



SURVEY OF AVIFAUNA OF BORIVALI MANGROVES ALONG THE COAST OF MUMBAI

Rahul R. Chauhan, H. U. Shingadia and Veena Sakthivel

Department of Zoology, S. V. K. M's Mithibai College, Vile Parle (West), Mumbai-400 056, India

ABSTRACT

The word mangroves is derived from the Portuguese word 'mangue' or marsh and the English word 'grove'. The origin of the word dates back to 1613. Mangroves are major forests found throughout the world along coastline from 25°N and 25°S. Mangroves have diverse ecology as well as economic functions. Mangroves provide breeding and nursery grounds for shrimp, crabs, marine fish, etc. Mangroves are among the world's most productive ecosystems that protect the coastal fisheries and livelihood. They reduce coastal erosion, buffer salinity, intrusion, supply and regenerate nutrients, and retard run-off.

As transition habitat between land and sea, mangroves are well adapted to deal with natural stresses like temperature, salinity, lack of oxygen, wave action, wind currents, etc. The past few decades' regions have increased many folds and pose a threat to mangrove forest cover which is about 4460 km² in India. In Mumbai remnants of previously luxuriant mangroves are seen at Vasai, Thane, Bandra and Vashi creek, Versova-Monari beach strip and Gorai regions in Borivali.

From March 2004 to July 2005 a survey of avifauna was undertaken to study its richness in Borivali mangroves along the coast of Mumbai. A total of 66 species of birds belonging to twenty four families of 15 Orders were recorded. Shore birds, starlings and warblers predominated the population. Globally threatened lesser flamingo was also sighted. Erratic rainfall, tidal water availability, fruiting seasonality, chemical pollutants, anthropogenic activities like wood cutting, garbage dumping and landfilling, etc. affect the bird population.

INTRODUCTION

Birds are one of the best indicators of environmental quality of any ecosystem. The Council of Environmental Quality (USA) identified birds as the common indicator of environmental changes. Most of the birds have specific habitat requirement from season to season, a loss of which may lead to their extinction.

Studies are available on the ecology of birds of coastal habitat from within the state (Samant 1985, Nitsure 2002), however, paucity exists in the scientific studies. There are some acting NGOs involved in the bird monitoring of Thane Creek (Pejaver Per. Comm.). Very little scientific study data are available on the ecology of birds of Borivali mangroves, Mumbai so far. The Present study has attempted to bring out the richness of avifauna recorded in Borivali mangroves.

STUDY AREA

All along the coast of Mumbai are found many creeks, in which tidal waters of Arabian sea flood upstream and inundate low lying areas. In a recent study of Maharashtra Remote Sensing Application Centre based on analysis of satellite imagery (done on the behest of the Bombay High Court) found that the state has approximately 257.71 sq. km of mangroves. While it seems surprising that the more urbanized area of Thane and Mumbai have largest swathes of dense mangroves, experts say this is because Thane has the largest area of mudflats. In fact, Mumbai even has the best stretch

of one particular species of mangrove along the entire western coastline.

Study area selected for the present work was Gorai creek (Borievali). It lies between latitude 19°14'12.69" N and longitude 72°49'12.51" E and is about 10 ft above sea level. The Gorai which transect the north west portion of the suburban Mumbai extends 12 km inland through vast mangrove mudflat and low lying marshy areas. Towards south of the creek lies the Gorai-Charkop. The northern bank of the creek is bordered by Gorai village, which is less developed and forms a natural beach. The shallow creek of Gorai is under the high influence of semidiurnal tides with spring and neap ranges of 3.5m and 1.8m respectively in the mouth are toward sea that induces good tidal flushing of the lower reaches.

The study was carried out from March 2004 to July 2005 for a period of sixteen months at regular intervals. A survey of avifauna was undertaken to enlist the species seen in and around mangroves. The study area was divided into two parts viz., mangrove forest and mix habitat.

Mangrove forest: The creek is lined by mud banks and mangroves. Other microhabitats identified in mangrove forest of Borivali mangroves were tidal lagoons, mudflats, grass patches and reed beds. The tidal water flushes the area regularly but only during spring tides the water reaches almost the entire area.

The vegetation under daily tidal influence comprises of *Avicennia marina*, being the dominant, *Rhizophora mucronata*, *Salvadora persica*, *Acanthus ilicifolius*, *Sesuvium Portulacastrum*, *Derris uliganosa*, *Clerodendron inerme*, *Aeluropus lagopoides* (grass) and *Typha angustata* (cattail) where other mangrove associated plant species present in the study area. The average height of mangroves falls between 2 and 6m.

Mix habitat (Reclaimed site): Once the mangrove forest, is now a reclaimed habitat for fodder grasses like *Paspalum* sp., *Penicum* sp. and *Paspaldium* sp. However, few stands of mangroves mainly *Avicennia marina* at periphery and patches of halophytic grass like *Aegilops purpuria* are present. The habitat attracts passerines and egrets.

MATERIALS AND METHODS

The study was carried out mostly in evening usually two hours before sunset using binoculars (NOCTOREX 8 × 21 Field 70 122m/1000m). Advantage of high tide and low tide was considered to monitor different occurrences of wablers and piscivorous birds. Standard guides such as Ali (1979), Campbell (1979), Ali & Ripley (1995) and Ali (1996) were referred for identification, classification and nomenclature of birds. During the present study birds which might have escaped notice/observation may be some small birds or are less in number or rarely seen.

The birds observed in the present study were categorized according to their occurrence, through out the study period. In accordance with the classification suggested by Ali (1996) birds were grouped as follows.

Resident (R): Birds indigenous and residing in the area throughout the year and hence are local.

Resident Migrant (RM): The birds which migrate locally within the country.

Migrant (M): Birds which arrive in the area under study from other countries from September and leave in March or later.

The birds are also categorized by "Modified Buden (1992) method" Kannan (1998) into three distinct categories as:

Table 1: Avifauna observed along Borivali mangroves, Mumbai.

Family	Sr. No.	Species	English Name	Status
Order: Pelecaniformes				
Phalacrocoracidae	1	<i>Phalacrocorax niger</i>	Little Cormorant	R,LM/C
Order: Ciconiiformes				
Ardeidae	2	<i>Egretta garzetta</i>	Little Egret	LM, R
~	3	<i>Ardea cinerea</i>	Grey Heron	LM/UC
~	4	<i>Casmerodius albus</i>	Large Egret	LM/C
~	5	<i>Mesophoyx intermedia</i>	Median Egret	R,LM/C
~	6	<i>Egretta gularis</i>	Indian Reef Heron	RM/UC
~	7	<i>Bubulcus ibis</i>	Cattle Egret	R,LM/C
~	8	<i>Nycticorax nycticorax</i>	Night Heron	R/r
~	9	<i>Ardeola grayii</i>	Indian Pond Heron	R,LM/C
Order: Phoenicopteridae				
Phoenicopteridae	10	<i>Phoenicopus minor</i>	Lesser Flamingo	LM/r
Order: Anseriformes				
Anatidae	11	<i>Anas crecca</i>	Common Teal	M/UC
~	12	<i>Dendrocygna javanica</i>	Lesser Whistling Teal or Tree Duck	R/UC
Order: Gruiformes				
Rallidae	13	<i>Fulica atra</i>	Common Coot	M/UC
~	14	<i>Amaurornis phoenicurus</i>	White Breasted Waterhen	R/r
Order: Falconiformes				
Accipitridae	15	<i>Milvus migrans</i>	Black Kite	R/C
~	16	<i>Haliastur indus</i>	Brahminiy Kite	R/UC
~	17	<i>Accipiter badius</i>	Shikra	R/UC
Order: Charadriiformes				
Charadriidae	18	<i>Vanellus indicus</i>	Red - wattled Lapwing	R/UC
~	19	<i>Vanellus leucurus</i>	White - tailed Lapwing	M/r
Scolopacidae	20	<i>Tringa stagnatilis</i>	Marsh Sandpiper	M/VC
Laridae	21	<i>Larus heuglini</i>	Herring Gull (Heuglin's Gull)	M/C
Order: Columbiformes				
Columbidae	22	<i>Columba livia</i>	Blue Rock Pigeon	M/C
~	23	<i>Streptopelia chinensis</i>	Spotted Dove	M/C
Order: Psittaciformes				
Psittacidae	24	<i>Sittacula krameri</i>	Rose Ringed Parakeet	R/C
~	25	<i>Psittacula euptria</i>	Indian Parakeet	R/UC
Order: Cuculiformes				
Cuculidae	26	<i>Centropus sinensis</i>	Crow Peasant or Coucal	R/C
~	27	<i>Centropus toulus</i>	Lesser Coucal	R/C
~	28	<i>Clamator jacobinus</i>	Pied Crested cuckoo	M/r
~	29	<i>Cuculus canorus</i>	Common Cuckoo	M/UC
~	30	<i>Eudynamis scolopacea</i>	Asian Koel	R/C
Order: Apodiformes				
Apodidae	31	<i>Cypsiurus balasiensis</i>	Asian Palm Swift	R,LM/C
Order: Coraciiformes				
Alcedinidae	32	<i>Alcedo atthis</i>	Small Blue Kingfisher	R/UC
~	33	<i>Halcyon smyrnensis</i>	White Breasted Kingfisher	R/C
~	34	<i>Halcyon coromanda</i>	Ruddy Kingfisher	R/UC
Meropidae	35	<i>Merops orientalis</i>	Small Bee - Eater	LM/C
Order: Piciformes				
Capitonidae	36	<i>Megalaima haemacephala</i>	Coppersmith Barbet	R/UC
Order: Passeriformes				
Pycnonotidae	37	<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	R/UC

Table cont...

Cont Table....				
~	38	<i>Pycnonotus leucotis</i>	White-Browed Bulbul	R,LM/UC
~	39	<i>Pycnonotus cafer</i>	Red-vented Bulbul	R,LM/C
~	40	<i>Pycnomotus leucogemys</i>	White Cheeked Bulbul	R/UC
Muscicapidae	41	<i>Copsychus saularis</i>	Oriental Magpie-Robin	R/UC
~	42	<i>Saxicoloides fulicata</i>	Indian Robin	LM/UC
~	43	<i>Turdoides caudatus</i>	Common Babbler	R/C
~	44	<i>Cisticola juncidis</i>	Streaked Fantail - Babbler	R/UC
~	45	<i>Orthotomus sutorius</i>	Common Tailorbird	R/UC
~	46	<i>Rhipidu albicollis</i>	White-throated Fantail-Flycatcher	R/UC
~	47	<i>Nectarinia zeylonica</i>	Purple - rumped Sunbird	R/UC
~	48	<i>Nectarinia minima</i>	Small Sunbird	R,LM/r
~	49	<i>Terpsiphone paradisis</i>	Paradise Flycatcher	R,LM/r
~	50	<i>Rhipidu aureola</i>	White-Browed Fantail-Flycatcher	R/UC
~	51	<i>Zosterops palpebrosa</i>	White Eye	R/r
~	52	<i>Dicamum erythrorhynchos</i>	Tickell's Flower Pecker	R,LM/r
Estrididae	53	<i>Lonchura malacca</i>	Black-headed Munia	R,LM/r
Passeridae	54	<i>Passer domesticus</i>	House Sparrow	R/UC
~	55	<i>Ploceus philippinus</i>	Baya Weaver	R/C
Sturnidae	56	<i>Sturnus contra</i>	Asian Pied Starling	R/C
~	57	<i>Acridotheres tristis</i>	Common Myna	R/C
~	58	<i>Sturnus roseus</i>	Rosy Starling	M/VC
~	59	<i>Acridotheres ginginiamus</i>	Bank Myna	R/C
Oriolidae	60	<i>Oriolus oriolus</i>	Eurasian Golden Oriole	R/UC
Dicruidae	61	<i>Dicrurus macrocercus</i>	Black Drongo	R/UC
Corvidae	62	<i>Corvus splendens</i>	House Crow	R/C
~	63	<i>Corvus macrorhynchus</i>	Jungle Crow	R/C
Order: Strigiformes				
Strigidae	64	<i>Athen brama</i>	Spotted Owlet	R/UC
~	65	<i>Bubo bubo</i>	Indian Horned Owl	R/UC
~	66	<i>Tyto alba</i>	Barn Owl	R/UC

R: Resident; M: Migrant; LM: Local Migrant; RM: Resident Migrant; C: Common; UC: Uncommon; r: Rare.

Common (C): Counted daily in relatively large numbers in flocks of 10.

Uncommon (UC): Observed on most of the days in relatively low numbers about 1-10/day.

Rare (r): Counted 15 times or less in year.

OBSERVATIONS

The present study revealed the presence of 66 species of birds of 25 families, belonging to 15 Orders. Out of these 51 species were resident birds, 7 migrants, 17 local migrants, 29 uncommon, 19 common and 10 rarely occurring species. Individuals of family Ardeidae, Cuculidae, Muscicapidae, Passeridae, Sturnidae and Corvidae were observed to be dominant throughout the study period.

Birds have been considered as useful bioindicators since they are versatile and live in varied habitats as herbivores or carnivores (Jarvinen & Vaisanen 1979). Some birds are migratory and responsible for fluctuating in the population of birds that occur during different seasons of the year. This helps to know if the area is normal or getting degraded due to anthropogenic activities. Total absence of birds may be considered as pollution indicator.

Similar kind of work was carried out by Bhargavi et al. (1996) in north region of Secundrabad and they have recorded a total of 45 species of birds belonging to 13 families, while Prashant et al.

(1994) in their study of coastal area of Nellore district recorded 78 species of birds. During the present study 66 species of birds were observed. Quadros (2001) in his study on Thane creek reported 55 species of birds while Maharashtra Nature Park Mahim, Mumbai (2000) has published a list of 84 species of birds sighted in their area. Berde et al. (2005) have reported 32 species of wetland birds at Bhatye estuary Ratnagiri in Maharashtra.

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