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# Avifaunal Diversity of the wetlands of Vasai-Virar Konkan area, Maharashtra, India

S.G. Gupta<sup>1</sup>, C.G. Roy<sup>2</sup> and P. Deb\*<sup>1</sup>

<sup>1</sup>Department of Zoology, SVKM's Mithibai College, Vile Parle (W), Mumbai 400 056, M.S., India

<sup>2</sup>Department of Botany, Ghanshyamdas Jalan College, Malad (E), Mumbai 400 097, M.S., India

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## ABSTRACT

Topographic and climatic heterogeneity makes India a bio diversely rich country. India is habitat to around 13% species of birds documented worldwide. Avifauna plays an important role in the food chain and are considered as biological indicators of ecosystem. Birds are scavengers, pollinating agents, seed dispersers and pest controllers. The avifaunal documentation of study area, Gogte saltpan (19°23'42" N, 72°48'38" E) and Viva wetland (19°27'35" N, 72°47'41" E) which are located in the northern part of Mumbai in Palghar district was done during the months of November 2021 and January 2022 by line transect and point count method. Overall, 84 species of birds including 15 orders and 36 families were recorded from both the study areas. Order Passeriformes (32%) was dominant followed by Charadriiformes (17%) and Pelecaniformes (12%), while family Scolopacidae (10%) was dominant followed by Ardeidae (10%), Anatidae (6%) and Accipitridae (6%). Both the study areas were dominated by order Passeriformes and family Ardeidae. Viva wetland recorded large number of avian diversities with count of 65 species, while 45 species were recorded in Gogte saltpan. IUCN Redlist species such as Black-tailed Godwit (NT), Lesser Flamingo (NT), Painted Stork (NT) and Greater Spotted Eagle (VU) were also observed during the study period. Both the study areas show similar habitat namely marshy wetland and grassland. Rapid urbanization as well as other anthropogenic activities are degrading and destroying the terrestrial as well as wetland habitats and are the major threats to birds. Proper monitoring of the same is required for sustainable development. The study highlights on the anthropogenic activities which are destroying these ecosystems and stresses on the need of sustainable utilization of these ecosystems to conserve biodiversity.

**Key words:** Gogte Saltpan, Viva wetland, Avifauna, Wetland

## Introduction

Birds are one of the essential elements of the biodiversity of the planet earth (Kiros *et al.*, 2018). Topographic and climatic heterogeneity makes India a bio-diversely rich country. Avifauna plays an important role in ecosystems (Kushwaha and Kulkarni, 2013; Abie *et al.*, 2019; Vala *et al.*, 2020; Dendup *et al.*, 2021). Urbanization leads to land cover changes, habitat destruction and fragmentation which are one of the major problems for declin-

ing population of birds (Singh *et al.*, 2018; Chen *et al.*, 2021; Lee *et al.*, 2022). According to estimates, the majority of people on earth will reside in urban areas by the year 2050 which raised concern over the future of already reduced diversity (Gatesire *et al.*, 2014).

Wetlands have water table near the surface of the land or are covered by shallow water and hence act as transitional land between aquatic and terrestrial ecosystem. Wetlands are considered to be one of the most productive ecosystems of the world and play

various roles such as aquifer recharge, flood control, nutrient absorption and erosion control (Kumar and Gupta, 2009; Luo *et al.*, 2019; Siva and Neelananarayanan, 2021). Present study focuses on the present diversity of birds in the study areas and importance of wetland ecosystems to birds for foraging food, roosting and nesting. Due to anthropogenic activities, these wetlands are declining at a very fast pace. Hence, there is an urgent requirement for sustainable use of these ecosystem resources to conserve the precious habitats for the benefit of mankind and other living species on the earth.

**Materials and Methods**

The study area Gogte saltpan (19°23'42" N, 72°48'38" E) and Viva wetland (19°27'35" N, 72°47'41" E) are located near Vasai Road and Virar railway station respectively, in the northern part of Mumbai in Palghar district. These are the temporary wetlands and consist of varied habitats in various season which attract resident as well as migratory birds. Both the habitats comprises of shrubland, grassland and small waterbodies which serve as a roosting, feeding and breeding sites for many species of birds. In Gogte, apart from saltpan, there are two water bodies namely Chulne lake and Gass lake. In Viva, local villagers use considerable and surrounding the wetland for cultivation of rice (Khan *et al.*, 2016) while majority of land in Gogte is used as saltpans.

The study was carried out in the month of November 2021 and January 2022 between 7:00 am to 2:00 pm. During the study period three visits were made to both the sites. Line transect and point count

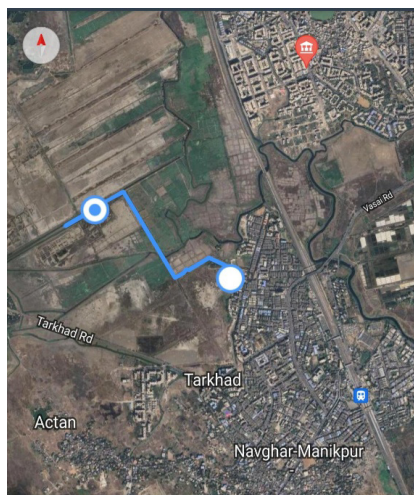


Fig. 1. Study area of Gogte Saltpan (<https://ebird.org>)

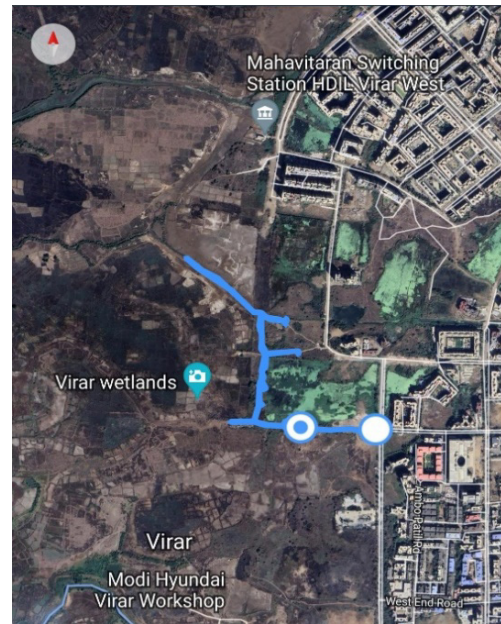


Fig. 2. Study area of Viva Wetland (<https://ebird.org>)

methods were employed for documenting bird diversity. Birds were observed and photographed with the help of Nikon action Ex 7x35 binocular and Nikon B600 camera. Field guide Grimmett *et al.* (2016) was used to identify the birds and were further classified into Resident, Resident Migrant and Migrant category using IUCN Red List database and ebird web portal.

**Results and Discussion**

**Observation**

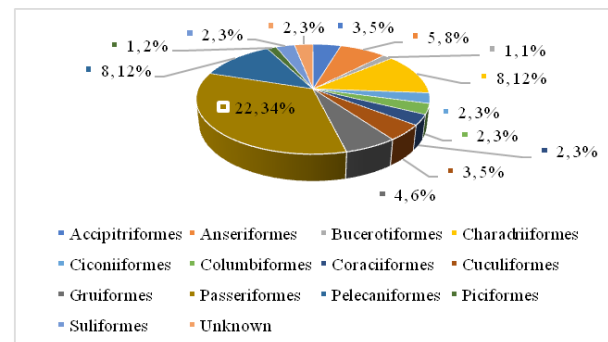


Fig. 3. Order wise representation of avifauna of Viva wetland

**Discussion**

84 species of birds were observed during the survey

**Table 1.** Checklist of Birds from Gogte saltpan and Viva wetland

Sr. No.	Common Name	Migratory/ Non-migratory	Scientific Name	Order	Family	IUCN Status	Viva Wet-land	Gogte Saltpan
1	Black Kite	Re	<i>Milvus migrans</i>	Accipitriformes	Accipitridae	-	√	√
2	Booted Eagle	M	<i>Hieraetus pennatus</i>	Accipitriformes	Accipitridae	LC	×	√
3	Eurasian Marsh-Harrier	M	<i>Circus aeruginosus</i>	Accipitriformes	Accipitridae	LC	√	√
4	Greater Spotted Eagle	M	<i>Clanga clanga</i>	Accipitriformes	Accipitridae	VU	√	√
5	Oriental Honey-buzzard	Re	<i>Pernis ptilorhynchus</i>	Accipitriformes	Accipitridae	LC	×	√
6	Cotton Pygmy-Goose	Re	<i>Nettapus coromandelianus</i>	Anseriformes	Anatidae	LC	√	×
7	Indian Spot-billed Duck	M	<i>Anas poecilorhyncha</i>	Anseriformes	Anatidae	LC	√	×
8	Knob-billed Duck	M	<i>Sarkidiornis melanotos</i>	Anseriformes	Anatidae	LC	√	×
9	Lesser Whistling-Duck	RM	<i>Dendrocygna javanica</i>	Anseriformes	Anatidae	LC	√	×
10	Northern Shoveler	M	<i>Spatula clypeata</i>	Anseriformes	Anatidae	LC	√	×
11	Eurasian Hoopoe	RM	<i>Upupa epops</i>	Bucerotiformes	Upupidae	LC	√	×
12	Little Ringed Plover	RM	<i>Charadrius dubius</i>	Charadriiformes	Charadriidae	LC	√	√
13	Red-wattled Lapwing	Re	<i>Vanellus indicus</i>	Charadriiformes	Charadriidae	LC	√	√
14	Bronze-winged Jacana	Re	<i>Metopidius indicus</i>	Charadriiformes	Jacanidae	LC	√	×
15	Pheasant-tailed Jacana	RM	<i>Hydrophasianus chirurgus</i>	Charadriiformes	Jacanidae	LC	√	×
16	Whiskered Tern	M	<i>Chlidonias hybrida</i>	Charadriiformes	Laridae	LC	×	√
17	Black-Winged Stilt	Re	<i>Himantopus himantopus</i>	Charadriiformes	Recurvirostridae	-	√	√
18	Black-tailed Godwit	M	<i>Limosa limosa</i>	Charadriiformes	Scolopacidae	NT	√	×
19	Common Greenshank	M	<i>Tringa nebularia</i>	Charadriiformes	Scolopacidae	LC	×	√
20	Common Sandpiper	M	<i>Actitis hypoleucos</i>	Charadriiformes	Scolopacidae	LC	√	√
21	Little Stint	M	<i>Calidris minuta</i>	Charadriiformes	Scolopacidae	LC	×	√
22	Marsh Sandpiper	M	<i>Tringa stagnatilis</i>	Charadriiformes	Scolopacidae	LC	×	√
23	Ruff	M	<i>Calidris pugnax</i>	Charadriiformes	Scolopacidae	LC	×	√
24	Temminck's Stint	M	<i>Calidris temminckii</i>	Charadriiformes	Scolopacidae	LC	×	√
25	Wood Sandpiper	M	<i>Tringa glareola</i>	Charadriiformes	Scolopacidae	LC	√	×
26	Asian Openbill	RM	<i>Anastomus oscitans</i>	Ciconiiformes	Ciconiidae	LC	√	√
27	Painted Stork	RM	<i>Mycteria leucocephala</i>	Ciconiiformes	Ciconiidae	NT	√	×
28	Rock Pigeon	Re	<i>Columba livia</i>	Columbiformes	Columbidae	LC	√	√
29	Spotted Dove	Re	<i>Spilopelia chinensis</i>	Columbiformes	Columbidae	-	√	√
30	White-throated Kingfisher	Re	<i>Halcyon smyrrnensis</i>	Coraciiformes	Alcedinidae	LC	√	×
31	Asian Green Bee-eater	Re	<i>Merops orientalis</i>	Coraciiformes	Meropidae	LC	√	×
32	Asian Koel	Re	<i>Eudynamis scolopaceus</i>	Cuculiformes	Cuculidae	LC	√	×
33	Greater Coucal	Re	<i>Centropus sinensis</i>	Cuculiformes	Cuculidae	LC	√	×
34	Pied Cuckoo	Re	<i>Clamator jacobinus</i>	Cuculiformes	Cuculidae	LC	√	×
35	Amur Falcon	M	<i>Falco amurensis</i>	Falconiformes	Falconidae	LC	×	√
36	Eurasian Coot	Re	<i>Fulica atra</i>	Gruiformes	Rallidae	LC	√	×
37	Eurasian Moorhen	Re	<i>Gallinula chloropus</i>	Gruiformes	Rallidae	LC	√	×
38	Gray-headed Swamphen	Re	<i>Porphyrio poliocephalus</i>	Gruiformes	Rallidae	LC	√	×
39	White-breasted Waterhen	Re	<i>Amaurornis phoenicurus</i>	Gruiformes	Rallidae	LC	√	×
40	Blyth's Reed Warbler	M	<i>Acrocephalus dumetorum</i>	Passeriformes	Acrocephalidae	LC	√	×
41	Ashy Prinia	Re	<i>Prinia socialis</i>	Passeriformes	Cisticolidae	LC	√	×
42	Plain Prinia	Re	<i>Prinia inornata</i>	Passeriformes	Cisticolidae	LC	√	×
43	Zitting Cisticola	Re	<i>Cisticola juncidis</i>	Passeriformes	Cisticolidae	LC	×	√
44	House crow	Re	<i>Corvus splendens</i>	Passeriformes	Corvidae	LC	√	×
45	Large-billed Crow	Re	<i>Corvus macrorhynchos</i>	Passeriformes	Corvidae	LC	√	×
46	Black Drongo	Re	<i>Dicrurus macrocercus</i>	Passeriformes	Dicruridae	LC	√	×
47	Indian Silverbill	Re	<i>Euodice malabarica</i>	Passeriformes	Estrildidae	LC	√	×
48	Red Avadavat	Re	<i>Amandava</i>	Passeriformes	Estrildidae	LC	√	×
49	Scaly-breasted Munia	Re	<i>Lonchura punctulata</i>	Passeriformes	Estrildidae	LC	√	√
50	Tricolored Munia	Re	<i>Lonchura malacca</i>	Passeriformes	Estrildidae	LC	√	×
51	Barn Swallow	M	<i>Hirundo rustica</i>	Passeriformes	Hirundinidae	LC	√	×
52	Dusky Crag-Martin	Re	<i>Ptyonoprogne concolor</i>	Passeriformes	Hirundinidae	LC	×	√

Table 1. Continued ...

Sr No.	Common Name	Migratory/ Non-migratory	Scientific Name	Order	Family	IUCN Status	Viva Wet-land	Gogte Saltpan
53	Red-rumped Swallow	RM	<i>Cecropis daurica</i>	Passeriformes	Hirundinidae	LC	√	×
54	Long-tailed Shrike	M	<i>Lanius schach</i>	Passeriformes	Laniidae	LC	√	×
55	Gray Wagtail	M	<i>Motacilla cinerea</i>	Passeriformes	Motacillidae	LC	×	√
56	Bluethroat	M	<i>Luscinia svecica</i>	Passeriformes	Muscicapidae	LC	√	×
57	Oriental Magpie-Robin	Re	<i>Copsychus saularis</i>	Passeriformes	Muscicapidae	LC	√	×
58	Siberian Stonechat	M	<i>Saxicola maurus</i>	Passeriformes	Muscicapidae	-	√	√
59	Purple-rumped Sunbird	Re	<i>Leptocoma zeylonica</i>	Passeriformes	Nectariniidae	LC	√	×
60	Indian Golden Oriole	RM	<i>Oriolus kundoo</i>	Passeriformes	Oriolidae	LC	×	√
61	House Sparrow	Re	<i>Passer domesticus</i>	Passeriformes	Passeridae	LC	√	√
62	Common Chiffchaff	M	<i>Phylloscopus collybita</i>	Passeriformes	Phylloscopidae	-	×	√
63	Red-vented Bulbul	Re	<i>Pycnonotus cafer</i>	Passeriformes	Pycnonotidae	LC	√	√
64	Common Myna	Re	<i>Acridotheres tristis</i>	Passeriformes	Sturnidae	LC	√	×
65	Indian Pied Starling	Re	<i>Gracupica contra</i>	Passeriformes	Sturnidae	-	√	√
66	Rosy Starling	M	<i>Pastor roseus</i>	Passeriformes	Sturnidae	LC	√	×
67	Gray Heron	RM	<i>Ardea cinerea</i>	Pelecaniformes	Ardeidae	LC	√	√
68	Great Egret	Re	<i>Ardea alba</i>	Pelecaniformes	Ardeidae	LC	√	√
69	Indian Pond-Heron	Re	<i>Ardeola grayii</i>	Pelecaniformes	Ardeidae	LC	√	√
70	Intermediate Egret	Re	<i>Ardea intermedia</i>	Pelecaniformes	Ardeidae	-	√	√
71	Little Egret	Re	<i>Egretta garzetta</i>	Pelecaniformes	Ardeidae	-	√	√
72	Purple Heron	Re	<i>Ardea purpurea</i>	Pelecaniformes	Ardeidae	LC	√	√
73	Western Reef-Heron	Re	<i>Egretta gularis</i>	Pelecaniformes	Ardeidae	-	√	√
74	Cattle Egret	RM	<i>Bubulcus ibis</i>	Pelecaniformes	Ardeidae	LC	√	√
75	Eurasian Spoonbill	RM	<i>Platalea leucorodia</i>	Pelecaniformes	Threskiornithidae	LC	×	√
76	Glossy Ibis	M	<i>Plegadis falcinellus</i>	Pelecaniformes	Threskiornithidae	LC	×	√
77	Lesser Flamingo	RM	<i>Phoeniconaias minor</i>	Phoenicopteriformes	Phoenicopteridae	NT	×	√
78	Coppersmith Barbet	Re	<i>Psilopogon haemacephalus</i>	Piciformes	Megalaimidae	LC	×	√
79	Eurasian Wryneck	M	<i>Jynx torquilla</i>	Piciformes	Picidae	LC	√	×
80	Indian Cormorant	Re	<i>Phalacrocorax fuscicollis</i>	Suliformes	Phalacrocoracidae	LC	√	√
81	Little cormorant	RM	<i>Microcarbo niger</i>	Suliformes	Phalacrocoracidae	LC	√	√
82	Diurnal raptor sp.	-	Unknown	Unknown	Unknown	-	√	×
83	Pipit sp.	-	Unknown	Unknown	Unknown	-	×	√
84	Swallow sp.	-	Unknown	Unknown	Unknown	-	√	×

Re- Resident; RM- Resident Migratory; M- Migratory; LC- Least Concern; NT- Near Threatened; VU- Vulnerable; √ - Present; ×- Absent.

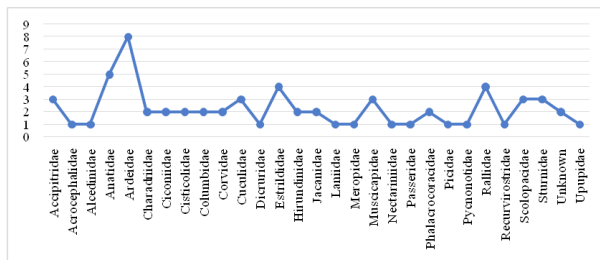


Fig. 4. Family wise representation of Avifauna of Viva wetland

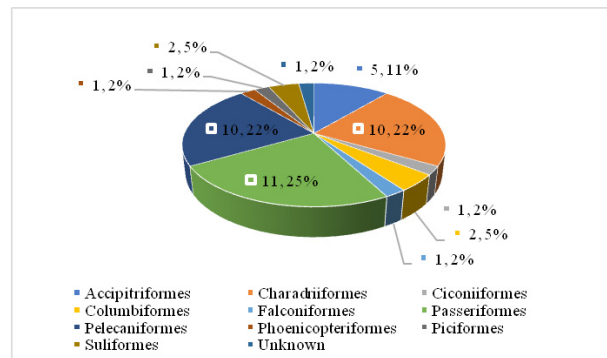


Fig. 5. Order wise representation of Avifauna of Gogte saltpan

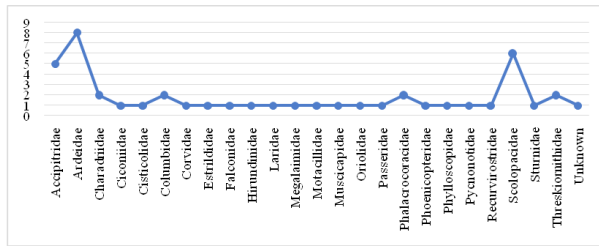


Fig. 6. Family wise representation of Avifauna of Gogte saltpan

in both the places comprising of 15 orders and 36 families. Order Passeriformes (32%) was dominant followed by Charadriiformes (17%) and Pelecaniformes (12%) while family Scolopacidae (10%) was dominant followed by Ardeidae (10%), Anatidae (6%) and Accipitridae (6%). Both the study areas were dominated by order Passeriformes and family Ardeidae. Viva wetland was recorded with a large number of avian diversities with a count of 65 species while Gogte saltpan had a count of 45 species. Overall, 26 species were found to be migratory bird species, 42 species were resident and 13 species were resident-migratory. IUCN Red List species such as Black-tailed Godwit (NT), Lesser Flamingo (NT), Painted Stork (NT) and Greater Spotted Eagle (Vulnerable) were also observed during the study period.

For functioning of the ecosystem and assessing the biodiversity, habitat quality is of prime importance. Habitat conservation has become an urgent issue due to rapid urbanization (Liu, 2022). Temporal changes, availability of food and roosting sites in both the habitats attract various birds, including migrants. Numerous factors, such as habitat loss, habitat destruction by pollutants and intense anthropogenic pressures reduce quality of terrestrial ecosystem which ultimately affects bird population. During the course of present study, pollutants in the form of sewage discharge and disposal of garbage were recorded. Previous studies by Verkey *et al.* (2015) and Khan *et al.* (2016) show high avifaunal diversity in the study area, which has reduced in the present study. This is a clear indication that anthropogenic activities have reduced the breeding, roosting and nesting sites of birds. Identifying and monitoring such biodiverse terrestrial habitat is the need of the hour. Effective laws should also be enforced by concerned authorities to conserve these precious terrestrial habitats.

Wetlands are part of terrestrial ecosystem and are

one of the most productive lands in the world which nurture biodiversity and also have high potential in providing livelihood to human. There is need of preservation and conservation of habitat and birds respectively from various anthropogenic activities such as habitat destruction, poisoning, bird traps etc. There is need for sustainable utilization of these ecosystems to conserve biodiversity and long-term use of produce.

## Acknowledgements

Department of Zoology, SVKM's Mithibai College, Vile Parle (W), Mumbai, Maharashtra 400056.

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