

Diversity of avifauna of Nigade in Raigad, Konkan, India A case for conservation

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Abstract: India is rich in Biodiversity with two global Hotspots. The avifauna of India includes around 1301 species, (Clements & James, 2000), Maharashtra has 43.67% of it. Birds are the indicators of the health of an ecosystem as they indicate its needs and diversity. There are several studies on Birds of Konkan (Shanbhag *et al* 2001) indicating the richness of bird species in Konkan. However, detailed study, exclusively on birds of Nigade in Raigad district has not been carried out. Nigade shows diversity of habitat like low hills, plains, marshlands, estuary, mangroves etc. This diversity of topography and habitat offers suitable environment and opportunities for the bird population for breeding, feeding, resting and nesting.

Present study was carried out for two years from June 2011- to June 2013. Visits were planned periodically covering all the seasons of the year. The visits were made during early mornings and late evening, since activity of birds is at its peak during this time. Total of 131 birds were observed which included residents, winter visitors and also summer visitors. Few rare and threatened species were also occasionally spotted.

This work, will not only establish a base line data on bird diversity of Nigade but also assess probable and likely impact of expansion plans of administration for the highway and the rail route. As about 90% of the bird species observed in the region were residents, we strongly recommend the need for conservation of such sites.

Key words: *Avifauna, conservation, ecosystem, Biodiversity*

Introduction:

Conservation of natural resource like diversity of species is the key to the environmental concern of the day. Biodiversity is the degree of variation of life forms within a given species, ecosystem and biome, whether naturally occurring or modified by humans, (DeLong, 1996). India has two global biodiversity hotspots. Birds are bipedal, egg laying warm blooded vertebrates with more than 9000 living species across the world. Maharashtra houses 43.67% of total Indian avifauna, (Clements and James 2000). Diversity of avifauna is one of the most important ecological indicators to evaluate the quality of habitats, (Blair 1999). Birds play various useful roles such as control of insect pests of agricultural crops, predators of rodents, scavengers, seed dispersers and as pollinating agents. Birds provide important ecological services that contribute to maintaining ecosystem processes and some of the necessary conditions on which humans and other organisms depend. These services range from food provisioning to modification of habitats and resource flows in biological communities. The estimation of local densities of avifauna helps to understand the abundance of various species of other organisms, (Turner 2003). Avifaunal diversity all over the world has been decreasing due to the destruction of natural habitat and various anthropogenic activities. Decline in the bird population can have negative impacts on an ecosystem, and their sensitivity to environmental change often lends

them as useful indicators of environmental quality. Thus they form an important component of natural ecosystem, (Manjunath and Bhaskar Joshi 2012).

There are several studies on avifaunal diversity of Maharashtra. (Verma *et. al.* 2004) studied biodiversity of avifauna of Mahul Creek, while (Chauhan *et. al.* 2008) surveyed the avifauna of Borivali Mangroves. Recently (Kushwaha *et. al.* 2013) documented the bird diversity of Bhandup pumping station, Mumbai. However paucity exists in reports of avifauna exclusively from Konkan region. (Pawar 2011) documented the species diversity of birds in Uran, while (Shanbhag *et al* 2001) studied impact of Konkan railway project on avifauna of Carambolim Lake – Goa and forest conservation in Konkan was reviewed by (Punde 2008). Thus literature survey revealed that reports on avifauna of Raigad region are scanty.

Materials and Methods

(i) Study Area:

Present study was undertaken at Nigade situated in Pen tehsil of Raigad district in Konkan, Maharashtra, India. It measures about 13.7 sq. km. It shows diversity of habitats like low hills, plains, marshlands, estuary and mangroves which offer suitable environment and opportunities for birds for feeding, resting, nesting and breeding.



Fig. a : Map showing the study area

(ii) Data collection

Nigade was surveyed for two years, from June 2011 to June 2013 at regular intervals covering all the seasons. Since the peak activity of most birds lasts for a short window of 2 to 3 hours, after sunrise or before sunset, visits were planned either early in morning or late evening. The study area was also surveyed randomly in addition to regular visits. Observations were made with the aid of 10 X 50 Nikon binocular and Nikon P500 Digital Zoom camera without disturbing their natural activities. Standard field guides were used for identification purpose (1, 5).

Results and Discussion:

During the study period 131 species belonging to 35 families were recorded from Nigade, Raigad. The avifaunal diversity of area comprises of 106 (80.91%) residents, 20 (15.27%) migrants (19 winter and 1 summer migrant) and 5 (3.82%) occasional visitors (Fig. b). The recorded species are given in Table 2. Of the recorded species, the highest number of species belonged to family Accipitridae and Corvidae(14), followed by Passeridae(11), whereas 10 families were found to be represented by single bird species (Table 1). The following formula was used for determining percentage of occurrence of Families (Basavarajappa, 2006).

$$\text{Percentage Occurrence} = \frac{\text{No of Species of each family}}{\text{Total no of Different species seen}} \times 100$$

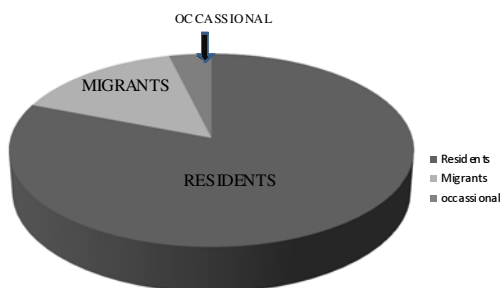


Fig. b: Percentage of resident, winter and summer migrant bird species recorded in the study area.

Table 1: Percentage occurrence of avifauna recorded at Nigade, Raigad representing families.

Sr. No.	Family	Number of bird species	% sighting of birds
1	Corvidae	14	10.69
2	Accipitridae	14	10.69
3	Passeridae	11	8.40
4	Ardeidae	10	7.63
5	Scolopacidae	6	4.58
6	Columbidae	6	4.58
7	Muscicapidae	6	4.58
8	Cuculidae	5	3.82
9	Sturnidae	5	3.82
10	Silvidae	5	3.82
11	Phalacrocoracidae	4	3.53
12	Threskiomithidae	4	3.53
13	Hirundinidae	4	3.53
14	Rallidae	3	2.29
15	Alcedinidae	3	2.29
16	Nectarinidae	3	2.29
17	Ciconidae	2	1.53
18	Phasianidae	2	1.53
19	Recurvirostridae	2	1.53
20	Psittacidae	2	1.53
21	Strigidae	2	1.53
22	Meropidae	2	1.53
23	Megalaimidae	2	1.53
24	Alaudidae	2	1.53
25	Pycnonotidae	2	1.53
26	Anatidae	1	0.76
27	Charatridae	1	0.76
28	Laridae	1	0.76
29	Tytonidae	1	0.76
30	Apodidae	1	0.76
31	Coraciidae	1	0.76
32	Upupidae	1	0.76
33	Bucerotidae	1	0.76
34	Picidae	1	0.76
35	Lanidae	1	0.76

Table2: List of birds recorded in Nigade, Raigad.

Sr. No.	Common name	Scientific name	Status
Family: Phalacrocoracide			
1	Indian Cormorant	<i>Phalacrocoraxfuscicollis</i>	R
2	Great Cormorant	<i>Phalacrocoraxcarbo</i>	R
3	Little Cormorant	<i>Phalacrocoraxniger</i>	R
4	Darter	<i>Anhinga melanogaster</i>	R– T
Family: Ardeidae			
5	Grey Heron	<i>Ardeacinerea</i>	M
6	Purple Heron	<i>Ardeapurpurea</i>	R
7	Indian Pond Heron	<i>Ardeolagravii</i>	R
8	Cattle Egret	<i>Bubulcus ibis</i>	R
9	Great Egret	<i>Casmerodiusalbus</i>	R
10	Intermediate Egret	<i>Mesophoyxintermedia</i>	R
11	Little Egret	<i>Egretta garzetta</i>	R
12	Western Reef Heron	<i>Egrettaularis</i>	R
13	Black-Crowned Night Heron	<i>Nycticoraxnycticorax</i>	R
14	Cinnamon Bittern	<i>Ixobrychuscinnamomeus</i>	R
Family: Ciconiidae			
15	Painted Stork	<i>Mycteria leucocephala</i>	R – T
16	Asian Openbill	<i>Anastomus oscilans</i>	R
Family: Threskiornithidae			
17	Black-Headed Ibis	<i>Threskiornismelanocephalus</i>	R – T
18	Black Ibis	<i>Pseudibispapillosa</i>	R – T
19	Glossy Ibis	<i>Plegadis falcinellus</i>	R
20	Eurasian Spoonbill	<i>Platalealeucorodia</i>	R
Family: Anatidae			
21	Spot-Billed Duck	<i>Anas poecilorhyncha</i>	R
Family: Accipitridae			
22	Black Shouldered Kite	<i>Elanus caeruleus</i>	R
23	Oriental Honey Buzzard	<i>Pernis ptilorhynchus</i>	R
24	Black Kite	<i>Milvus migrans</i>	R
25	Brahminy Kite	<i>Haliastur Indus</i>	R

26	Shikra	<i>Accipiter badius</i>	R
27	Crested Goshawk	<i>Accipiter trivirgatus</i>	O
28	Booted Eagle	<i>Hieraaetus pennatus</i>	M
29	White-Bellied Sea Eagle	<i>Haliaeetus leucogaster</i>	O
30	Long-Billed Vulture	<i>Gyps indicus</i>	O
31	Eurasian Marsh Harrier	<i>Circus aeruginosus</i>	M
32	Crested Serpent Eagle	<i>Spilornis cheela</i>	R
33	Common Kestrel	<i>Falco tinnunculus</i>	R
34	Osprey	<i>Pandion haliaetus</i>	R
35	Common Buzzard	<i>Buteo buteo</i>	O
Family: Phasianidae			
36	Rain Quail	<i>Coturnix coromandelica</i>	R
37	Jungle Bush Quail	<i>Perdica asiatica</i>	R
Family: Rallidae			
38	White-Breasted Waterhen	<i>Amaurornis phoenicurus</i>	R
39	Common Moorhen	<i>Gallinula chloropus</i>	R
40	Purple Swampphen	<i>Porphyrio porphyrio</i>	R
Family: Recurvirostridae			
41	Black-Winged Stilt	<i>Himantopus himantopus</i>	R
42	Pied Avocet	<i>Recurvirostra avosetta</i>	M
Family: Charadriidae			
43	Red-Wattled Lapwing	<i>Vanellus indicus</i>	R
Family: Scolopacidae			
44	Black-Tailed Godwit	<i>Limosa limosa</i>	M
45	Bar-Tailed Godwit	<i>Limosa lapponica</i>	M
46	Wood Sandpiper	<i>Tringa glareola</i>	M
47	Common Sandpiper	<i>Actitis hypoleucos</i>	M
48	Little Stint	<i>Calidris minuta</i>	M
49	Common Greenshank	<i>Tringa nebularia</i>	M
Family: Laridae			
50	River Tern	<i>Sterna aurantia</i>	R
Family: Columbidae			
51	Yellow-Footed Green Pigeon	<i>Treron phoenicoptera</i>	R

52	Rock Pigeon	<i>Columba livia</i>	R
53	Red Collared Dove	<i>Streptopeliatranquebarica</i>	R
54	Spotted Dove	<i>Streptopeliachinensis</i>	R
55	Laughing Dove	<i>Streptopeliasenegalensis</i>	R
56	Emerald Dove	<i>Chalcophapsindica</i>	R
Family: Psittacidae			
57	Rose-Ringed Parakeet	<i>Psittaculakrameri</i>	R
58	Plum-Headed Parakeet	<i>Psittaculacyanocephala</i>	R
Family: Cuculidae			
59	Pied Crested Cuckoo	<i>Clamatorjacobinus</i>	M
60	Common Hawk-Cuckoo	<i>Hierococcyxvarius</i>	R
61	Banded Bay Cuckoo	<i>Cacomantissonneratii</i>	R
62	Asian Koel	<i>Eudynamysscolopacea</i>	R
63	Greater Coucal	<i>Centropussinensis</i>	R
Family: Tytonidae			
64	Barn Owl	<i>Tyto alba</i>	R
Family: Strigidae			
65	Jungle Owlet	<i>Glaucidiumradiatum</i>	R
66	Spotted Owlet	<i>Athenebrama</i>	R
Family: Apodidae			
67	Asian Palm Swift	<i>Cypsiurusbalasiensis</i>	R
Family: Alcedinidae			
68	Lesser Pied Kingfisher	<i>Cerylerudis</i>	R
69	Small Blue Kingfisher	<i>Alcedoatthis</i>	R
70	White-Breasted Kingfisher	<i>Halcyon smyrnensis</i>	R
Family: Meropidae			
71	Blue-Tailed Bee-Eater	<i>Meropsphilippinus</i>	M
72	Small Green Bee-Eater	<i>Meropsorientalis</i>	R
Family: Coraciidae			
73	Indian Roller	<i>Coraciasbenghalensis</i>	R
Family: Upupidae			
74	Common Hoopoe	<i>Upupaepops</i>	R
Family: Bucerotidae			
75	Indian Grey Hornbill	<i>Ocyerosbirostris</i>	R

Family: Megalaimidae			
76	Brown-Headed Barbet	<i>Megalaimazeylanica</i>	R
77	Coppersmith Barbet	<i>Megalaimahaemacephala</i>	R
Family: Picidae			
78	Yellow Crowned Woodpecker	<i>Dendrocoposmahrattensis</i>	R
Family: Alaudidae			
79	Rufous-Tailed Lark	<i>Ammomanesphoenicurus</i>	R
80	Malabar Crested Lark	<i>Galeridamalabarica</i>	R
Family: Hirundinidae			
81	Dusky Crag Martin	<i>Hirundoconcolor</i>	R
82	Wire-Tailed Swallow	<i>Hirundosmithii</i>	R
83	Barn Swallow	<i>Hirundorustica</i>	M
84	Red rumped Swallow	<i>Hirundodaurica</i>	R
Family: Lanidae			
85	Long tailed Shrike	<i>Laniusschach</i>	R
Family: Corvidae			
86	Eurasian-Golden Oriole	<i>Oriolusoriolus</i>	R
87	Black-Naped Oriole	<i>Orioluschinensis</i>	O
88	Black-Headed Oriole	<i>Oriolusxanthornus</i>	R
89	Black Drongo	<i>Dicrurusmacrocerus</i>	R
90	Ashy Drongo	<i>Dicrurusleuncophaeus</i>	M
91	House Crow	<i>Corvussplendens</i>	R
92	Large-Billed Crow	<i>Corvusmacrorhynchos</i>	R
93	Scarlet Minivet	<i>Pericrocotusflammeus</i>	R
94	Small Minivet	<i>Pericrocotuscinnamomeus</i>	R
95	Common Iora	<i>Aegithinatiphia</i>	R
96	Golden-Fronted Leaf Bird	<i>Chloropsisaurifrons</i>	R
97	Blue-Winged Leaf Bird	<i>Chloropsiscochinchinensis</i>	R
98	White-Browed Fantail	<i>Rhipiduraaureola</i>	R
99	White-Throated Fantail	<i>Rhipiduraalbicollis</i>	R
Family: Sturnidae			
100	Chestnut-Tailed Starling	<i>Sturnusmalabaricus</i>	M

101	Rosy Starling	<i>Sturnusroseus</i>	M
102	Asian Pied Myna	<i>Sturnus contra</i>	R
103	Common Myna	<i>Acridotherestrictis</i>	R
104	Jungle Myna	<i>Acridotheresfuscus</i>	R
Family: Pycnonotidae			
105	Red-Whiskered Bulbul	<i>Pycnonotusjocosus</i>	R
106	Red-Vented Bulbul	<i>Pycnonotuscafer</i>	R
Family: Silvidae			
107	Jungle Babbler	<i>Turdoidesstriatus</i>	R
108	Plain Prinia	<i>Priniaainornata</i>	R
109	Grey Breasted Prinia	<i>Priniahodgsonii</i>	R
110	Ashy Prinia	<i>Priniasocialis</i>	R
111	Common Tailor Bird	<i>Orthotomussutorius</i>	R
Family: Muscicapidae			
112	Oriental Magpie-Robin	<i>Copsychussaularis</i>	R
113	White-Rumped Shama	<i>Copsychusmalabaricus</i>	R
114	Common Stone Chat	<i>Saxicolatorquata</i>	M
115	Pied Bush Chat	<i>Saxicolacaprata</i>	R
116	Indian Robin	<i>Saxicoloidesfulicata</i>	R
117	Orange-Headed Ground Thrush	<i>Zootheracitrinacitrina</i>	R
Family: Passeridae			
118	Paddyfield Pipit	<i>Anthusrufulus</i>	R
119	Forest Wagtail	<i>Dendronanthusindicus</i>	M
120	Yellow Wagtail	<i>Motacillaflava</i>	M
121	Grey Wagtail	<i>Motacillacinerea</i>	M
122	House Sparrow	<i>Passer domesticus</i>	R
123	Yellow Throated Sparrow	<i>Petroniaaxanthocollis</i>	R
124	Baya Weaver	<i>Ploceusphilippinus</i>	R
125	Red Munia	<i>Amandavaamandava</i>	R
126	White-Rumped Munia	<i>Lonchurastrata</i>	R
127	Black-Headed Munia	<i>Lonchura Malacca</i>	R
128	Scaly breasted Munia	<i>Lonchurapuntulata</i>	R

Family: Nectarinidae			
129	Purple-Rumped Sunbird	<i>Nectariniazeylonica</i>	R
130	Lotens Sunbird	<i>Nectarinialotenia</i>	R
131	Purple Sunbird	<i>Nectariniaasiatica</i>	R

(R-Resident, M-Migrant, T-Threatened, O-Occasional)

The present study reflects a moderately healthy diversity of avifauna at Nigade. In the recent times, the diversity of avifauna is impacted by various anthropogenic activities such as proposed expansion plan of administration for highways and rail routes near the study area. Such plans are likely to cause fragmentation of natural habitat decreasing its value for bird use. Due to such developmental activities, entire natural habitat of this area and its biodiversity is likely to become vulnerable to the upcoming changes. This, in turn may change the land use of the area impacting the avifaunal diversity in particular. The altered habitat may not be useful for the bird population of the area for nesting, breeding and feeding purposes and thus will affect the resident population of the birds. The change in the habitat may compel the migrant species to search for alternate habitat and thus then, may not attract the migrant species. The rare and vulnerable species may get lost in the course of time.

Therefore it is the need of an hour to monitor the areas scientifically in this rapidly changing environment. The study shall be focused on status, distribution and conservation of the species of avifauna of the region. This can be achieved through meaningful participation of local population in protection and conservation of bird species. There is a need to spread a word of awareness about the conservation of species to maintain the ecological balance. We propose to take this study forward to understand the level of participation of the local people for the cause and assess the probable impact of above mentioned developmental activities on the habitat.

It is recommended that town/city planners take such facts in to consideration while planning any developmental activities to conserve biodiversity of the region in general and of avifauna in particular. Bird species not only add aesthetic value to our life but also help in agriculture and in maintaining a healthy ecological balance. Exhaustive study of biodiversity of the region may ensure its conservation. The study of flora along with avifauna can help in drawing some conclusive inferences.

Conclusions

From present study following conclusions can be drawn,

1. The study area shows good avifaunal diversity which can help in establishing baseline data of birds of Nigade.
2. Considering the extent of anthropogenic activities in the region, there is a need for conservation of the study area.

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