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Seasonal Variation of Avifaunal diversity of wetlands near New Viva College, Virar (west), District- Palghar, Maharashtra, India

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Abstract

The study was carried out in the wetland area near New Viva College, Virar west (19 °46' N: 72 °79'E), Palghar District of Maharashtra, during July 2015 to June 2016. As per the observations, total 97 species of birds from 16 Orders and 39 families were recorded in three different seasons. Maximum numbers of bird species were recorded in post monsoon season (82 sp.), followed by monsoon (77sp) and in pre-monsoon it was 47 sp. Order Passeriformes (41%) is the dominant order followed by order Pelecaniformes (14%) and order Charadriiformes (13%). Out of 39 observed families, family Ardeidae showed maximum number of birds (11sp.) followed by family Muscicpidae (7sp.) and family Scolopacidae (6 sp.) and Motacillidae, Accipitridae (5sp. each).16 families comprises a single species of bird in each. The birds were categorised as Very Common (VC) 20 %, Common(C) 31%, Uncommon (UC) 22% and Rare(R) 24 % depending upon the observation during survey. Cypsiurus balasiensis (Asian palm swift), Columba livia (Blue rock pegion) and Mesophoyx intermedia (median egret) were the most dominant species in all three seasons in the study area. Seven globally Near Threatened species (IUCN), namely River tern (Sterna aurantia), Painted stork (Mycteria leucocephala), Eurasian roller (Coracias garrulous), Alexandrine parakeet (Psittacula eupatria), lesser flamingo (Phoeniconaias minor), Black Tailed Godwit (Limosa limosa) and Indian Black Ibis (Pseudibis papillosa) were recorded. During this study, seasonal variations of birds were recorded in monsoon, post-monsoon and pre-monsoon season. Simpson's index value for pre-monsoon is 0.959, for monsoon is 0.9682 and for post-monsoon is 0.9684. This study depicted that species diversity was abundant in spite of many anthropogenic activities. The current avifaunal diversity is in threat from habitat destruction due to developmental activities and sewage dumping.

Keywords: Avifaunal diversity, Anthropogenic activities, Wetland, Simpson's index.

Introduction

For the healthy ecosystem avifauna is important factor as they play various roles as pollinator, predators and scavenger, thus form an important part of food chain¹. Birds are found throughout the world, in all continents, oceans, even on extreme islands and also in nearly every climate. Birds are commonly utilized as an indicator of ecosystem integrity also marks the environmental quality^{2,3}.

They aid in the pollinization of plants; Birds also play major role in dispersal of propagules of plants and plankton^{4,5}. India harbours about 1237 species of birds, out of which 580 species are found in Western Ghat⁶. Pande et.al.⁷ reported 568 sp. of birds from 83 families from Maharashtra state. Johnson Varkey et.al.⁸ recorded a total of 93 bird species from Gogte salt plant which is sub urban parts of Mumbai. This study deals with diversity of avifauna at the wetland area near new Viva College Virar (west). During Rainy season this study area appears to be flooded, locals cultivate rice in this period and rest of the year it remains as a swamp, a water- logged body and majority of the area appears very dry during hot season, thus variation in birds diversity has observed during different seasons of the year. Study area: The geographical position of the study area shows latitude (19 °46' N) longitude (72 °79'E), which is near the west coast of Maharashtra near new Viva College in Virar west. This temporary wetland area attracts many migratory birds to this region. Its habitat varies in different seasons. Though in monsoon it is completely flooded, it shows wide range of variation in dry summer. Small portion of area is always remain wet either as swamp or as water logged body. Appearance of Cotton Teal (Nettapus coromandelianus) was reported in the same area⁹. Local people use this area for rice cultivation during monsoon. Study area comprises of grassland, shrubs and small trees. Tall trees are very few in numbers whereas large portion is covered with grass and water-body which serves as breeding and feeding ground for many birds. The study area was divided into four transact. Transact One and Four ware mostly covered with long grasses and shrubs which are submerged in water while transact Two and Three comprises of small grasses, weeds and seasonal rice cultivation.

Materials and Methods

This study was carried out in three seasons (Monsoon, Post monsoon and Pre monsoon) from July 2015 to June 2016. All

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the four quadrants were surveyed at least twice in a month. Point count method and quadrant method were used to record the avian diversity. Binocular and photo camera (DLSR) were used and identified using field guide^{10,11}. Birds were classified as Resident (R), Resident Migratory (RM), and Migratory (M) according to their migratory status. Data was recorded on the basis of their visit to the study area as Very common (VC), Common(C), Uncommon (UC), and Rare(R). Species diversity

and abundance is calculated by using Simpson's Diversity Index.

$$D = 1 - \left(\frac{\sum n (n-1)}{N(N-1)}\right)$$

n = Total number of organism of a particular species, N = Total number of organism of all species.

Table-1
Showing checklist of birds: R-Rare; UC- Uncommon; C-Common; VC-Very Common;, R-Regional; RM-Regional Migrant;
M-Migratory

Order	Family	Scientific Name	Common Name	IUCN Status ¹²	Abundance Status	Migratory Status
	Jacanidae	Metopidius indicus	Bronze winged jacana	Least concern	С	R
		Hydrophasianus chirurgus	Pheasant tail jacana	Least concern	С	RM
	Scolopacidae	Actitis hypoleucos	Common sandpiper	Least concern	UC	R
		Limosa lapponica	Bar tailed godwit	Least concern	R	М
		Limosa limosa	Black tailed godwit	Near Threatened	R	М
		Tringa glareola	Wood sandpiper	Least concern	R	М
Charadrii formes		Calidris temminckii	Temmincks stint	Least concern	R	М
		Calidris minuta	Little stint	Least concern	R	М
	Charadriidae	Vanellus indicus	Red wattled lapwing	Least concern	С	R
	Sternidae	Chlidonias hybrida	Whiskered tern	Least concern	R	М
		Sterna aurantia	River tern	Near Threatened	R	RM
	Recurvirostridae	Himantopus himantopus	Black winged stilt	Least concern	R	М
	Laridae	Chroicocephalus brunnicephalus	Brown headed gull	Least concern	R	RM
Apodiformes	Apodidae	Cypsiurus balasiensis	Asian palm swift	Least concern	VC	R
Gruiformes	Rallidae	Gallinula chloropus	Common Moorhen	Least concern	VC	R
		Porphyrio porphyrio	Purple moorhen	Least concern	VC	R
		Amaurornis phoenicurus	White breasted waterhen	Least concern	С	R
		Fulika atra	Common coot	Least concern	VC	R
Suliformes	Phalacrocoracidae	Microcarbo niger	Little cormorant	Least concern	VC	R
		Phalacrocorax fuscicollis	Indian shag	Least concern	С	R
Passeriformes	Cisticolidae	Prinia inornata	Plain prinia	Least concern	С	R
		Prinia socialis	Ashy prinia	Least concern	VC	R

Order	Family	Scientific Name	Common Name	IUCN Status ¹²	Abundance Status	Migratory Status
		Orthotomus sutorius	Common tailor bird	Least concern	С	R
	Corvidae	Corvus brachyrhynchos	Common crow	Least concern	VC	R
		Corvus (macrorhynchos) culminatus	Indian jungle crow	Least concern	С	R
	Sturnidae	Gracupica contra	Pied myna	Least concern	VC	R
		Acridotheres tristis	Common myna	Least concern	VC	R
		Pastor roseus	Rosy starling	Least concern	R	М
	Passeridae	Passer domesticus	House sparrow	Least concern	VC	R
	Dicruridae	Dicrurus leucophaeus	Ashy Drongo	Least concern	R	R
		Dixrurus macrocercus	Black drongo	Least concern	VC	R
	Estrildidae	Lonchura malacca	Tri coloured munia	Least concern	С	R
		Lonchura punctulata	Scaly breasted munia	Least concern	UC	R
		Amandava amandava	Red munia	Least concern	С	R
		Lonchura malabarica	Indian silver bill	Least concern	R	R
	Pycnonotidae	Pycnnonotus jocosus	Red Whiskered bulbul	Least concern	С	R
		Pycnonotus cafer	Red vented bulbul	Least concern	С	R
	Acrocephalidae	Acrocephalus stentoreus	Indian great reed warbler	Least Concern	R	RM
	Motacillidae	Motacila flava	Yellow wagtail	Least concern	С	R
		Motacila alba	White wagtail	Least concern	С	М
		Motacila cinerea	Grey wagtail	Least concern	С	М
		Dendronanthus indicus	Forest wagtail	Least concern	R	М
		Anthus rufulus	Paddy field pipit	Least concern	UC	R
	Alaudidae	Eremopterix griseus	Ashy crown sparrow lark	Least concern	UC	М
		Galerida cristata	Common crusted lark	Least concern	С	RM
		Ammomanes phoenicura	Rufous tailed lark	Least concern	С	RM
		Alaudae gulgula	Oriental skylark	Least concern	UC	RM
	Hirundinidae	Hirundo smithii	Wire tailed swallow	Least concern	UC	RM
		Hirundo rustica	Barn swallow	Least concern	R	R

Order	Family	Scientific Name	Common Name	IUCN Status ¹²	Abundance Status	Migratory Status
	Muscicpidae	Saxicola caprata	Pied Bushchat	Least concern	С	М
		Saxicoloides fulicatus	Indian robin	Least concern	С	R
		Copsychus saularis	Oriental magpie robin	Least concern	С	R
		Luscinia svecica	Blue Throat	Least concern	UC	RM
		Saxicola torquatus	Common stonechat	Least concern	VC	М
		Saxicola maurus	Siberian stonechat	Least concern	С	М
		Oenanthe deserti	Desert wheatear	Least concern	UC	М
	Laniidae	Lanius schach	Long tailed Shrike	Least concern	С	R
		Lanius vittatus	Bay backed shrike	Least concern	С	R
	Tephrodornithidae	Tephrodornis pondicerianus	Wood shrike	Least concern	С	R
	Leiothrichidae	Turdoides caudata	Common babbler	Least concern	UC	R
	Threskiornithidae	Pseudibis papillosa	Black ibis	Near Threatened	R	М
		Plegadis falcinellus	Glossy ibis	Least concern	UC	М
		Platalea leucorodia	Eurasian spoonbill	Least concern	UC	RM
	Ardeidae	Ardea alba	Greater egret	Least concern	UC	R
		Egretta garzetta	Lesser egret	Least concern	VC	R
		Mesophoyx intermedia	Median egret	Not evaluated	VC	R
		Bubulcus ibis	Cattle egret	Least concern	VC	R
relecamonies		Ardeola grayii	Pond heron	Least concern	VC	R
		Nycticorax nycticorax	Black crown night heron	Least concern	R	R
		Ardea cinera	Grey heron	Least concern	С	R
		Ardea purpurea	Purple heron	Least concern	UC	R
		Ixobrychus sinesis	Yellow bittern	Least concern	R	R
		Ixobrychus cinnamomeus	Chestnut bittern	Least concern	R	R
		Egretta gularis	Western reef egret	Least concern	UC	R
Columbiformes	Columbidae	Columba livia	Blue rock pegion	Least concern	VC	R
Accinitriformes	Accipitridae	Elanus axillaris	Black shoulder kite	Least concern	UC	R
Accipitriformes		Milvus migrans	Pariah kite	Least concern	VC	R

Order	Family	Scientific Name	Common Name	IUCN Status ¹²	Abundance Status	Migratory Status
		Haliastur indus	Brahminy kite	Least concern	VC	RM
		Circus aeruginosus	Western marsh harrier	Least concern	UC	RM
		Accipiter badius	Shikra	Least concern	UC	R
Ciconiiformes	Ciconiidae	Anastomus oscitans	Asian openbill	Least concern	С	RM
		Mycteria leucocephala	Painted stork	Near Threatened	R	R
	Anatidae	Dendrocyagna javanica	Lessor whistling duck	Least concern	UC	М
Angoriformog		Tadorna ferruginea	Ruddy sheld duck	Least concern	R	М
Anseriformes		Anas poecilorhyncha	Spot billed duck	Least concern	R	М
		Sarkidiornis melanotos	Knob billed duck	Least concern	R	RM
Coraciiformes	Halcyonidae	Halcyon smyrnensis	White throated kingfisher	Least concern	VC	R
	Alcedinidae	Alcedo atthis	Small blue kingfisher	Least concern	С	R
	Coraciidae	Coracias benfhalensis	Indian roller	Least concern	С	R
		Coracias garrulus	Eurasian roller	Near Threatened	UC	М
	Meropidae	Merops orientalis	green bee-eater	Least concern	UC	R
Bucerotiformes	Upupidae	Upupa epops	Common hoopoe	Least concern	С	R
Psittaciformes	Psittaculidae	Psittacula krameri	Rose ringed parakeet	Least concern	С	R
		Psittacula eupatria	Alexandrine parakeet	Near Threatened	R	R
Phoenicopterifor mes	Phoenicopteridae	Phoeniconaias minor	Lesser flamingo	Near Threatened	UC	М
Cuculiformes	Cuculidae	Eudynamys scolopaceus	Asian koel	Least concern	С	R
Podicipetiformes	Podicipedidae	Tachybaptus ruficollis	Little grebe	Least concern	UC	RM

Result and Discussion

This study was taken under consideration for awareness regarding wetlands birds and its conservation. Total 97 species of birds from 16 orders and 39 families were recorded in the study area in three different seasons. It was found that the total number of bird species during pre-monsoon was- 47 sp., monsoon -77 sp., and for post monsoon, it was- 82 species of bird. Order Passeriformes (41%) is the dominant order containing 40 species followed by order Pelecaniformes (14%) and order Charadriiformes (13%) which contain 14 species and 13 species respectively. Out of 39 observed families, family Ardeidae showed maximum number of birds (total 11 sp.) followed by family Muscicpidae (7sp.) and family Scolopacidae (6sp.), while Motacillidae, Accipitridae each

containing 5 species. Family Rallidae, Estrildidae Alaudidae, contain 4 species each Family Cisticolidae Anatidae Threskiornithidae and Sturnidae has 3 species each .16 families representing single species of birds and 11 families were found to be having 2 species each. The birds were categorised as Common(C) 31%, Rare(R) 24% Uncommon(UC) 22% Very common(VC) 20%, and depending upon the observation during survey. Cypsiurus balasiensis (Asian palm swift), Columba livia (Blue rock pegion) and Mesophoyx intermedia (median egret) were the dominant species in the study area. According to IUCN Red Data List seven globally Near Threatened species, namely River tern (Sterna aurantia), Painted stork (Mycteria Eurasian roller (Coracias garrulous), leucocephala), Alexandrine parakeet (Psittacula eupatria), lesser flamingo (Phoeniconaias minor) and Indian Black Ibis (Pseudibis

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papillosa) were recorded. Out of 97 species, 15 species were resident migratory, 23 were migratory and remaining 59 species were resident. Maximum diversity of birds was recorded in the first quadrant. Ducks were observed only in monsoon and post monsoon seasons, winter visitors like Blue throat, Desert wheatear, Eurasian roller were also recorded in the study area. During pre-monsoon total 47 species were recorded while in monsoon it was 77 species and 82 species in the post monsoon season. This diversity index value of the encountered avifauna was estimated to be in Monsoon, post-monsoon and premonsoon. Simpson's index value for pre monsoon is 0.9682 and for post-monsoon is 0.9684.

Threats: The study area forms one of the main feeding grounds for large number birds. The local people do paddy farming in these wetlands. Apart from these, the part of wetland is used for construction purpose which interrupts the ecosystem of the wetland. Being wetland, the fresh water fishes are found in the study area thus, nets are sets up in the area to catch the fishes and often the birds get entangled in these nets. It was also observed the birds like Herons and Ducks are poached directly for meat and for the bait purpose. Birds like jacanas, coots and moorhens have their regular breeding activities in these area but these are disturbed due to anthropogenic activities. During the pre-monsoon season most of the study area is dry, the grasses and scrubs are burned with fire for deweeding which again disturbs the avifauna.



Figure-1 Representation of Abundance Category of Birds



Representation of migratory status of Birds



Figure-3 Comparison of percentage of bird's species belonging to different avian order



Figure-4 Percentage occurrence of avifauna represented in families

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Conclusion

The observation and data collected from the study area reveals that the study area supports a healthy avian diversity. In postmonsoon season maximum bird diversity was observed as compared to pre-monsoon and monsoon as this study area provides feeding and breeding ground for many birds. Anthropogenic activities are a concern for the existing bird diversity of the study area. Development projects in these areas will deplete the breeding and feeding ground of the avifauna and thus affecting the diversity of that area,

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