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## Checklist of intertidal marine fauna in mangrove ecosystem, Ghogha coast, Gulf of Khambhat, India

**Devendra Solanki, Jignesh Kanejiya, Imtiyaz Beleem and Bharatsinh Gohil**

### Abstract

The central aim of the study is to evaluate intertidal diversity of marine fauna in mangrove ecosystem of Ghogha coast. The present study deals with investigation of macro as well as mega fauna reported in mangrove ecosystem of Ghogha coast, Gulf of Khambhat, India. Total 71 marine fauna were reported, 42 avian fauna from 31 genera from 12 families, 14 species of Crustacea from 13 genera recorded from 10 family, 9 species of Molluscs from 8 genera were recorded from 7 family and three species of Mudskippers were recorded from Oxudercinae-gobies and three different genera and three species of snakes from three genera and two family were recorded in mangroves ecosystem of Ghogha coast.

**Keywords:** Mangrove ecosystem, Diversity, Crustacean, Molluscs, Avian fauna

### Introduction

Gulf of Khambhat covers an amount of about 3120 km<sup>2</sup> chiefly of mudflats with some rocky (sandstones) intertidal area and a volume of 62,400 million m<sup>3</sup><sup>[1]</sup>. Gujarat state supports about one fifth of total mangrove cover in India<sup>[2]</sup>. *Avicennia marina* is common floral species in coastal area of Piram Island, Ghogha, and Mahuva<sup>[1]</sup>.

Mollusca are second to Arthropoda in contest to extant species. Diversity of Molluscs fauna recorded from coastline of India is 5,169 species<sup>[3]</sup>. In Indian mangroves 138 brachyuran crab variety were recorded.<sup>[4]</sup> Significant works were carried out on habitat distribution and diversity of brachyuran crabs in mangroves of east and west coasts of India<sup>[5-9]</sup>. Roy (2013)<sup>[10]</sup> has reported 66 species of crabs from the west coast of India while Beleem *et al.* (2014)<sup>[11]</sup> reported 80 species of brachyuran crab from the coastline of Gujarat. Scanty works have been done in the Gulf of Khambhat by various authors, 36 species crustacean fauna were recorded in Gulf of Khambhat while 10 species of prawns and shrimps and 3 species of lobster recorded in Gulf of Khambhat.<sup>[12]</sup>

About 34 species of mudskipper were worldwide in which 9 species has been recorded in India. Out of 9 species 5 species of mudskipper recorded on various coasts of Gujarat.<sup>[13]</sup> There is about 518 species of reptiles which were recorded from India<sup>[14]</sup> in which 294 snakes, there 6 species of sea snakes described by Khaire, 2014.<sup>[15]</sup> Around 25 species of sea snakes belonging from 3 families and 10 genera were documented from Indian oceans, there are 4 species from family Colubridae recorded previously.<sup>[16]</sup> *Gerarda* and *Cerberus* have reported from eight different coasts in Gujarat, Gulf of Khambhat.<sup>[17]</sup> There are around 150 species of aquatic birds residing coastal habitats of Gujarat.<sup>[18]</sup> Stanley (2004)<sup>[19]</sup> has reported 62 water birds from Gulf of Khambhat. Present checklist has been prepared by comprising of all previously recorded and presently recorded marine fauna from Ghogha coast, Gulf of Khambhat, India.

### Materials and Methods

#### Study area

Gujarat is one of the major maritime states of India, which have longest shoreline of about 1,650 km.<sup>[20]</sup> Ghogha is a small coastal town situated on the mid-western shore of the Gulf of Khambhat. The coastal area of Ghogha is about 4 km long (21°40'32" to 21°41'18" N and 72°17'5" to 72°16'48 E) in Bhavnagar, Gujarat (Figure 1). It comprises unique in

characteristics in having supra-tidal zone sandy, while middle intertidal zone is rocky-muddy with sparse mangrove and lower intertidal zone is highly muddy. *Avicennia marina* is the principal mangrove species of the coast.

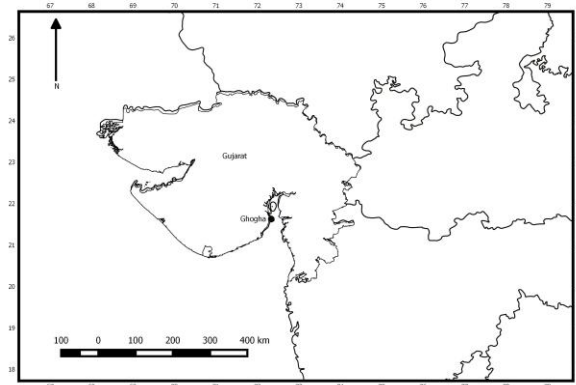


Fig 1: Map of Study area

### Method

The sampling was carried out from June 2014 to May 2016 in mangrove cover of Ghogha coast. Samples were collected by hand picking method as well as purchased from fishermen e.g., crabs, prawns, lobsters, squilla, molluscs and mudskipper during low tides as well as in high tides. The samples were cleaned and arranged out species, then placed them into 4-10% formalin, preserved species were identifying by standard keys provided by Chhapgar, 1957 [21], Dholakiya, 2013 [22], Murdy, 1989 [23], Apte, 2006 [24] respectively. Encountered Snakes were photographed with digital camera and identified them with the help of a book by Neelinkumar Khaire, 2014 [15]. Birds were observed with a 7x10 Nikon binoculars and photographed by Canon Sx520 HS digital camera and identified with the help of a standard Book of Indian bird of the Indian Subcontinent by Grimmette et al. 2011 [25].

### Results

The coast characteristics of Ghogha is sandy at supratidal region, muddy at middle intertidal and lower intertidal zone and somewhere rocky, and rocky sandy at middle and lower intertidal zone, patches of mangroves are seen which contains magnificent faunal diversity like brachyuran crabs, molluscs, reptiles and other mega fauna like birds. Total 71 species are recorded from the intertidal zone of Ghogha, among them out of them 42 avian fauna in 12 families in 31 genera (Table.2), 14 species of crustaceans (09 species of crabs, 03 species of prawns, 1 species of lobster and 1 species of Squilla) from 10 families in 13 genera, 9 species of Molluscs from 7 families in 8 genera and 3 species of Mudskippers which belongs to Oxudercinae-gobies from 3 different genera and 3 species of snakes from 2 families in 3 genera (Table 1). Diversity percentage was recorded as 59% of Coastal birds, 20% of Crustaceans, 13% of Molluscs, 4% of Mudskippers and 4% of Snakes (Fig.3). In molluscs *Assiminea brevicula*, *Cerithideopsisilla cingulata*, *Peronia verruculata* are the prominent gastropods found throughout the year while *Nerita violacea* and *Nassarius stolatus* are rarely seen in mangrove area. *Cerithium* species and minute Gastropods were abundant in upper and mid-intertidal regions at Ghogha stations (Ramnathan et al. 2002). In crustacean *Uca (Austruca) annulipes*, *Metopograpsus*

*messor*, *Scylla serrata*, *Parasesarma plicatum*, *Macrophthalmus pectinipes*, *Penaeus monodon* are commonly found in intertidal zone and from fishing. Mudskippers like *Boleophthalmus dussumieri* and *Periophthalmus waltoni* are very common with great abundance and density in mangrove area. Species of sea snakes *Acrochordus granulatus* and *Gerarda prevostiana* are reported in mangroves for frequent. Feeds mainly on fish, shrimps and crabs [13]. Livelihood of Local people and fishermen depend upon few traditional methods for catching of crustaceans, molluscs and mudskippers at Ghogha coast.

Table 1: Checklist of Crustaceans, Molluscs, Mudskippers and Snakes of Ghogha coast.

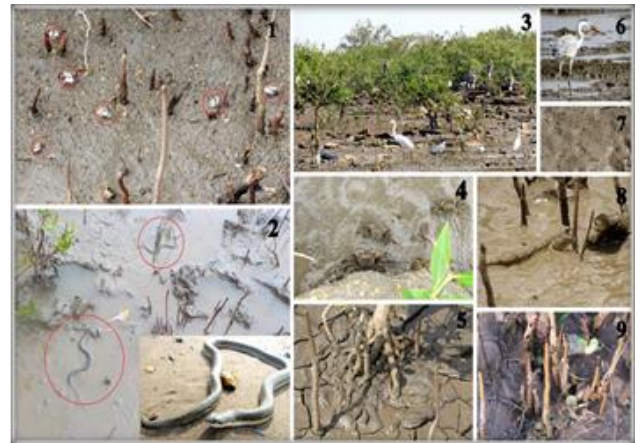
NO.	Species Name (Scientific name)
<b>Crustaceans</b>	
<b>Family: Ocypodidae</b>	
1	<i>Uca (Austruca) annulipes</i> (H. Milne Edwards, 1837)
<b>Family: Dotillidae</b>	
2	<i>Dotilla blanfordi</i> (Alcock, 1900)
<b>Family: Matutidae</b>	
3	<i>Ashtoret lunaris</i> (Forskål, 1775)
<b>Family: Portunidae</b>	
4	<i>Scylla serrata</i> (Forskål, 1775)
5	<i>Metopograpsus messor</i> (Forskål, 1775)
<b>Family: Sesarnidae</b>	
6	<i>Parasesarma plicatum</i> Latreille, 1803
<b>Family: Macrophthalmidae</b>	
7	<i>Macrophthalmus pectinipes</i> (Guerin, 1839)
8	<i>Macrophthalmus sulcatus</i> (H. Milne Edwards, 1852)
<b>Family: Pilumnidae</b>	
9	<i>Heteropanope glabra</i> Stimpson, 1858
<b>Family: Penaeoidea</b>	
10	<i>Metapenaeus dobsoni</i> (Miers, 1878)
11	<i>Mierspenaeopsis sculptilis</i> (Heller, 1862)
12	<i>Penaeus monodon</i> (Fabricius, 1798)
<b>Family: Palinuridae</b>	
13	<i>Panulirus polyphagus</i> (Herbst, 1793)
<b>Family: Squillidae</b>	
14	<i>Squilla mantis</i> (Linnaeus, 1758)
<b>Mollusca</b>	
<b>Family: Trochidae</b>	
1	<i>Tectus niloticus</i> (Linnaeus, 1767)
2	<i>Trochus radiatus</i> (Gmelin, 1791)
<b>Family: Cerithiidae</b>	
3	<i>Clypeomorus batillariaeformis</i> (Habe & Kosug, 1966)
4	<i>Clypeomorus bifasciata</i> (G.B. Sowerby II, 1855)
<b>Family: Potamididae</b>	
5	<i>Cerithideopsisilla cingulata</i> (Gmelin, 1791)
<b>Family: Assiminiidae</b>	
6	<i>Assiminea brevicula</i> (Pfeiffer, 1855)
<b>Family: Onchidiidae</b>	
7	<i>Peronia verruculata</i> (Cuvier, 1830)
<b>Family: Neritidae</b>	
8	<i>Nerita violacea</i> (Gmelin, 1791)
<b>Family: Nassariidae</b>	
9	<i>Nassarius stolatus</i> (Gmelin, 1791)
<b>Mudskippers</b>	
<b>Family: Gobiidae, Sub Family: Oxudercinae</b>	
1	<i>Boleophthalmus dussumieri</i> (Valenciennes, 1837)
2	<i>Periophthalmus waltoni</i> (Koumans, 1955)
3	<i>Scartelaos histophorus</i> (Valenciennes, 1837)
<b>Snakes</b>	
<b>Family: Colubridae</b>	
1	<i>Gerarda prevostiana</i> (Eyndoux & Gervais, 1822)
2	<i>Cerberus rynchops</i> (Russel, 1796)
<b>Family: Acrochordidae</b>	

3	<i>Acrochordus granulatus</i> (Schneider, 1799)
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**Table 2:** Checklist of Shoreline Birds of Ghogha Coast

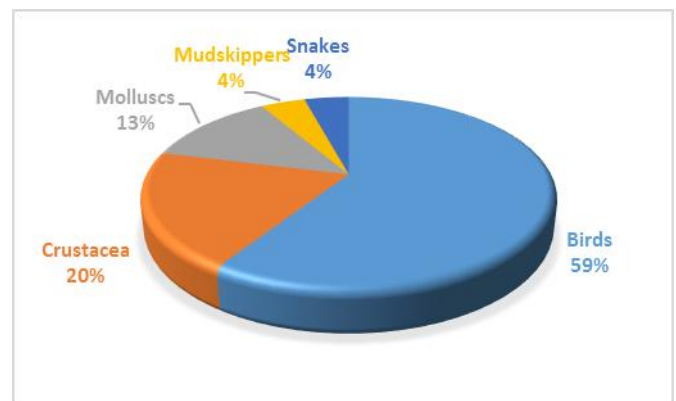
No.	Scientific Name	Common Name
<b>Family: Accipitridae</b>		
1	<i>Haliastur Indus</i> (Boddaert, 1783)	Brahminy Kite
2	<i>Circus aeruginosus</i> (Linnaeus, 1758)	Marsh Harrier
<b>Family: Alcedinidae</b>		
3	<i>Halcyon smyrnensis</i> (Linnaeus, 1758)	White-Throated Kingfisher
4	<i>Ceryle rudis</i> (Linnaeus, 1758)	Pied Kingfisher
5	<i>Alcedo atthis</i> (Linnaeus, 1758)	Common Kingfisher
<b>Family: Anatidae</b>		
6	<i>Casmerodius albus</i> (Linnaeus, 1758)	Great Egreat
7	<i>Ardea cinerea</i> (Linnaeus, 1758)	Grey Heron
8	<i>Ardeola grayii</i> (Sykes, 1832)	Indian Pond Heron
9	<i>Mesophoyx intermedia</i> (Wagler, 1827)	Intermediate Egreat
10	<i>Egretta garzetta</i> (Linnaeus, 1766)	Little Egreat
11	<i>Egretta gularis</i> (Bosc, 1792)	Western Reef Egreat
<b>Family: Charadriidae</b>		
12	<i>Limosa limosa</i> (Linnaeus, 1758)	Black Tailed godwit
13	<i>Tringa nebularia</i> (Gunnerus, 1767)	Common green shank
14	<i>Tringa totanus</i> (Linnaeus, 1758)	Common redshank
15	<i>Tringa ochropus</i> (Linnaeus, 1758)	Green Sandpiper
16	<i>Charadrius dubius</i> (Scopoli, 1786)	Common Sandpiper
17	<i>Charadrius alexandrinus</i> (Linnaeus, 1758)	Little ringed plover
18	<i>Actitis hypoleucos</i> (Linnaeus, 1758)	Kentish plover
19	<i>Calidris minuta</i> (Leisler, 1812)	Little Stint
20	<i>Calidris alpina</i> (Linnaeus, 1758)	Dunlin
21	<i>Calidris alba</i> (Pallas, 1764)	Sanderling
22	<i>Vanellus indicus</i> (Boddaert, 1783)	Red-wattled Lapwing
23	<i>Numenius arquata</i> (Linnaeus, 1758)	Eurasian Curlew
24	<i>Numenius phaeopus</i> (Linnaeus, 1758)	Whimbrel
<b>Family: Ciconiidae</b>		
25	<i>Mycteria leucocephala</i> (Pennant, 1769)	Painted stork
<b>Family: Laridae</b>		
26	<i>Sterna caspia</i> (Pallas, 1770)	Caspian tern
27	<i>Sterna hirundo</i> (Linnaeus, 1758)	Common tern
28	<i>Sterna albifrons</i> (Pallas, 1764)	Little Tern
29	<i>Sterna aurantia</i> (Gray, JE, 1831)	River tern
30	<i>Gelochelidon nilotica</i> (Gmelin, 1789)	Gull-Billed turn
31	<i>Larus minutus</i> (Pallas, 1776)	Little Gull
<b>Family: Motacillidae</b>		
32	<i>Dendronanthus indicus</i> (Gmelin, 1789)	Yellow Wagtail
<b>Family: Phalacrocoracidae</b>		
33	<i>Phalacrocorax niger</i> (Vieillot, 1817)	Little Cormorant
<b>Family: Phoenicopteridae</b>		
34	<i>Phoenicopterus ruber</i> (Linnaeus, 1758)	Greater Flamingo
35	<i>Phoenicopterus minor</i> (Geoffroy Saint-Hilaire, 1798)	Lesser flamingo
<b>Family: Recurvirostridae</b>		
36	<i>Himantopus himantopus</i> (Linnaeus, 1758)	Black-winged Stilt
37	<i>Recurvirostra avosetta</i> (Linnaeus, 1758)	Pied Avocet
<b>Family: Threskiornithidae</b>		
38	<i>Pseudibis papillosa</i> (Temminck, 1824)	Black Ibis
39	<i>Platalea leucorodia</i> (Linnaeus, 1758)	Eurasian Spoonbill
40	<i>Threskiornis melanocephalus</i> (Latham,	White ibis

	1790)	
<b>Family: Burhinidae</b>		
41	<i>Burhinus oedicnemus</i> (Linnaeus, 1758)	Eurasian Thicknee
42	<i>Esacus Recurvirostris</i> (Cuvier, 1829)	Great Thicknee



**Fig 2:** various fauna reported in Mangroves of Ghogha Coast.

1. *Uca (Austruca) annulipes* 2. *Gerarda prevostiana* 3. *Casmerodius albus*, *Mesophoyx intermedia*, *Egretta gularis*, *Mycteria leucocephala*, *Threskiornis melanocephalus* in mangroves 4. *Parasesarma plicatum* 5. *Cerithideopsilla cingulata* 6. *Ardea cinerea* with mudskipper 7. *Assiminea brevicula* 8. *Periophthalmus waltoni* 9. *Tectus niloticus*, *Cerithideopsilla cingulata*, *Nassarius stolatus* in Mangroves roots.



**Fig 3:** Intertidal faunal diversity of mangrove ecosystem, Ghogha coast

**Conclusions**

The highly muddy habitat of Ghogha is rich in diversity of macro-fauna and shoreline birds. Gastropods being herbivores, carnivores, scavengers, and filter feeder play a key role in the mangrove ecosystems; they help in maintaining the functioning and productivity of mangroves. The mudflats and coastal swamplands offers feeding ground for the large numbers of shoreline birds like herons, egrets, storks, ibises, sandpipers, plovers, Gulls and turns. Herons, egrets and storks breed in mangroves of Ghogha coast. Mangrove forests have declined drastically in some part of Ghogha in past one decade. The main reasons behind mangrove loss and degradation are ro-ro ferry service, population encroachment, mangrove cutting, coastal industrialization, and alteration to coastal ecosystem. Thus, incentive and stringent strategies should be planned to prevent the area being bleached, which could be heaven for

varieties of fauna.

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