposition in the sediment of mangrove ecosystem. The mangrove cover observed in Gulf of Khambhat is very less as compare Gulf of Kachchh and it is mostly confined to the estuarine region[19]. Though the area has sparse mangroves cover still it supports excellent crab diversity and further studies are needed to carve the picture of brachyuran crab diversity of Gulf of Khambhat.

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