

SPECIES DIVERSITY OF AVIFAUNA AT THANE CREEK NEAR RUTUCHAKKRA NATURE PARK

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ABSTRACT : The species diversity and density of birds of the mangroves, mudflats and near by reclaimed land at Thane creek near Rutuchakkra Nature Park (72°55' to 73°00' E longitude & 19°00' to 19°15' latitude) was studied at weekly intervals from September 2000 to March 2002. At low tide, exposed mudflats served ideal feeding grounds for winter visitors, like Little Stint, Common Sandpiper, Red Shanks, Plovers etc. Mudflats were separated by thin water currents and bordered by dense mangroves like *Avicennia marina*, *Avicennia officinalis* etc. & reclaimed land. At few places mangrove patches were seen as islands. The mudflats and near by area harboured a total of 69 species of birds belonging to 26 families and 12 orders, of which 32 species were wetland inhabitants. Charadriiforms formed the largest group inhabiting the estuarine wetland. Maximum species diversity was observed in the month of December 2000 (49 species). Some rare visitors like Avocet (*Recurvirostra avocetta*) was also noted at the site, which is one of the Important Bird Species according to IBA (Important Bird Area) declaration. The present study comprised of a survey of avifauna of Thane creek (Rutuchakkra Park), which will be useful in providing base line data, for planning effective management to study bird diversity with respect to development of Rutuchakkra Nature Park and pollution load on the creek.

Key Words: Mangrove, Avifauna, Creek

INTRODUCTION

The variety of distinctive species, ecosystems and habitats, influence the productivity and services provided by the specific ecosystems (Ravan, 1992). The species composition of a specific area or a community is interlinked to the available resources of the area in question, which includes physical structure of the habitat, availability of food and biotic interactions.

The mangroves enrich the creek water with nutrients, act as nursery ground for fish, entrap mud and heavy metals, control salinity of ground water and reduce the impact of tidal currents. This fragile ecosystem is threatened by reclamation, pollution, fire wood exploitation etc.

The area under study was a garbage dumping land of Thane Municipal Corporation. The garbage dumping has been stopped and the area is being developed as "Nature Park" – known as "Rutuchakkra Nature Park". At present there are no plants other than few existing mangroves and shrubs. The new plantation has been started in the area and simultaneously the mangrove plantation is also undertaken. It is expected that within a span of 3 to 4 years, the habitat in the area under study will be restored.

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.

Thus the conservation value of a habitat could be assessed by the presence of various species of birds in an area. Recently Thane creek area has been declared as IBA (Important Bird Area) and hence the detailed ornithological survey from Rutuchakkra area was undertaken to prepare a base line data.

SELECTION OF STUDY AREA

With its geomorphic head near the city of Thane, the Thane creek is geographically located at 72°55' to 73°00' E longitude and 19°00' to 19°15' latitude. The creek extends about 26km, northwards from the south of Mumbai harbor bay and joins the Ulhas River by a minor connection near Thane city (Map 1). The creek is around 6 km. wide at its mouth and 0.5 km. wide at the confluence with the estuary.

Thane Municipal Corporation previously used the bank of the creek near Kalwa bridge (Map 2) as garbage dumping ground. The total landfill area is about 17 acres with length about 1.5 km. and width about 80 meters. It used to stink and was full of plastic bags and other city wastes.

The Nature Park under development was named as "Rutuchakkra" in which six zones were formed, zone 5, which has landfill area of 3 acres, was selected for observation. It was away from vehicular pollution and close to mud flats, where the expanse of water was less

and shallow. This made the observations easy and easy.

Small bushy mangroves surrounded the selected zone; hence abundance of birds was felt more in this area. The nallas from Thane town entered the creek from both the sides of area under study, bringing fresh water, which formed thin streams during low tide. Due to the compound wall along the boundary with locked gate, overall anthropological activities were less in the area under study.

MATERIAL & METHODS

The aim of the study was to produce detailed report of changes in the number of birds, over a short period and hence weekly census of birds was conducted, for estimating the bird population of the area from September 2000 to March 2002 (i.e. for 19 months). The data was compiled and presented to show monthly fluctuations in population.

The observations were quantitative in nature & were made during the evening, just an hour & half before sunset. The creek area under study is towards East side from the observation ground, hence it was difficult to make visual observations in the morning, as the colour differentiation was not possible due to the rising sun.

The census was made by visual counts of birds, from specific points and also walking on the boundary wall, by direct sighting using binoculars (10 X 50 magnifications). In case 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 differential occurrence of waders and piscivorous birds.

Standard guides such as Ali (1979), Campbell (1979), Ali & Ripley (1995), Ali (1996), aided identification, classification and nomenclature of birds. During the present study the birds, which might have escaped notice / observation may be some small birds, or are less in number and seen rarely.

The birds observed in the present study were categorised according to their occurrence, throughout the year as per the classification suggested by Dharamkumarsinhji (1973) and Ali (1996).

Resident (R) : birds indigenous & residing in the area through out 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 country from September and leave in March or latter.

The birds were also categorised by "modified Sudar (1992) method" Karman (1993) into three distinct categories as

Common - Counted daily in relatively large numbers in flocks of ten.

Uncommon - Observed on most of the days in relatively low numbers about 1 - 15 per day.

Rare - Counted 15 times or less in a year.

(Migratory bird species were categorised under common, uncommon or rare for the specific period, based on the observations performed during the migration period).

RESULTS & DISCUSSION

Birds have been considered as useful biological indicators because they are ecologically versatile and live in all kinds of habitats as herbivores or carnivores (Jarvinen & Vaisanen, 1979). The aquatic avifauna is susceptible to the changes in wetlands, similarly they are most conspicuous in an ecosystem & hence can be easily observed for monitoring the changes taking place (Morrison, 1980). Some birds are migratory & hence the population of birds that occurs during the different seasons of the year fluctuates, which may help to know whether the area is normal or getting polluted, as total absence of birds from any area may be considered as pollution indication (Borale et al., 1994).

7 species of mangroves and mangrove associates were present at study area, belonging to 5 families, namely *Acanthus ilicifolius*, *Derris trifoliata*, *Sonneratia apetala*, *Salvadora persica*, *Avicennia marina* var. *marina*, *Avicennia marina* var. *acutissima*, *Avicennia officinalis*. Among the mangroves *Avicennia marina* was the dominant species.

Thane creek is now declared as the Important Bird Area (IBA), which may get an international importance, when it comes under RAMSAR convention. The area under study was a part of Thane creek. Though small, it was equally important because bird like Pied Avocet (*Recurvirostra avocetta*), included in Important Bird Species, visits this area and nearby locality.

According to IBA survey (BNHS 2002), 205 species of birds are reported from the Thane creek region, of which 69 sps. of birds belonging to 25 families and 12 orders were noted at the site of study and few more were sighted from nearby sites. (Table 1).

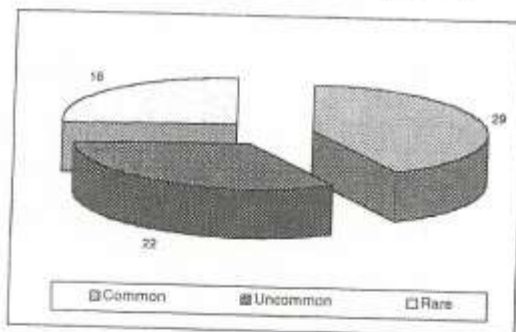
Bhargavi et al. (1996) in their study on wetlands recorded total 45 species of birds belonging to 13 families, while Prashant et al (1994) in their study of coastal area of Nellore district recorded 78 sps of birds. Borges & Shanbhag (2001) observed that the mudflats and mangroves of Chorao Island in Mandovi estuary (Goa), harboured a total of 47 bird species belonging to 14 families of which 33 sps. were wetland denizens.

During the present study, 32 spp. of wetland birds were noticed. Quadros (2001) in his study on Thane creek reported 55 spp of birds, while Maharashtra Nature Park Mahim Mumbai, (2000) had published the list of 84 spp of birds sighted in their area.

Compared to the data available, sighting 69 bird spp in such a small area under study supports the idea of the Thane creek to be considered for IBA & also suggests that the ecological conditions in this area and vicinity, if protected and improved, can help to increase the number of birds visiting the area.

The largest order recorded during the present study was Passeriformes (Table1) with 10 families and 26 species of birds. Whereas the second largest order recorded was Charadriiformes with 3 families and 20 species of birds. Order Ciconiiformes though represented by only one family, include 7 species of birds. Other orders were represented by 1 or 2 species.

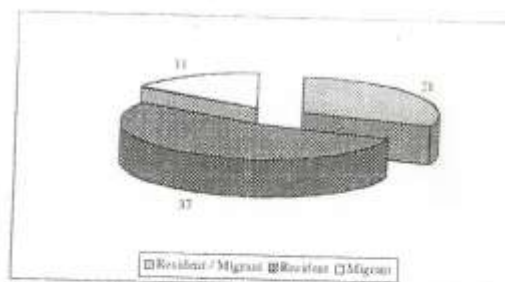
According to the classification based on modified Buden (1992) method & (Kannan, 1998) these birds fall under three categories: common, uncommon and rare, of which 29 species were common, 22 species were uncommon and 18 species were rare. (Graph 1)



Graph 1: Categories of bird species based on observations

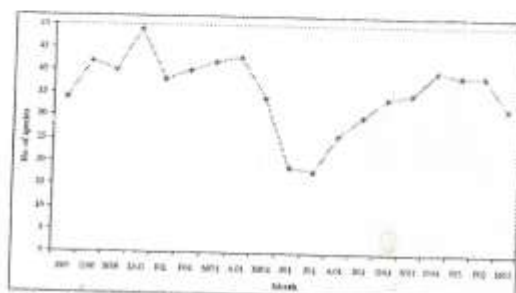
Population study of different species of birds from the area under study elucidated that it serves as a habitat for two main categories of birds a) Resident b) Migrant. The resident birds were further of two categories namely Local or Resident migrant (RM) & Resident (R)

Out of 69 bird species visiting the area under study, 11 species were migratory including Marsh Harrier, Golden Plover, Grey Plover, Blacktailed Godwit, Greenshank, Wood Sandpiper, Marsh Sandpiper, Little stint, Great Blackheaded Gull, Blackheaded Gull and Rosy Pastor. From the remaining, 21 species were of resident - migrants and 37 were resident. The resident migrants include predominantly Cattle Egret, Little Ringed plover, Common Sandpiper, Swallow, Blackwinged Stilt etc. while among resident, dominants



Graph 2: Variation based on habitat preference

were Pond Heron, Common Pariah Kite, Myna (all types) and Munias. The large number of resident species indicates that the area was conducive for them throughout the year. (Graph 2)



Graph 3 Monthly variation of the number of bird species

The total number of species visiting the area under study, increased from September to December 2000 (Graph 3) which include the winter migrants as well as residents. The species number dropped down below twenty in June and July 2001 and then again increased in pre-winter and winter period. During the low tide large mudflats were exposed and since the benthic fauna of the area was very rich, it must have attracted many varieties of birds in non-monsoon seasons. But in the months of June & July, because of large expanse of water due to heavy rains, some resident species might have migrated at nearby areas. While the winter & local migrants had returned to their homelands and only some resident species remained at the site reducing the number.

The total number of birds (Graph 4) were more than 1200/day during winter months i.e. from December 2000 – March 2001 and November 2001 to February 2002 (for 4 months) in both the years. This can be attributed to winter migrants residing in the area under study during that period. In the month of May 2001 the number of birds again rose high which might be due to the fact that the area under study is on the return route of migratory birds such as Blacktailed Godwit, Common Sandpiper & Little Stint.

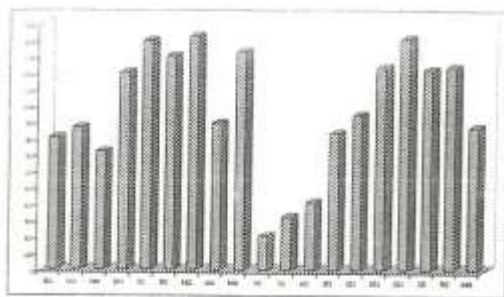
Table 1 : Check - list of Birds at Thane creek near Rutuchakra Nature Park, Thane

Sr. No.	**Serial No.	Order	Family	Common Name	Latin Name *
PELECANIFORMES					
1	8		Phalacrocoracidae	Little Cormorant	<i>Phalacrocorax niger</i>
CICONIIFORMES					
2	12		Ardeidae	Gray Heron	<i>Ardea cinerea</i>
3	16			Pond Heron	<i>Ardeola grayii</i>
4	18			Cattle Egret	<i>Bubulcus ibis</i>
5	14			Large Egret	<i>Ardeola alba</i>
6	20			Little Egret	<i>Egretta garzetta</i>
7	22			Night Heron	<i>Nycticorax nycticorax</i>
8	19			Median Egret	<i>Egretta intermedia</i>
ANSERIFORMES					
9	45		Anatidae	Lesser Whistling Teal	<i>Dendrocygna javanica</i>
FALCONIFORMES					
10	75		Accipitridae	Common Pariah Kite	<i>Milvus migrans goyinda</i>
11	76			Brahminy Kite	<i>Haliastur indus</i>
12	106			Marsh Harrier	<i>Circus aeruginosus</i>
GRUIFORMES					
13	148		Rallidae	Whitebreasted Waterhen	<i>Amaurornis phoenicurus</i>
CHARADRIIFORMES					
14	161		Charadriidae	Redwattled Lapwing	<i>Vanellus indicus</i>
15	165			Golden Plover	<i>Pluvialis apricaria</i>
16	164			Grey Plover	<i>Pluvialis squatarola</i>
17	166			Little Ringed Plover	<i>Charadrius dubius</i>
18	171			Blacktailed Godwit	<i>Limosa limosa</i>
19	174			Redshank	<i>Tringa totanus</i>
20	176			Greenshank	<i>Tringa nebulosa</i>
21	177			Wood Sandpiper	<i>Tringa glareola</i>
22	175			Marsh Sandpiper	<i>Tringa stagnatilis</i>
23	179			Common Sandpiper	<i>Tringa hypoleucos</i>
24	186			Little Stint	<i>Calidris minuta</i>
25	193		Recurvirostridae	Blackwinged Stilt	<i>Himantopus himantopus</i>
26	194			Avocet	<i>Recurvirostra avosetta</i>
27	204		Laridae	Great Blackheaded Gull	<i>Larus ichthyaetus</i>
28	205			Brownheaded Gull	<i>Larus brunnicephalus</i>
29	206			Blackheaded Gull	<i>Larus ridibundus</i>
30	209			Caspian Tern	<i>Hydroprogne caspia</i>
31	211			Common Tern	<i>Sterna hirundo</i>
32	207			Indian Whiskered Tern	<i>Chlidonias hybrida</i>
33	208			Gullbilled Tern	<i>Geleochelidon nilotica</i>
COLUMBIFORMES					
34	226		Columbidae	Blue Rock Pigeon	<i>Columba livia</i>
35	233			Spotted Dove	<i>Streptopelia chinensis</i>
PSITTACIFORMES					
36	237		Psittacidae	Roseringed Parakeet	<i>Psittacula krameri</i>
CUCULIFORMES					
37	251		Cuculidae	Koel	<i>Eudynamis scolopacea</i>
APODIFORMES					
38	278		Apodidae	House Swift	<i>Apus affinis</i>
39	279			Palm Swift	<i>Cypsiurus parvus</i>

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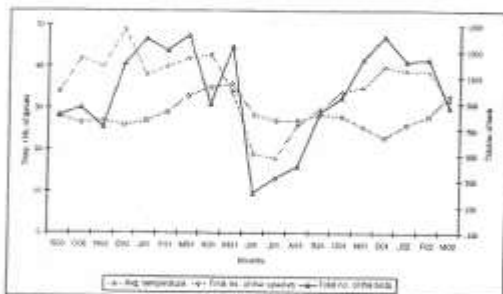
Sr. No.	** Serial No.	Order	Family	Common Name	Latin Name *
CORACIFORMES					
40	284		Alcedinidae	Small Blue Kingfisher	<i>Alcedo atthis</i>
41	289			Whitebreasted Kingfisher	<i>Halcyon smyrnensis</i>
42	295		Meropidae	Small Green Bee-eater	<i>Merops orientalis</i>
43	300		Upupidae	Hoopoe	<i>Upupa epops</i>
PASSERIFORMES					
44	332		Alaudidae	Bush Lark	<i>Mirafra assamica</i>
45	333			Crested Lark	<i>Galerida cristata</i>
46	342		Hirundinidae	Swallow	<i>Hirundo rustica</i>
47	344			Wiretailed Swallow	<i>Hirundo smithii</i>
48	350		Lamidae	Rufousbacked Skrike	<i>Lanius schach</i>
49	356		Dicruridae	Black Drongo	<i>Dicrurus adsimilis</i>
50	369		Sturnidae	Pied Myna	<i>Sturnus contra</i>
51	370			Indian Myna	<i>Acridotheres tristis</i>
52	367			Rosy Pastor	<i>Sturnus roseus</i>
53	380		Corvidae	House Crow	<i>Corvus splendens</i>
54	381			Jungle Crow	<i>Corvus macrorhynchos</i>
55	402		Pycnonotidae	Redwhiskered Bulbul	<i>Pycnonotus jocosus</i>
56	404			Redvented Bulbul	<i>Pycnonotus cafer</i>
57	403			Whitecheeked Bulbul	<i>Pycnonotus leucogenys</i>
58	448		Muscicapidae	Whitbrowed Fantail Flycatcher	<i>Rhipidura aureola</i>
PASSERIFORMES					
59	458		Muscicapidae	Streaked Wren Warbler	<i>Prinia gracilis</i>
60	456			Ashy Wren Warbler	<i>Prinia socialis</i>
61	481			Pied Bushchat	<i>Saxicola caprata</i>
62	479			Collared Bushchat	<i>Saxicola torquata</i>
63	503		Motacillidae	Yellow Wagtail	<i>Motacilla flava</i>
64	506			White Wagtail	<i>Motacilla alba</i>
65	499			Paddyfield Pipit	<i>Authus novaezeelandiae</i>
66	521		Ploceidae	House Sparrow	<i>Passer domesticus</i>
67	532			Spotted Munia	<i>Lonchura punctulata</i>
68	527			Red Munia or Avadavat	<i>Estrilda amandava</i>
69	533			Blackheaded Munia	<i>Lonchura malacca</i>

(* Latin names are as per "Pictorial Guide of Indian Birds" by Salim Ali & Ripley, 1995)
(** Serial numbers are as per "The Book of Indian Birds" by Ali, 1996)



Graph 4: Monthly variation of total number of birds / day

Graph 3 indicates that the total number of species of birds visited in the 1st year of study were more than 2nd year of study. Similarly Graph 4 indicates that total number of birds visited during 1st year of study were also more than 2nd year of study. This can be attributed to slight high temperature in the month of September & October during second year of study (Graph 5) which might have prevented few of the early migrants from residing in the area under study and instead they might have shifted to near by areas.



Graph 5: Monthly variation of average temperature, bird species & total number of birds / day.

From the data it appeared that the earliest arrival period of migrants was early September, while late arrival period may begin in November. When there was an early arrival, population and variety of birds was also more (Vyawahare, 1986). This explained more species and number of birds in the year 2000-01 than in 2001-02. At the site, early to arrive were Little Stints & Common Sandpiper immediately followed by Blackwinged Stilts, which coincided with the observation, made by Vyawahare (1986).

Among winter migrants Little Stints were predominant, which were seen in congregations of 200-300 birds daily, from September to April 2001. Their number increased in the month of May 2001, which might be due to return migrants. Common Sandpiper, the resident migrant accompanied Little Stints, and form the

2nd dominant species. Blackheaded Gull and Rosy Pastor made their arrival in December and remained till April or May whereas Blacktailed Godwit arrived early i.e. in the month of October - November and remained upto early May.

Among resident birds, Cattle Egret and House Crow were found to be dominating and present more than hundred in number on any given day throughout the year, while Little Cormorant, Pond Heron, Gray Heron, though less in number were found throughout the year. In the landfill area Red Munia were found more in number than House Sparrows, especially during September, October, February & March.

Thus the observations made on total number of migratory and residential species inhabiting the area under study indicate, that it can harbour varieties of birds, which is due to suitable climatic conditions and environmental parameters. Thus though a long list of birds makes reading laborious, it is necessary for knowing the present status. Later a similar list will make it possible to evaluate the nature of extent of changes that have taken place, due to development of Nature Park.

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