

UNVEILING THE FAUNAL DIVERSITY IN AN AROUND MANGROVE ECOSYSTEM OF DUTT MANDIR, DONGRI VILLAGE, BHAYANDER, MAHARASHTRA

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Abstract: Mangrove forests also called mangrove swamps are productive wetlands that occur along the coast line and are among the world's most productive ecosystem. They provide refuge as well as serve breeding and nursing grounds for many species of animals. The mangrove vegetation and estuarine water provide habitats to diverse animal species. The tangled mass of roots provide an ideal dwelling for spawn, fry, fingerlings and juveniles of many species of finfish, shellfish and crustaceans. The green canopy surrounding this area provides roosting and nesting sites for many birds. The present study deals with the faunal diversity of insects, crustaceans, fishes, reptiles, aves and mammals observed at Dutt mandir, Dongri Village, Bhayander (West) during the period of two years from 2012 to 2014. The study area is blessed with salt pans, estuarine water and mudflats. These mangroves are rich in the faunal diversity, but the threat to the biodiversity possibly due to anthropogenic activities and climatic changes does exist.

Keywords: Mangrove forest, Dutt Mandir, Dongri village, Bhayander, Anthropogenic, faunal diversity,

Introduction: Biodiversity reflects the number, variety and variability of living organisms. Biodiversity includes diversity within and between individuals, populations, species, communities and ecosystems. Ecosystem includes major natural systems such as grasslands, mangroves, coral reefs, wetlands, and tropical forests, as well as agricultural ecosystems that depend on human activity for their existence and maintenance¹.

Information on species diversity, richness, evenness and dominance evaluation on biological components of ecosystem is essential to understand the detrimental changes in the environment or deterioration of water quality². With the present global loss of thousands of species as a result of pollution and habitat destruction, assessment of species diversity and richness are highly needed. Such studies assist environmental biologist predicts where and how many species go extinct such

that certain effective measure, may be taken to concave them³.

Biodiversity of marine waters has been studied extensively by large number of researchers which includes diversity of marine algae, mangroves, crustaceans, mollusks, fish, reptiles, birds and mammals. Kathiresan and Rajendra⁴, studied the mangrove ecosystem of Indian Ocean region, while Terdalkar *et.al.*, studied, mangrove biodiversity and economics of Ratnagiri coast with special reference to Bhatye estuary⁵. Intertidal biodiversity with reference to Mollusca in and around Mumbai was studied by Jaiswar⁶.

Area and Objectives of Study

The present investigation was carried out at the Dutta Mandir, Dongri village, Bhayander west mangroves, having a natural mangrove habitat of *Acanthus iliforus*, *Avicenia officinalis*, *Exocarria agallocha*, *Salvadora persica* (tooth brush plant-Meswak) and *Sonneratia* species. There have been no detailed studies carried out till date to quantify the anthropogenic effect on faunal biodiversity in this region of Bhayander mangroves. Keeping the above hypothesis in mind the very purpose of the study is to investigate biodiversity status of the proposed mangroves.

- To study the faunal biodiversity in the mangrove habitat of the region.

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- To suggest certain remedial measures for conserving the flora and fauna in order to improve the ecological status of the proposed mangrove region and to maintain the biodiversity status.
- The proposed work may help authorities, local people and others to avoid disturbing the naturally rich biodiversity in proposed area.

Material and Methodology For Biodiversity Studies

The Study area: Dutt mandir Dongri village is located in Bhayander city of Thane district situated just north of Gorai Mumbai. It is just 2 km away from Bhayander creek. It is a region with varied heritage of biodiversity for observing avi-fauna of Bhayander constituting variety of species. The region is easily accessible from Bhayander. Dutta Mandir Dongri village, mangroves is blessed with saltpans and estuarine water which attracts variety of birds. During monsoons salt pans and surrounding area blushes with greenery which makes the study area an ideal habitat for faunal diversity.

Account of Faunal diversity: Density: Abundant(+++), Common (++) , Rare (+), not sighted (-)

Table No 1 Insects recorded in study area

Sr. No	Common name Butterflies	Scientific name	2012-13	2013-14
01	Small Salmon Arab	<i>Colitis amata</i>	+++	+++
02	Common grass yellow	<i>Euremahe cabe</i>	+++	+++
03	Common crow	<i>Euploea core</i>	++	++
04	Jezebel	<i>Delias eucharis</i>	++	++
05	Plain Tiger	<i>Danaus chrysippus</i>	++	++
06	Common Mormon	<i>Papiliopolytes</i>	++	+
07	Common Emigrant	<i>Catopsilia Pomona</i>	++	++
08	Grey Pansy	<i>Junonia atlites</i>	+++	++
09	Lemon Pansy	<i>Junonia lemonias</i>	++	++
10	Pierrot	<i>Castalius rosimon</i>	++	++
11	Praying mantis	<i>Schizocephalus bicornis</i>	++	++
12	Dragon flies	<i>Trithemis pallidinevi</i>	+++	+++
13	Jewel beetle	<i>Chrysocoris stoli</i>	++	++
14	Carpenter beetle	<i>Xylocopa leucothorax</i>	++	++
15	Little honey bee	<i>Apis florea</i>	++	++

Table No 2 Crustceans recorded in the study area

Sr. No	Common name	Scientific name	2012-13	2013-14
01	Mangrove crab/mud crab (Ocypodidae)	<i>Scylla seretta</i>	++	++
02	Fidler crab (Ocypodidae)	<i>Uca sp.</i>	++	++
03	Indian white shrimp (Peaeidea)	<i>Penaeus indicus</i>	+++	++
04	Tiger prawn(Penaeidae)	<i>Penaeus monodon</i>	++	++

Table No 3 Molluscan recorded in the study area.

Sr. No.	Name of the shell	Class	Family	2012-13	2013-14
01	<i>Telescopium telescopium</i>	Gastropoda	Potamididae	++	++

Biological diversity of the fauna at Bhayander mangroves was studied by field observations. Observation were made along the selected paths of mangrove stretch, near Dutt Mandir, Dongri Village Bhayander west. Monitoring of paths was either in the morning between 06.00 and 09.00 hours or in the evening between 17.00 and 18.00 hours during post monsoon and pre monsoon for two years period that is 2012 – 2014.

Equipments used during the trails were Olympus binocular and Nikon camera was used for photography. Observation were made by direct visual method of various insects, mollusks, fish, reptiles and birds along the selected path. Molluscan dead shells were collected, washed, dried and kept in plastic zip-lock bags. Specimens were identified with relevant literature such as Ali⁷, Apte Deepak,^{8,9} Issac Khehimkar,¹⁰ Daniel,¹¹ Grimmitt et.al.,¹² Monga S,¹³ Pandey et.al,¹⁴ Shubhalaxmi V¹⁵. Online resources were also used.

02	<i>Potamides cingulatus</i> (Hornshell)	Gastropoda	Potamididae	++	++
03	<i>Cerithium cingulatus</i> (Girdled Horn shells)	Gastropoda	Cerithiidae	++	++
04	<i>Cassidula nucleus</i> (mangrove ear snail)	Gastropoda	Ellobatidae	++	++
05	<i>Turritella terebracerea</i> (Screw shells)	Gastropoda	Turritellidae	++	+++
06	<i>Nerita crepidularia</i>	Gastropoda	Neritidae	++	+
07	<i>Nerita polita</i>	Gastropoda	Neritidae	++	++
08	<i>Gastrana polygona</i>	Bivalvia	Tellinidae	++	++
09	<i>Angulus sinuata</i>	Bivalvia	Tellinidae	++	++
10	<i>Paphia malabarica</i>	Bivalvia	Veneroidae	++	++

Table No 4 Pisces recorded in the study area

Sr. No	Common name	Scientific name	2012-13	2013-14
01	Tilapia (Kalimachee)	<i>Oreochromis mosambicus</i>	+++	+++
02	Mullet/ Boi	<i>Mugil cephalus</i>	+++	+++
03	Therapon (Naria)	<i>Therapon jarbua</i>	++	++
04	Cat fish (Singhada)	<i>Arius sp.</i>	++	++
05	Mudskipper(Newtee)	<i>Boleophthalmus sps.</i>	+++	+++

Table No 5: Reptilian Fauna recorded in the study area.

Sr. No	Common name	Scientific name	2012-13	2013-14
01	Checkered keel back	<i>Xenochrophis piscator</i>	+	-
02	Rat Snake	<i>Ptyas mucosa</i>	+	+
03	Garden lizard	<i>Calotes versicolor</i>	+++	+++
04	Skink	<i>Mabuya carinata</i>	++	++
05	Rock gecko	<i>Hemidactylus maculatus</i>	++	+
05	Green keelback	<i>Macropisthodon plumbicolor</i>	+	-

R= Resident, LM =Local migrant, WV= Winter visitor

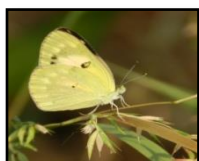
Table No 6 :Avian species recorded in the study area

Sr. No	Family	Common name	Scientific name	Remark	2012-13	013-14
01	1)Accipitridae	Black Kite	<i>Milvus migrans</i>	R/LM	+++	+++
02	Accipitridae	Black Winged Kite	<i>Elanus axillaris</i>	R/LM	++	++
03	Accipitridae	Shikra	<i>Accipiter badius</i>	R/LM	++	++
04	2)Alcedinidae	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	R	+++	++
05	Alcedinidae	Common Kingfisher	<i>Alcedo atthis</i>	R	++	+
06	3)Apodidae	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	R	+++	++
07	4)Ardeidae	Grey Heron	<i>Ardae cinerea</i>	WV	++	++
08	Ardeidae	Indian Pond Heron	<i>Ardeola grayii</i>	R	+++	+++
09	Ardeidae	Great Egret	<i>Egretta alba</i>	R/LM	++	++
10	Ardeidae	Little Egret	<i>Egretta garzetta</i>	R/LM	+++	++
11	Ardeidae	Western Reef Heron	<i>Egretta gularis</i>	WV	++	++
12	Ardeidae	Indian Cormorant	<i>Phalacrocorus fuscicollis</i>	R	+++	+++
13	Ardeidae	Black crown Night Heron	<i>Nycticorax nycticorax</i>	R	++	+

14	5)Centropodidae	Great Coucal	<i>Centropus sinensis</i>	R	++	++
15	6)Charadriidae	Little Ringed Plover	<i>Charadrius dubius</i>	WV	++	++
16	7)Cisticolidae	Prinia	<i>Prinia inornata</i>	R	++	+
17	8)Columbidae	Rock pigeon	<i>Columba livia</i>	R	+++	+++
18	Columbidae	Spotted dove	<i>Streptopelia chinensis</i>	R	++	++
19	Columbidae	Oriental Turtle Dove	<i>Streptopelia orientalis</i>	R	+	+
20	9)Corvidae	House crow	<i>Corvus splendens</i>	R	++	++
21	Corvidae	Large billed crow	<i>Corvus macrorhynchus</i>	R	++	++
22	10)Cuculidae	Asian Koel	<i>Eudynamys scolopaceus</i>	R	++	++
23	11)Dicruridae	Black Drongo	<i>Dicrurus macrocercus</i>	R	+++	++
24	Dicruridae	Ashy Drongo	<i>Dicrurus leucophaeus</i>	WV	++	++
25	12)Falconidae	Common Kestrel	<i>Falco tinnunculus</i>	R/LM	++	+
26	13)Laniidae	Brown Shrike	<i>Lanius cristatus</i>	WV	++	+
27	14)Megalaimidae	Coppersmith Barbet	<i>Megalaima haemacephala</i>	R	++	++
28	15)Meropidae	Chestnut Headed Bee-eater	<i>Merops leschenaulti</i>	R/LM	+	-
29	Meropidae	Little Green Bee-eater	<i>Merops orientalis</i>	R/LM	++	++
30	16)Muscicapidae	Blue Rock Thrush	<i>Monticola solitarius</i>	WV	+	-
31	Muscicapidae	Indian Robin	<i>Copsychus fulicatus</i>	R	++	++
32	Muscicapidae	Oriental Magpie-Robin	<i>Copsychus saularis</i>	R	++	++
33	Muscicapidae	Red-brested Flycatcher	<i>Ficedula parva</i>	WV	+	-
34	17)Nectariniidae	Purple rumped Sunbird	<i>Nectarina zeylonica</i>	R	+++	++
35	18)Oriolidae	Golden oriole	<i>Oriolus kundoo</i>	LM	++	++
36	19)Passeridae	House sparrow	<i>Passer domesticus</i>	R	++	++
37	20)Pittacidae	Rose ringed Parakeet	<i>Pittacula krameri</i>	R	+++	++
38	21)Ploceidae	Baya Weaver	<i>Ploceus philippinus</i>	R	+++	++
39	22)Pycnonotidae	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	R	++	+++
40	Pycnonotidae	Red-vented Bulbul	<i>Pycnonotus cafer</i>	R	++	++
41	Pycnonotidae	White ear Bulbul	<i>Pycnonotus leucotis</i>	R	++	-
42	23)Rallidae	Water hen	<i>Amaurionis phoenicurus</i>	R	++	++
43	24)Recurvirostridae	Blackwinged Stilt	<i>Himantopus himantopus</i>	R/WV	++	+
44	25)Rhipiduridae	White spotted Fantail	<i>Rhipidura albicollis</i>	R	++	+
45	26)Scolopacidae	Wood Sandpiper	<i>Tringa glareola</i>	WV	+++	++
46	Scolopacidae	Common Greenshank	<i>Tringa nebularia</i>	WV	++	++
47	27)Strunidae	Common Myna	<i>Acridotheres tristis</i>	R	+++	+++
48	Strunidae	Rosy Starling	<i>Strunus roseus</i>	R	+++	++
49	Strunidae	Asian pied starling	<i>Strunus contra</i>	R	+	+
50	28)Sylviidae	Common Tailorbird	<i>Orthotomus sutrorius</i>	R	++	++
51	29)Upupidae	Hoopoe	<i>Upupa epos</i>	RM	+	-

Table No 6: Mammal species in the study area

Sr. No	Common name	Scientific name	2012-13	2013-14
01	Indian Flying Fox (Chiroptera)	<i>Pteropus giganteus</i>	++	++
02	Little Indian field mouse (Rodentia Murridae)	<i>Mus booduga</i>	++	++
03	Jungle striped Squirrel (Rodentia Sciuridae)	<i>Funambulus tristriatus</i>	++	++
04	House shrew (Sciuridae)	<i>Suncus murinus</i>	++	++
05	Hanuman Langur (Cercopithecidae)	<i>Semnopithecus entellus</i>	++	+



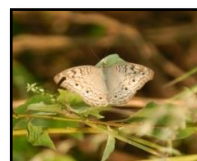
Small Salmon Arab



Common Emigrant



Common Jezebel



Grey Pansy



Lemon Pansy



Common Mormon



Common Pierrot



Common Castor



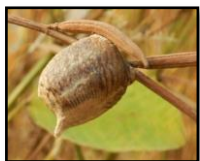
Tawny Coster



Common Crow



Pea Blue



Praying Mantis Egg Pod



Wasp



Jewel Beetle



Dragonfly

Plate No 1: Insects diversity



Mangrove Crab



Mangrove Prawns



Telescopium



Horn Shell

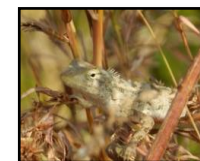


Cassidula nucleus

Plate No 2: Crustacean and Molluscan diversity



Garden lizard (*Calotes versicolor*)



Green Keelback

Plate No 3: Reptilian diversity



Pond heron



Cormorant & Pond heron



Flock of egrets



Greater Egrets



Western reef egret



Sandpiper



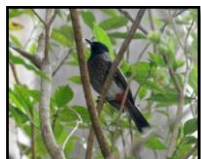
Black winged Stilt



Common kingfisher



White breasted kingfisher



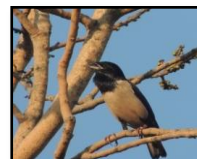
Red vent Bulbul



White ear bulbul



Asian pied starling



Rosy starling



Flock of Common Myna



Golden oriole



Black drongo



Spotted dove



Green Bee eater



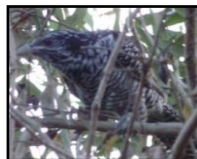
Indian Robin



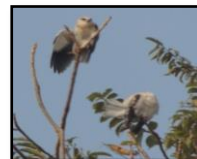
Greater Coucal



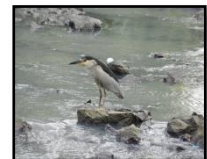
Kite and Shikra



Female cuckoo



Black winged Kite



Black-crowned Night Heron

Plate No 4: Avian Diversity

Result and Discussion: Dutt Mandir Dongri Village Bhayander is quiet rich in diversity of insects, crustaceans, fish and avian diversity. Reptilian and Mammalian diversity was limited in both the year.

Table No 1 shows the variety of 15 insects species found in study area of Bhayander mangroves. Small salmon arab *Colitis amata*, the mangrove butterfly dominated the Bhayander mangrove area due to abundance of its host plant *Acanthus* and *Salvadora* species. 10 species of butterflies were recorded along with 5 species of insects

in form of Praying Mantis, Jewel beetles, Little honey bee *Apis floreae*, Carpenter bees *Xylocopa* and Dragon flies species (Odontidae).

Table no 2 shows Crustaceans observed in form of mangrove crab or mud crab, Fidler crab *Uca* species, Indian white shrimp and Tiger prawns which formed the major catch by local fisherman. Also Mysis, prawn larvae dominate the fishing catch post monsoon period. Mysids are primarily found in benthic habitats of the estuarine water in the study area.

Molluscs are the second biggest category of invertebrates on the planet. Intertidal molluscan communities serve as bridges between geographically and temporally separated groups to explore morphological and ecological convergence. The findings show that gastropods are abundant as compared to bivalves as the macrobenthic fauna. *Telescopium* found in the mudflats and *Cassidula* nucleus, seen on the bark of trees. *Potamides* horn shell commonly found in polluted mangrove habitat dominated the brackish water of the area. Individual species or groups are also affected by climate change and strive to adapt to their new surroundings.

Fishes like mudskippers (*Boleophthalmus* species), mullet (*Mugil* species), and *Tilapia* (*Oreochromis* species) occurred throughout the year and formed dominant catch of local fishermen. Cat fish (*Aurios* species) and *Naria* or *Therapon* species were found during post monsoon period (October to February).

In the present study with respect to avian diversity some total 51 species of birds representing 29 families (Table No 6) were recorded at this Bhayander Mangroves region. Family Ardeidae (Indian Pond heron, Egrets, Indian Cormorant), Accipitridae (Black kite), Strunidae (Common Myna), Pycnonotidae (Bulbuls) shows high occurrence throughout the study period.

Grey Herons, Western Reef Egrets, Little Ringed Plovers, Black-winged Stilts, and Wood Sandpipers were only sighted during post monsoon or winter season. In the year 2013-14 some of the birds were less sighted (Common Kingfisher, Black-crowned Night Heron, Oriental Turtle Dove, Common Kestrel & White-Browed Fantail). Birds like Common Hoopoe, Blue Rock Thrush, Red-breasted Flycatcher, White-eared Bulbul, Chestnut-headed Bee-Eater, were not sighted during the year 2013-14.

Climate change acts in combination with major threats such as habitat loss and alien invasive species, making their impact worse. In addition to climate change, other factors contributing to biodiversity loss are land use changes, invasive species, overexploitation and pollution. Species that have the capability to keep up with climate shifts may survive; Others that cannot respond are likely to suffer. Species with high fertility and dispersal capacities have proved to be highly adaptive to variable climatic conditions. "Survival of fittest" is the common experience in nature, a cornerstone of ecology.¹⁶

The mangrove ecosystem is getting polluted with different kind of effluents, contaminants from industrial

wastes and most of the mangroves are on the verge of disappearance due to reclamation for housing, agriculture and salt evaporation site, sewage discharge, etc.¹⁷.

Following control measures could be suggested to stop the degradation of ecosystem near Bhayander mangrove region.

- People could be acquainted with the mangroves near their area. They could be vigilant towards activities happening in their surrounding areas, concerning destruction in mangroves areas, and can protect mangroves under Maharashtra Tree Felling Act and Environment Protection Act.
- Maximizing the involvement of local communities and stakeholders and a commitment to long-term engagement are key to success.

"As the loss of Biodiversity is a source of worry only when it is too late to correct it."

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