

Mangroves Associated Avifauna of Shiroda Mithagar Area of Sindhudurg District Maharashtra

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Abstract: Mangrove ecosystem provides an excellent habitat for birds. To understand association between mangroves and birds, avifauna from the mangroves and surrounding areas of Shiroda salt pans was studied. The species diversity and density of birds in and around mangroves, mudflats and riverside of Shiroda's latitude is between 15.3292 and 15.78816 while its longitude is between 73.68207 and 74.0271. It was studied at regular intervals. Exposed mudflats at tide, served as ideal feeding grounds for winter visitors, like Little Stint, Common Sandpiper, Plovers, Egrets etc. Mud flats were separated by thin water currents and bordered by dense mangroves like *Avicennia marina*, *A. officinalis* etc and reclaimed land. At few places thick mangrove patches were seen as islands. The mudflats and nearby areas inhabit all most 10 orders, 17 families and 28 genera. Members of families Ardeidae, Charadriidae, Phalacrocoracidae and Scolopacidae showed dominance over other families. The reason for their dominance may be due to their adaptability to estuarine climatic condition. Little Cormorant, Little Egret, Median Egret, Western Reef-egret, Cattle egret, Black Bittern, Red-wattled Lapwing, Common Sandpiper, Small Blue Kingfisher, White breasted Kingfisher, Brahminy Kite, Black kite were the most commonly occurring birds in the study area. Maximum diversity was observed in the months of November and December. The present study comprised of detailed survey of avifauna of Shiroda mithagar Sindhudurg which will contribute in providing baseline data, for planning effective management to study bird diversity and also provide clues for developing this creek as an ecotourism center. Further, studies on their relation with other biotic factors will be useful in understanding their ecology.

Key words: Avifauna, Shiroda mithagar, Mangrove biodiversity

INTRODUCTION

Mangroves are among the world's most productive ecosystems that protect the coastal populations and support the coastal fisheries and livelihood. Due to ever-growing population and urbanization, the mangroves around the globe are degrading and there is a need to understand these fragile ecosystems to

conserve its biodiversity. Most of the coastal and brackish water fisheries are dependent on these ecosystems, as they provide excellent nursery grounds for a variety of commercially important prawns, crabs, finfishes, as they provide abundant food and shelter for these organisms.

Ecosystems of coastal areas, small islands and mangroves in particular have an important economic value for local population living from both terrestrial and marine resources. Mangroves are situated in the tropics and sub-tropics of the world and consist of forest ecosystems growing at brackish water conditions near the sea shores.

The species composition of a specific area or a community is interlinked to the available resources of the area, which includes physical structure of the habitat, food availability and biotic interactions.

India has a long coastline of over 8000 Kms with associated continental shelf of 0.5 million sq km and Exclusive Economic Zone of 2.02 million sq kms (Zingde, 2002). The mangrove forest cover in India is 4460km² (Upadhyay *et al.*, 2002). About 80% of the Indian mangroves are confined to the east coast while remaining 20% are distributed along the west coast. The mangrove forest cover along the coast is rapidly declining and hence needs prompt attention for protection and conservation (Upadhyay *et al.*, 2002). Now a day, marine areas are also becoming popular as resources of recreation and tourism. Due to the encroachments of human beings in the marine and estuarine regions, for various purposes, the biodiversity in certain areas is disturbed and under the threat of destruction (Kathiresan, 2002).

Study the diversity of avifauna associated with mangroves in one of the most important estuarine ecosystem of Shiroda mithagar which is an important Mangrove area along the coast of Sindhudurg.

Birds are one of the best indicators of environmental quality of any ecosystem (Ripley, 1978). The Council of Environmental Quality (USA) identified birds as the commonly used indicators of environmental change (Morrison, 1986). Most of the birds have specific habitat requirement from season to season, a loss of which may lead to their extinction. Migratory birds visiting the mangroves fly long distance to find food and nesting places there (Panitz, 1997). Some of the resident birds are dependent on mangroves for survival. Loss of mangroves in any area directly and indirectly affects population of birds, which are dependent on these ecosystems (Nagrajan and Thiagesan, 1995). More frequently human interference and their activities are responsible for degradation of mangroves. Protection of the mangrove inhabiting birds will require effective management of the entire mangrove habitat. The mangroves are very important for survival of birds, but information on birds associated with mangroves in India is very scanty (Samant, 1985, Kathiresan, 2000).

The Study Area

Shiroda Mithagar is a tidal flat area with a mix of mudflats, and mangrove forests. The area is a vital stopover point for migratory birds and a breeding ground for resident birds. Shiroda Mithagar is known for its rich biodiversity, with over more than 40 species of birds documented.

Biodiversity of Shiroda mithagar:

Sindhudurg coast has been blessed with luxuriant, thick mangrove vegetation with patches of other associated flora and fauna. Almost 14 species of mangroves (*Rhizophora mucronata*, *Rhizophora apiculata*, *Kandelia candel*, *Bruigera cylindrica*, *Briugera gymnorhiza*, *Sonneratia alba*, *Avicennia alba*, *Avicennia marina*, *Avicennia officinalis*, *Lumnitzera racemosa*, *Aegiceras corniculatum*, *Ceriops tagal* and *Exocaeria agallocha*, *Heretara sps.*) inhabit the saline backwaters supporting the fisheries along the coast and housing a wide range of fauna and specifically bird fauna. The mangrove associates occurring are – *Erythrina indica*, *Zizypus jujuba*, *Sisuvium portulacatrum*, *Vitex negundo*, *Ipomea biloba*, *Derris uliginosa*, *Derris trifoliata*, *Pongamia pinnata*, *Caesalpinia crista*, *Cordia myxa*, *Plectranthus volubilis*, *Acanthus illicifolius*, *Salvadora persica*, *Thespesia populnea*, *Calophyllum inophyllum*, *Clerodendron inerme* etc., (Cooke, 1958 and Almeida, 1998).

Apart from the above, the mangroves of this area house an impressive diversity of fauna and provides breeding ground for a variety of mollusks like *Katelsysia Katelsysia*, *Katelsysia opima*, *Meretrix Meretrix*, *Gelonia proxima*, *Crossostrea madrasensis*, *Dosinia prostrata*, *Turbo species*, *Arca granosa*, *Dosinia cretacea*, *Codium asiaticum*, *Solen truncates* and button shells. Some of the crab species occurring in this region are *Neptunus species*, *Gelasimus Dussumeieri*, *Gelasimus marionis* etc.,

MATERIAL AND METHODS

The present study was carried out to understand diversity status of birds over a short period and hence fortnight census of birds was conducted from January to December. Though monthly observations have been taken to analyze occurrence of migratory birds in particular season, but the data was given in general format. The observations were quantitative in nature and were made during early morning hours or evening, just an hour and half before sunset. The censuses were made by visual counts of birds, from specific points and also with the help of boat to get closer look of these birds. Avifauna was observed by using Olympus binoculars (10 x 50 magnifications) and photography by D7500 Nikon Camera with 200-500 mm Telephoto lens. In case where number was too large to count approximation was made with the help of binoculars. Advantage of high tide and low tide was considered, to monitor different occurrence of waders and piscivorous birds. The avifauna was identified by using standard literature for classification and nomenclature of birds (Ali and Ripley, 1995, 2001; Ali, 2002; Pande, 2003). During present study the birds, which might have escaped from observation may be some small birds, or are less in number and seen rarely. The birds observed in present study were categorized according to their occurrence throughout the study period suggested by Dharam Kumar Sinhji (1973) and Ali (1996).

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 area under study during a particular season

RESULTS AND DISCUSSION

The present study revealed presence of 40 species of birds belonging to 9 orders, 18 families and 34 genera. Out of these, 22 species were resident, 6 migrant, 7 local migrants, 7 winters migrant, 15 uncommon, 13 common and 12 rarely occurring species were observed. Individuals of family Ardeidae were found to be dominant, representing 10 species.

Birds have been consider as useful biological indicators because they are ecologically versatile and live in all kinds of habitats as herbivores or carnivores (Jarvinen and Vaisanen, 1979). The aquatic avifauna is susceptible to the changes in wetlands; similarly they are more conspicuous in an ecosystem and hence can be easily observed for monitoring the change taking place (Morrison, 1986). Some birds are migratory, which are responsible for fluctuations in the population of birds that occur during different seasons of the year, which may help to know whether area is normal or getting polluted, as total absence of birds from any

area may be considered as pollution indication (Borale *et al*; 1994).

Seven species of mangroves and mangroves associates were present in the study area, belonging to five families, namely *Acanthus ilicifolius*, *Derris trifoliata*, *Sonneretia apetala*, *Salvadora persica*, *Avecennia marina* var, *marina*, *A.marina* var,*accutissima*, *A. officinalis*. Among the mangroves *A. marina* was the dominant species.

Bhargavi *et al.* (1996) in their study on wetlands recorded total 40 species of birds belonging to 13 families, while Prashant *et al* (1994) in their study of coastal area of Nellora district recorded 78 species of birds. During the present study, 32 species of wetland birds are noticed. Quadros (2001) in his study on Thane creek reported 55 species of birds, while Maharashtra nature park, Mahim, Mumbai (2000) had published the list of 84 species of birds sighted in their area.

Table 1: Mangrove associated bird species from Shiroda mithagar area

Orders	Families	Sr. No	Species	English	Status
Pelecaniformes	Phalacrocoracidae	1	<i>Phalacrocorax niger</i> (Vieillot, 1817)	Little Cormorant	R.LM/C
Ciconiiformes	Ardeidae	2	<i>Egretta garzetta</i> (Linnaeus, 1766)	Little Egret	R.LM/C
		3	<i>Egretta gularis</i> (Bosc, 1792)	Western Reef-Egret	LM/C
		4	<i>Ardea cinerea</i> (Linnaeus, 1758)	Grey Heron	LM/UC
		5	<i>Casmerodius albus</i> (Linnaeus, 1758)	Large Egret	LM/ C
		6	<i>Mesophoyx intermedia</i> (Wagler, 1829)	Median egret	R.LM/C
		7	<i>Bubulcus ibis</i> (Linnaeus, 1758)	Cattle egret	R.LM/C
		8	<i>Ardeola grayii</i> (Sykes, 1832)	Indian Pond-Heron	R.LM/UC
		9	<i>Ardea cinerea</i> (Linnaeus, 1758)	Grey Heron	M/r
	Cooniidae	10	<i>Anastomus oscitans</i> (Boddaert, 1783)	Asian open Bill-Stork	LM/r
	Threskiomithidae	11	<i>Plegadis falcinellus</i> (Linnaeus, 1766)	Glossy Ibis	LM/r
		12	<i>Threskiornis melanocephalus</i>	Black headed Ibis	LM/UC

			(Latham, 1790)		
Falconiformes	Accipitridae	13	<i>Elanus caeruleus</i> (Desfontaines, 1789)	Black shouldered Kite	LM/r
		14	<i>Milvus migrans</i> (Boddaert, 1783)	Black kite	R/C
		15	<i>Haliastur Indus</i> (Boddaert, 1783)	Brahminy Kite	R/C
Charadriiformes	Charadriidae	16	<i>Charadrius dubius</i> (Scopoli, 1786)	Little Ringed Plover	MR/C
		17	<i>Charadrius alexandinus</i> (Linnaeus, 1758)	Kentish Plover	WM/r
		18	<i>Charadrius mongolus</i> (Pallas, 1776)	Lesser Sand plover	M/UC
		19	<i>Pluvialis fulva</i>	Pacific goldon Plover	WM
		20	<i>Vanellus indicus</i> (Boddaert, 1783)	Red-wattled Lapwing	R/C
	Scolopacidae	21	<i>Gallinago gallinago</i> (Linnaeus, 1758)	Common Snipe	WM/U C
		22	<i>Numenius arquata</i> (Linnaeus, 1758)	Eurasian Curlew	M/UC
		23	<i>Tringa totanus</i> (Linnaeus, 1758)	Redshank	WM/C
		24	<i>Tringa ochropus</i> (Linnaeus, 1758)	Green Sandpiper	M/C
		25	<i>Actitis hypoleucos</i> (Linnaeus, 1758)	Common Sandpiper	M/C
		26	<i>Numenius phaeopus</i> (Linnaeus, 1758)	Whimbrel	
	Laridae				
		27	<i>Sterna albifrons</i> (Pallas, 1764)	Little Tern	WM
Psittaciformes	Psittacidae	28	<i>Psittacula krameri</i> (Scopoli, 1769)	Rose-ringed Parakeet	R/UC
Cuculiformes	Cuculidae	29	<i>Eudynamys scolopacea</i> (Linnaeus, 1758)	Asian Koel	R/UC
Apodiformes	Apodidae	30	<i>Cypsiurus balasensis</i> (J.E.Gray, 1829)	Asian Palm-Swift	R/UC
Coraciiformes	Alcedinidae	31	<i>Alcedo atthis</i> (Linnaeus, 1758)	Small Blue Kingfisher	R/UC
		32	<i>Halcyon smyrnensis</i> (Linnaeus, 1758)	White Throated Kingfisher	R/C
	Bucerotidae	33	<i>Anthracerous</i>	Malabar Pied	R/r

			<i>coronatus</i>	Hornbill	
	Meropidae	34	<i>Merops orientalis</i> (Latham, 1880)	Green Bee-eater	R/C
Passeriformes	Hirundinidae	35	<i>Hirundo rustica</i> (Linnaeus, 1758)	Common Swallow	R/C
	Motacillidae	36	<i>Motacilla alba</i> (Linnaeus, 1758)	White Wagtail	R/UC
		37	<i>Motacilla cinerea</i> (Tunstall, 1771)	Grey Wagtail	R/UC
	Dicruridae	38	<i>Dicrurus macrocerus</i> (Vieillot, 1817)	Black Drongo	R/UC
	Corvidae	39	<i>Corvus splendens</i> (Vieillot, 1817)	House Crow	R/C
		40	<i>Corvus macrorhynchos</i> (Walger, 1827)	Jungle Crow	R/UC

R= Resident; M=Migrant; LM=Local Migrant;
WM= Winter Migrant

UC=Uncommon; C = Common;r =Rare

Egrets were seen throughout the study period and were most abundant in number. Their dominance over other species of birds is due to their nesting period and location of their nesting sites in the mangroves of Shiroda mithagar area. As they are the estuarine birds and get their food in this ecosystem, they can be considered as resident and local migrants of this area. Bird species of family Scolopacidae were observed feeding on the mudflats of Mangrove Island. Most of them were winter migrants. Mudflats are feeding ground for these visitors, which also indicate rich macro and meiofauna such as crabs, polychaetas and some mollusks on these mudflats.

Birds like Little Cormorant, Western reef Egrets, Indian pond Heron, etc. were seen in the middle zone of the study area. Their appearance towards the riverine side of the estuary was very rare and moreover showed their presence towards the sea side or towards the mouth of the estuary. Some species such as White Throated Kingfishers, Pied Kingfisher, Red-wattled lapwing, and some species of Sandpipers like Marsh Sandpiper were observed to be present throughout the entire estuary.

The present studies shows that, the mangrove islands present along the estuarine zone show presence of maximum number of avifauna as compared to the sea side of the estuary or towards the mouth of the estuary. The probable reason could

be the settlements of the fishermen community along the coast especially near the mouth of the estuary, may have caused disturbances in this particular area. Apart from the above, mangrove cutting was also seen at couple of places and human encroachments was also evident. If such activities are continued then it may destroy the roosting and breeding sites of most of the bird species.

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