

A STUDY ON DIVERSITY OF MANGROVE ASSOCIATED MACROFAUNA OF BHAVNAGAR COAST, GUJARAT

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Abstract: The planktonic and benthic animal communities also play a very important role in the mangrove ecosystem just like the terrestrial animals. Mangrove forests serve as a link between terrestrial and marine ecosystems. The present study was carried out at Ghogha and Gopnath coast of Bhavnagar District. Mangroves and its associated fauna are important biological components of coastal wetland that have greater ecological and economical values. Total 27 faunal species belonging to 19 families were identified from mangrove ecosystem of Bhavnagar coast.

Keywords: Mangroves, Faunal Diversity, Bhavnagar Coast.

Introduction: The name 'Mangrove' for this peculiar community originated from a combination of the Portuguese word 'mangue' that stands for tree and an English word 'grove' that stands for a stand of trees. These mangrove tree communities were described as 'mangales' by Walsh [1] and as 'mangals' by Tomlinson [2]. The mangal in relation with its associated abiotic factors constitute the mangrove ecosystem. However the term mangrove according to Chapman [3] expresses two distinctly different notions. Mangroves grow along the embankment of almost all the estuaries, deltas, backwaters, creeks and other protected areas of the coast. Mangrove ecosystem commands intensive attention among the coastal ecosystem due to not only their peculiar habitat characteristics but also due to their rich biodiversity. Taxonomic diversity and significance of mangroves and mangrove associates, as an ecological group, is well known [4], [5], [6].

The planktonic and benthic animal communities also play a very important role in the mangrove ecosystem just like the terrestrial animals. Sufficient data on the seasonal distribution and abundance of these organisms are available from Indian mangrove waters [7].

Mangrove forests serve as a link between terrestrial and marine ecosystems [8]. Mangrove ecosystem covered 47% world's mangrove area with 85% world's mangrove species from different habitats having an important role in coastal biodiversity of 30 countries that bordered the Indian Ocean [9].

Material and Method:

Study Area: Length of the coast of Bhavnagar District is 152 km, as part of the Gulf of Khambhat. The present study was carried out at Ghogha and Gopnath coast of Bhavnagar District during July 2014 to December 2014.

Gopnath: The geographic location of Gopnath is 21° 13' N latitude and 72° 05' E longitude. Southern part of Gopnath coast is sandy and rocky and northern part is muddy which is covered by two sub species of

Avicennia namely *Avicennia marina* var. *marina* and *Avicennia marina* var. *acutissima*.

Ghogha: The geographic location of Ghogha is 21° 41' N latitude and 72° 16' E longitude. Coast of Ghogha is muddy and covered by two sub species of *Avicennia* namely *Avicennia marina* var. *marina* and *Avicennia marina* var. *acutissima*.

Method:

Biodiversity Assessment: For the assessment of the present biodiversity status, mangrove associated fishes, crabs, prawns, gastropods, insects, birds; existing around the study area were considered. The fishes, prawns, crabs, molluscs and other fauna were collected from the study area and preserved as per standard method.

Sampling Method for Macrofaunal Diversity: The intertidal zone of each sampling sites were surveyed regularly once in a month and all the macrofauna and flora encountered were recorded properly. Extensive photography was carried out for the identification of the animal species with the help of standard manual, identification keys, and with proper use of internet. Hand picking method was applied where photography was not sufficient.

Result and Conclusion:

Mangrove biodiversity: At taxonomic level, the biodiversity of mangrove ecosystem of Bhavnagar coast includes both, variety of flora and fauna. The identified fauna and associated flora during the study period are presented below in detail.

Faunal diversity: Mangroves and its associated fauna are important biological components of coastal wetland that have greater ecological and economical values. Total 27 faunal species belonging to 19 families were identified from mangrove ecosystem of Bhavnagar coast.

Sea anemones: *Anthopleura* sp. of sea anemone, belonging to family Actiniidae was recorded from mangroves of Ghogha (Table 01).

Barnacles: Barnacles are filter feeders; they filter the water and feed. Various parts of Mangrove like,

trunk, leaf and pneumatophores provide substratum for the attachment to the barnacles. Only two species of barnacles are recorded from mangroves of Gopnath (Table 02). *Semibalanus balanoides* was the dominant species.

Crabs: Crabs are quite common and occurred in large numbers in mangrove habitat of Bhavnagar coast. In the present study 07 species belonging to 06 families are recorded from mangroves of Bhavnagar coast (Table 03). Crabs belonging to the family *Grapsidae* and *Portunidae* were the most dominant forms, which play a vital role in recycling the nutrients enhancing the role of decay of plant materials and litter processing. *Metopograpsus messor* and *Scylla serrata* are the dominant species belonging to family *Grapsidae* and *Portunidae* respectively. *M. messor* and *M. letifrons* feed on propagules of mangroves [11], including *Avicennia marina*.

Molluscs: Molluscs live on the surface and in the mud, firmly attached to the roots, or forage in the canopy of mangrove. They are mainly composed of gastropods and bivalves. But the mangrove habitat of Bhavnagar coast only represented by gastropods. Most are deposit feeders that scrap organic particles from the surface. Total nine species of gastropods belonging to seven families were identified from mangrove habitat of Bhavnagar coast (Table 04). *Onchidiidae* is the dominant family of gastropods, which plays a vital role in detritus food web. *Onchidium* sp. belongs to family *Onchidiidae* is the dominant species of gastropods at all both the sites of mangrove habitats. It is a shell-less and air breathing marine pulmonate sea slug. *Onchidium* sp. feed during low tide, when the water recedes and the slugs are exposed to the air. *Littoraria scabra* is a marine snail belonging to the family of periwinkles (*Littorinidae*) and lives on mangrove trees. It is a dominant grazer on mangrove trees, and may play an important role in the food web dynamics of these ecosystems. *Assimineia* sp. belongs to family *Assimineidae* commonly seen on the surface of the mud as large bed in mangrove habitat. It breathes air through a lung, instead of through gills like most other marine snails. The only single specimen of *Nassarius eranea* belongs to family *Nassariidae* and *Oliva gibbosa* belongs to family *Olividae* were recorded from mangroves of Gopnath coast. Two species of family *Potamididae* namely *Telescopium telescopium* and *Cerithidea cingulata* were recorded from mangroves of Bhavnagar coast. *T. telescopium* was only found from mangroves of Gopnath coast where as *Cerithidea cingulata* were present in both

the sites. The species of *Trochus radiatus* and *Trochus niloticus* belonging to family *Trochidae* are found from mangroves of both the sites.

Fishes: Mangrove forests are unique in their function as nursery ground for a number of fish species, of them some have commercial value and other are important links in the mangrove food web. Only 2 species of mudskipper namely *Boleophthalmus dussumieri* and *Boleophthalmus boddarti* belongs to family *Gobiidae* were recorded from mangrove ecosystem of Bhavnagar coast (Table 05). Mudskipper is commonly known as *Lepta* or *Levta* in Gujarat, and is consumed by local people as a food.

Birds: Mangrove habitats of Bhavnagar coast harbours variety of bird life. Mainly water fowl and water dependant species use the mangrove forest for feeding, roosting, resting and nesting purpose. Majority of the birds were seen resting on coastal beach or in mangrove forest during high tide and they use mangrove swamps and mudflats for feeding, when the area gets exposed during the low tides.

Total 6 species of birds belonging to 2 families were recorded from mangrove habitats surveyed of Bhavnagar coast (Table 06). Family *Ardeidae* is the dominant family, because bird species of this family such as Grey Heron (*Ardea cinerea*), Indian Pond Heron (*Ardeola grayii*), Great Egret (*Casmerodius albus*), Intermediate Egret (*Mesophoyx intermedia*), Little Egret (*Egretta garzetta*) were found throughout the year in large numbers.

Conclusion: The result of my study shows that the mangrove ecosystem of Bhavnagar coast provides a suitable habitat for many marine and terrestrial life forms. Biodiversity of mangrove habitat of Gopnath coast is rich and more in species diversity than the mangrove habitat of Ghogha. This is may be due to the mangroves of Gopnath coast completely submerged into water during high tide, which mix the nutrient content time to time. It is also the reason why abundance of barnacles is found from the mangroves of Gopnath coast. Fauna of 27 species were identified from two mangrove areas of Bhavnagar coast which provide suitable habitat for them. These habitats provide feeding, breeding and resting ground for many of the migratory and residential birds. Fishermen from surrounding area regularly fish from the mangrove area and collect crabs and mudskippers. In the present study, one species of sea anemone, two species of barnacles, seven species of crabs, nine species of molluscan, two species of fish and seven species of birds were recorded from the survey site.

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Table 01: List of sea anemones identified from study area				
Sr.No	Family	Species	S1	S2
1	Actiniidae	Anthopleura sp.	+	-

Table 02: List of barnacles identified from study area				
Sr.No	Family	Species	S1	S2
1	Archaeobalanidae	<i>Semibalanus balanoides</i>	+	-
2	Balanidae	<i>Balanus Amphitrite</i>	+	-

Table 03: List of crabs identified from study area				
Sr.No	Family	Species	S1	S2
1	Diogenidae	<i>Clibanarius zebra</i>	+	+
2	Gecarcinidae	<i>Cardisoma carnifex</i>	-	+
3	Grapsidae	<i>Metopograpsus letifrons</i>	+	-
4	Grapsidae	<i>Metopograpsus messor</i>	+	+
5	Ocypodidae	<i>Uca annulipes</i>	+	+
6	Portunidae	<i>Scylla serrata</i>	+	+
7	Sesarmidae	<i>Parasesarma pictum</i>	-	+

Table 04: List of molluscs identified from study area				
Sr.No	Family	Species	S1	S2
1	Assimineidae	<i>Assiminea sp.</i>	+	+
2	Littorinidae	<i>Littoraria scabra</i>	+	-
3	Nassariidae	<i>Nassarius eranea</i>	+	-
4	Olividae	<i>Oliva gibbosa</i>	+	-
5	Onchidiidae	<i>Onchidium sp.</i>	+	+
6	Potamididae	<i>Telescopium telescopium</i>	+	-
7	Potamididae	<i>Cerithidea cingulata</i>	+	+
8	Trochidae	<i>Trochus radiatus</i>	+	+
9	Trochidae	<i>Trochus niloticus</i>	+	+

Sr.No	Family	Species	S ₁	S ₂
1	Gobiidae	<i>Boleophthalmus dussumieri</i>	+	+
2	Gobiidae	<i>Boleophthalmus boddarti</i>	-	+

Sr.No	Common Name	Species	S ₁	S ₂
Family: Phalacrocoracidae				
1	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	+	-
Family: Ardeidae				
2	Grey Heron	<i>Ardea cinerea</i>	+	+
3	Indian Pond Heron	<i>Ardeola grayii</i>	+	+
4	Great Egret	<i>Casmerodius albus</i>	+	+
5	Intermediate Egret	<i>Mesophoyx intermedia</i>	+	-
6	Little Egret	<i>Egretta garzetta</i>	+	+

S₁= Gopnath, S₂= Ghogha

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