

Feeding Guild of Avifauna of Navegaon National Park, Maharashtra, India

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Abstract

Present study deals with the feeding guilds of 142 species of birds recorded in Navegaon National Park, Maharashtra. The feeding guilds were codified and divided into 8 categories on the basis of food preferred by birds and were recorded as insectivores (58.45%), carnivores (26.06%), frugivores (19.01%), granivores (18.31%), omnivores (13.38%), piscivores (12.68%), nectarivores (9.15%) and herbivores (2.11%). Species which preferred more than one food type were placed in multiple feeding guilds. 114 residents were found in all seasons in the study area. This proves that the study area is quite rich in terms of food availability and thus helps to maintain a healthy avifaunal population. Navegaon National Park is therefore an important refuge for birds.

Keywords: Avifauna, Navegaon National Park, Feeding Guilds., biochemical study, soil samples, PSM.

1. Introduction

The term guild was defined by Root [1] as a group of species that exploit the same class of environmental resources in a similar way. The term guild groups together species without regard to taxonomic position that overlap significantly in their niche requirements. So it can be said that each species fulfills an ecological role according to its use of resources within a community [2]. The distribution of birds in a particular area depends on various factors which include quantity and quality of food available, perching, roosting and nesting sites. But, most important among these is the quantity and quality of food [3].

Food is usually considered to be the most important resource and the feeding guilds have been used extensively by ornithologists in interpreting the assemblages of species [4]. The study of avian feeding guilds is important for understanding the complexity of ecosystem structure and for providing updated information on each type of habitat in the ecosystem [5]. The feeding guilds in a bird community are described by the way species obtain food, the types of food taken, the foraging substrates exploited and the heights at which different species forage [6]. These data help to compare communities within and between habitats [7] and also to assess the health of the ecosystem and management needs for the conservation of species and ecosystem [8]. Birds were selected for this study because they are best suited for studies of the patterns of change in feeding guilds. They are tolerant of habitat change, and they show a wide range of feeding guilds [9].

A representative area of Navegaon National Park, Maharashtra was surveyed and the feeding habits of recorded species were studied. Although, the diverse avifaunal assemblage has attracted hordes of bird experts and enthusiasts here, the feeding guilds of avifauna of this particular area is yet to be documented. The objective of the present study was to collect

scientific information on fielding guilds of avifauna of Navegaon National Park.

2. Experimentation

Study Area

The Navegaon National Park is situated in Gondia District, which is at the North East edge of Maharashtra State, India. It lies between $20^{\circ} 45'$ to $21^{\circ} 2'$ N and $80^{\circ} 5'$ to $80^{\circ} 15'$ E. It is located in Nagpur Forest Circle. The distance between the National Park and the geographical centre of the country, i.e., the Zero Mile at Nagpur, Central India comes to 140 km. The forest lies towards East of Zero Mile. The total area of the Park is 133.88 km^2 .

A sample study area considered as the representative area of the National Park was selected for the purpose of intensive study. This area of the National Park is of 32.398 km^2 (the tourist zone of the Park), which lies to the South Western region of the Park (Fig.1.1).



Fig. 1.1 Location of Navegaon National Park in India and Maharashtra

The famous Navegaon lake, with an expanse of 11 km² that provides refuge to the waterfowl and waders, lies to the South -West of the study area. A village named Rampuri is situated adjoining this lake. Here agriculture is practiced. The village and the lake lie outside the South -West boundary of the National Park giving an edge effect to the South-Western side of the Park. Hence, the area provides a variety of habitat types, thereby, catering to different species with different food preferences.

Methods:

The study area was visited on a monthly basis for a period of 3 years from Jan 2010 to Jan 2013 by the author accompanied by bird enthusiasts. The representative area was surveyed for three consecutive days on every visit. Mostly, the study area was visited in the mornings when the avian activity is optimum. Some visits were also made in afternoon, so that the round would be completed in the evening (time range: 12.00 to 6:30pm). Therefore, all the three periods of the day were covered and it was possible to document the nocturnal species.

Binoculars (Olympus 8X40) were used for collecting the data on the feeding habits of the present avifauna. Digital camera of the brand SONY model-DSC-H7 was used for photographic evidences. "Point-count" method was used for the present study. Local bird experts were interviewed regarding the feeding habits and other details of the avifauna. The local knowledge is meaningful because their centuries old traditions and lifestyle is in direct contact with the matters of management of wild resources eg. hunting and grazing" [9]. The revised edition of Grimmett *et al.* [11] and Salim Ali [12, 13] was followed for the identification, nomenclature and information on species distribution.

When the food included insects, but not flesh, the birds were grouped as insectivores (In). The birds that fed on plant material as well as on flesh, excluding insects were classified as omnivores (Om). Birds whose diet included seeds and grains were categorized as granivores (Gr). Frugivores (Fr), that fed on fruits and berries. The birds that preferred flesh, excluding insects and fish were grouped under carnivores (Cv). Piscivore (Pi) was

documented against the birds that included fish in their diet. Birds that relished nectar were classified as nectarivores (Ne), while the birds that fed entirely on plant material were categorized as herbivores (Hr). Other birds that were spotted but not observed feeding were not included in the list.

3. Results and Discussion

The survey revealed the presence of 167 species. Out of these, feeding habits of 142 species could be observed (Table 1.1) of which 83 (58.45%) species were recorded as insectivores (In), followed by 37 (26.06%) carnivores, 27 (19.01%) frugivores, 26 (18.31%) granivores, 19 (13.38%) omnivores, 18 (12.68%) piscivores, 13 (9.15%) nectarivores and 3 (2.11%) herbivores. [Table 2, Fig. 1]. The availability of food appears to be one of the major factors determining the bird numbers and species diversity of specific area [14]. Variation in vegetation structure influences the distribution of bird feeding guilds [15].

In tropical forest areas, communities of understorey birds tend to be dominated by insectivorous birds [16] which are very dependent on forest environments and rarely move between forest patches in fragmented areas [17].

Most of the species preferred more than one food type and showed wide range of feeding guilds, and so they were placed in more than one guild. For example: Eurasian Golden Oriole was observed to feed on insects, fruits, berries as well as on nectar. And hence, it was categorized as an insectivore (In), frugivore (Fr) and nectarivore (Ne) and was placed in multiple feeding guilds. This was done to show all the specific preferences observed. This concept does not follow the original concept of guild by Root [1].

The response of different species of birds is expected to be different in accordance to the difference in feeding habits. Specific type of feeding, nesting and roosting habits give rise to immediate response of birds to any changes in environment. As the birds move away from

Table 1 : Feeding guild and food preferred by the avifauna of Navegaon National Park.

Sr. No.	Common name	Zoological name	Feeding Guild	Food preferred
1.	Indian Peafowl	<i>Pavo cristatus</i>	Om	Seeds, insects, fruits, small reptiles.
2.	Red Junglefowl	<i>Gallus gallus</i>	Gr/In/Fr	Seeds, insects, fruits.
3.	Red Spurfowl	<i>Galloperdix spadicea</i>	Gr/In/Fr	Seeds, berries, insects.
4.	Painted Spurfowl	<i>Galloperdix lunulata</i>	In/Fr	Insects, berries.
5.	Jungle Bush Quail	<i>Perdica asiatica</i>	In/Gr	Insects, seeds.
6.	Rain Quail	<i>Coturnix coromandelica</i>	Om	Seeds, insects, small invertebrates.
7.	Yellow-footed Green Pigeon	<i>Treron phoenicoptera</i>	Fr	Fruits, berries.
8.	Laughing dove	<i>Streptopelia senegalensis</i>	Gr/In	Seeds, insects.
9.	Spotted Dove	<i>Streptopelia chinensis</i>	Gr/Fr	Grains, seeds, fruits, seeds.
10.	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	Gr/In	Grains, seeds, insects.
11.	Emerald Dove	<i>Chalcophaps indica</i>	Gr/Fr	Seeds, fruits.
12.	Red Collared Dove	<i>Streptopelia tranquebarica</i>	Gr	Seeds, grains.
13.	Rock Pigeon	<i>Columba livia</i>	Gr/Fr	Seeds, fruits.
14.	Rose-ringed parakeet	<i>Psittacula krameri</i>	Fr/Gr	Fruits, berries, seeds, grains.
15.	Asian Koel	<i>Eudynamis scolopacea</i>	Fr/In	Fruits, insects.
16.	Greater Coucal	<i>Centropus sinensis</i>	Om	Fruits, seeds, insects, small mammals, lizards.
17.	Common Hawk Cuckoo	<i>Hierococcyx varius</i>	Om	Fruits, berries, insects, lizards.
18.	Sirkeer Malkoha	<i>Phaenicophaeus leschenaultia</i>	Om	Fruits, berries, insects, lizards.
19.	Pied cuckoo	<i>Clamator jacobinus</i>	In	Insects, caterpillars.
20.	Barn Owl	<i>Tyto alba</i>	Cv/In	Small mammals, lizards, insects.
21.	Collared Scops Owl	<i>Otus bakkamoena</i>	Cv/In	Insects, rodents.
22.	Brown Fish Owl	<i>Ketupa zeylonensis</i>	Cv/Pi	Fish, lizards.
23.	Mottled Wood Owl	<i>Strix ocellata</i>	Cv	Lizards.
24.	Spotted Owlet	<i>Athene brama</i>	Cv/In	Insects, rodents.
25.	Indian Nightjar	<i>Caprimulgus asiaticus</i>	In	Insects.
26.	House swift	<i>Apus affinis</i>	In	Insects.
27.	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Cv/In	Small reptiles, amphibians, insects.
28.	Common Kingfisher	<i>Alcedo atthis</i>	Pi	Fish.
29.	Pied Kingfisher	<i>Ceryle rudis</i>	Pi	Fish.
30.	Green bee-eater	<i>Merops orientalis</i>	In	Insects.
31.	Blue-tailed Bee-eater	<i>Merops philippinus</i>	In	Insects.
32.	Indian Roller	<i>Coracias benghalensis</i>	Cv/In	Insects, small reptiles.
33.	Common Hoopoe	<i>Upupa epops</i>	In/Fr	Insects, seeds, berries.
34.	Indian Grey Hornbill	<i>Ocyrceros birostris</i>	Fr/In/Gr	Fruits of figs, seeds, insects.
35.	Coppersmith Barbet	<i>Megalaima haemacephala</i>	Fr	Fruits, berries.
36.	Brown-headed Barbet	<i>Megalaima zeylanica</i>	Fr	Fruits, berries.
37.	Common Flameback	<i>Dinopium Javanese</i>	In	Insects.

38.	Black-rumped Flameback	<i>Dinopium benghalense</i>	In	Insects.
39.	Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i>	In	Insects.
40.	White-naped Woodpecker	<i>Chrysocolaptes festious</i>	In	Insects.
41.	Brown-capped Pygmy Woodpecker	<i>Dendrocopos nanus</i>	In	Insects.
42.	Indian Pitta	<i>Pitta brachyuran</i>	In	Insects.
43.	Ashy-crowned sparrow Lark	<i>Eremopterix grisea</i>	Gr/In.	Seeds, insects.
44.	Wire-tailed Swallow	<i>Hirundo smithii</i>	In	Insects
45.	Barn Swallow	<i>Hirundo rustica</i>	In	Insects
46.	Dusky Crag Martin	<i>Hirundo concolor</i>	In	Insects
47.	Long-tailed Shrike	<i>Lanius schach</i>	Cv/In	Insects, lizards.
48.	Bay-backed Shrike	<i>Lanius vittatus</i>	Cv/In	Insects, lizards.
49.	Eurasian Golden Oriole	<i>Oriolus oriolus</i>	In/Fr/Ne	Insects, fruits, berries, nectar.
50.	Black-hooded Oriole	<i>Oriolus xanthornus</i>	Fr/Ne	Fruits, berries, nectar.
51.	Black drongo	<i>Dicrurus macrocercus</i>	In/Ne	Insects, nectar
52.	Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	In/Ne/Fr	Insects, fruits, nectar.
53.	White-bellied Drongo	<i>Dicrurus caerulescens</i>	In	Insects.
54.	Ashy Drongo	<i>Dicrurus leucophaeus</i>	In	Insects.
55.	Common mynah	<i>Acridotheres tristis</i>	In/Gr/Fr	Insects, grains, fruits.
56.	Brahminy Starling	<i>Sturnus pagodarum</i>	In/Gr/Fr	Insects, grains, fruits.
57.	Asian Pied starling	<i>Sturnus contra</i>	In/Fr	Insects, fruits.
158.	Chestnut-tailed Starling	<i>Sturnus malabaricus</i>	In/Fr/Ne	Insects, fruits, nectar.
59.	Rosy Starling	<i>Sturnus roseus</i>	In/Gr/Fr/Ne	Insects, grains, fruits, nectar.
60.	House Crow	<i>Corvus splendens</i>	Om	Insects, grains, fruits, eggs, small reptiles, household refuse.
61.	Large-billed Crow	<i>Corvus macrorhynchos</i>	Om	Insects, grains, fruits, eggs, small reptiles, village refuse.
62.	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Om	Insects, fruits, eggs, nectar, small reptiles
63.	Small Minivet	<i>Pericrocotus cinnamomeus</i>	In	Insects.
64.	Common Iora	<i>Aegithina tiphia</i>	In	Insects.
65.	Red-vented bulbul	<i>Pycnonotus cafer</i>	Fr/In/Ne	Fruits, berries, nectar, insects.
66.	Jungle Babbler	<i>Turdoides striatus</i>	In/Gr/Fr/Ne	Insects, grains, berries, nectar.
67.	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	In/Fr/Ne	Insects, berries, nectar.
68.	Tickell's Blue Flycatcher	<i>Cyornis tickelliae</i>	In	Insects.
69.	Asian Paradise Flycatcher	<i>Terpsiphone paradise</i>	In	Insects.
70.	White-browed Fantail	<i>Rhipidura aureola</i>	In	Insects.
71.	Black-naped Monarch	<i>Hypothymis azurea</i>	In	Insects.
72.	Ashy prinia	<i>Prinia socialis</i>	In	Insects.
73.	Common Tailorbird	<i>Orthotomus sutorius</i>	In	Insects.
74.	Indian Robin	<i>Saxicoloides fulicata</i>	In	Insects.

75.	Oriental Magpie Robin	<i>Copsychus saularis</i>	In	Insects.
76.	Pied Bushchat	<i>Saxicola caprata</i>	In	Insects.
77.	White-rumped Shama	<i>Copsychus malabaricus</i>	In	Insects.
78.	Orange headed Thrush	<i>Zoothera citrine</i>	In/Fr	Insects, fruits.
79.	Yellow Wagtail	<i>Motacilla flava</i>	In	Insects.
80.	Grey Wagtail	<i>Motacilla cinerea</i>	In	Insects.
81.	White-browed Wagtail	<i>Motacilla madaraspatensis</i>	In	Insects.
82.	White Wagtail	<i>Motacilla alba</i>	In	Insects.
83.	Citrine Wagtail	<i>Motacilla citreola</i>	In	Insects.
84.	Paddyfield Pipit	<i>Anthus rufulus</i>	In	Insects.
85.	Purple Sunbird	<i>Nectarinia asiatica</i>	Ne	Nectar.
86.	Purple-rumped Sunbird	<i>Nectarinia zeylonica</i>	Ne	Nectar.
87.	Oriental White-eye	<i>Zosterops palpebrosus</i>	Fr/Ne/In	Fruits, nectar, insects.
88.	House Sparrow	<i>Passer domesticus</i>	Gr	Seeds.
89.	Chestnut-shouldered Petronia	<i>Petronia xanthocollis</i>	Gr/Ne/In/Fr	Grains, nectar, berries, insects.
90.	Indian Silver bill	<i>Lonchura malabarica</i>	Gr	Grains, seeds.
91.	White-rumped Munia	<i>Lonchura striata</i>	Gr	Seeds.
92.	Red Munia	<i>Amandava amandava</i>	Gr	Seeds.
93.	Black-headed Munia	<i>Lonchura Malacca</i>	Gr	Grains, seeds.
94.	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Gr	Seeds.
95.	Baya Weaver	<i>Ploceus philippinus</i>	Gr	Seeds.
96.	Black-breasted Weaver	<i>Ploceus benghalensis</i>	Gr	Seeds.
97.	Shikra	<i>Accipiter badius</i>	Cv	Small reptiles, birds.
98.	Black-shouldered Kite	<i>Elanus caeruleus</i>	Cv	Rodents, small reptiles, birds.
99.	Black-kite	<i>Milvus migrans govinda</i>	Cv	Rodents, small birds.
100.	White-eyed Buzzard	<i>Butastur teesa</i>	Cv/In	Insects, rodents.
101.	Oriental Honey-Buzzard	<i>Pernis ptilorhyncus</i>	In	Bees.
102.	Crested Serpent Eagle	<i>Spilornis cheela</i>	Cv	Reptiles.
103.	Changeable Hawk Eagle	<i>Spizaetus cirrhatus</i>	Cv	Small reptiles, birds.
104.	Eurasian Marsh Harrier	<i>Circus aeruginosus</i>	Cv	Small birds.
105.	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	Om	Aquatic plants, small invertebrates.
106.	Ruddy Shelduck	<i>Tadorna ferruginea</i>	Om	Aquatic plants, small invertebrates.
107.	Northern Pintail	<i>Anas acuta</i>	Om	Aquatic plants, small invertebrates.
108.	Garganey	<i>Anas querquedula</i>	Om	Aquatic plants, small invertebrates.
109.	Northern Shoveler	<i>Anas clypeata</i>	Om	Aquatic plants, small invertebrates.
110.	Common Teal	<i>Anas crecca</i>	Om	Aquatic plants, small invertebrates.
111.	Red-crested Pochard	<i>Rhodonessa rufina</i>	Hr	Aquatic plants
112.	Common Pochard	<i>Aythya ferina</i>	Om	Aquatic plants, small invertebrates.

113.	Gadwall	<i>Anas strepera</i>	Hr	Aquatic plants.
114.	Spot-billed Duck	<i>Anas poecilorhyncha</i>	Hr	Aquatic plants
115.	Cotton Pygmy-goose	<i>Nettapus coromandelianus</i>	Om	Aquatic plants, small invertebrates.
116.	Painted Stork	<i>Mycteria leucocephala</i>	Cv/Pi	Fish, amphibians.
117.	Asian Openbill	<i>Anastomus oscitans</i>	Cv	Molluscs
118.	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Cv/Pi	Fish, snails.
119.	Black Ibis	<i>Pseudibis papillosa</i>	Gr/In	Grains, insects.
120.	Grey Heron	<i>Ardea cinerea</i>	Cv/Pi	Fish, amphibians.
121.	Purple Heron	<i>Ardea purpurea</i>	Cv/Pi/In	Fish, amphibians, insects.
122.	Indian Pond Heron	<i>Ardeola grayii</i>	Cv/Pi/In	Fish, insects, crustaceans.
123.	Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Cv/Pi/in	Fish, insects, frogs.
124.	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Pi/In/Cv	Fish, insects, frogs.
125.	Little egret	<i>Egretta garzetta</i>	Pi/In/Cv	Fish, amphibians, insects.
126.	Great Egret	<i>Casmerodius albus</i>	Cv	Frog.
127.	Intermediate Egret	<i>Mesophoyx intermedia</i>	Pi/In/Cv	Fish, amphibians, insects.
128.	Cattle Egret	<i>Bubulcus ibis</i>	Cv/In	Insects, spiders, earthworms.
129.	Little Grebe	<i>Tachybaptus ruficollis</i>	Cv/Pi	Fish, small invertebrates.
130.	Darter	<i>Anhinga melanogaster</i>	Pi	Fish.
131.	Little Cormorant	<i>Phalacrocorax niger</i>	Pi	Fish.
132.	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Cv/In/Pi	Insects, small fish and invertebrates.
133.	Purple Swamphen	<i>Porphyrio porphyria</i>	Om/Pi	Aquatic plants, small fish and invertebrates.
134.	Common Moorhen	<i>Gallinula chloropus</i>	Om	Aquatic plants, small invertebrates.
135.	Common Coot	<i>Fulica atra</i>	Om	Aquatic plants, small invertebrates.
136.	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Cv/In	Insects, small invertebrates.
137.	Bronze-winged Jacana	<i>Metopidius indicus</i>	Cv/In	Insects, small invertebrates.
138.	Red-wattled Lapwing	<i>Vanellus indicus</i>	Cv/In	Insects, small invertebrates, mollusks.
139.	Common Sandpiper	<i>Actitis hypoleucos</i>	Cv/In	Insects, small invertebrates.
140.	Little Ringed Plover	<i>Charadrius dubius</i>	Cv/In	Insects, small invertebrates.
141.	Black-winged Stilt	<i>Himantopus himantopus</i>	Cv/In	Insects, mollusks and other small invertebrates.
142.	River Tern	<i>Sterna aurantia</i>	Cv/Pi/In	Fish, insects, other invertebrates.

(In = Insectivore, Om = Omnivore, Cv = Carnivore, Hr = Herbivore, Pi= Piscivore, Fr= Frugivore, Gr= Granivore, Ne= Nectarivore)

Table 2: Count and Percentage of avifaunal species observed in Feeding guilds.

Feeding Guild	No. of species	%
Insectivore	83	58.45 %
Carnivore	37	26.06 %
Frugivore	27	19.01 %
Granivore	26	18.31 %
Omnivore	19	13.38 %
Piscivore	18	12.68 %
Nectarivore	13	9.15 %
Herbivore	3	2.11 %

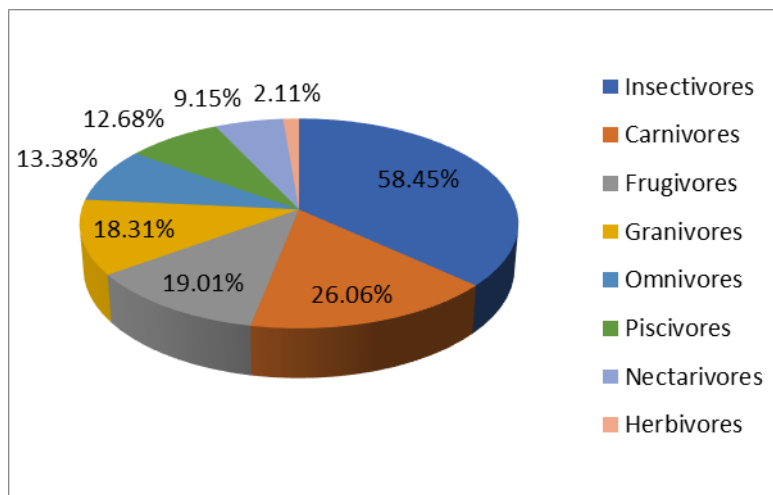


Figure 1. Feeding guild of the avian community in Navegaon National Park (Some species represent more than one feeding guild)

any adverse condition, their presence in a particular area can be associated with their dietary guilds, their habitat type as well as human disturbances [18].

During the study period insectivores were recorded as the most dominant group in Navegaon National Park. In the Indian context, a large number of birds are mainly insectivorous and they help to diminish large numbers of the pest species in ecosystems [19]. Zakaria and Francis [20] also reported most of the bird fauna as insectivore in tropical forest of Indo-Australia.

Considering different guilds, Martin and Karr [21] noted that insectivorous birds had greater spatial stability and are more site-attached than any other ones. Birds like various species of flycatchers, fowl, dove, owl, bee-eater, flameback, shrike, martin and woodpecker were recorded as insectivores. Insectivorous birds can be attracted to places where the offer of prey is greater [22].

Birds of Prey like Black Kite, Crested Serpant Eagle, Changeable Hawk Eagle, Eurasian Hawk Eagle and

species like Asian Openbill, Great Egret, Mottled Wood Owl, were found to be carnivores. Pigeon, Parakeet, Koel, Hoopoe, Hornbill and Barbet were recorded as Frugivorous. Presence of frugivorous birds in any habitat indicates the sufficient availability of fruits in that habitat. [23].

Granivorous birds were observed as Red jungle fowl, Spurfowl, Quail, Dove, Pigeon, Hornbill, Munia and Weaver bird. Birds like Peafowl, Coucal, Cuckoo, House crow, Treepie and Aquatic birds like Ducks, Pintail, Gargeny, Shoveller, Common Teal, Common Pochard, Swamphen, Moorhen and Coot represented Omnivore guild whose diet included a broad range of food items such as fruits, seeds, insects, small mammals and lizards. Arshad et al. [21] also observed the omnivorous birds preferring the pericarp of the oil palm fruit, insects such as Dermaptera, Hymenoptera, Isoptera, Orthoptera and Coleoptera, and leeches and snails in oil palm plantation.

The aquatic species like Red Crested Pochard, Gadwall and Spot Billed Duck were found to feed on plant material and were grouped as herbivores whereas some species like Darter and Cormorant fed exclusively on fish. Sunbirds fed on nectar while pigeons and some doves gorged on fruits, seeds and grains. [24, 25]. One of the major factor determining the bird numbers and species diversity of specific area is the availability of food [13] sizes of individual species may have been mediated by the availability of suitable field conditions and

abundance can be attributed to the diverse habitat types and easy availability of protein-rich invertebrates and other food [25].

4. Conclusion

Out of 142 species, 114 residents were found in all seasons in the study area and 28 migrants selected different 8 feeding guilds through out the study period. This proves that the study area is quite rich in terms of

food availability. Navegaon National Park is therefore an important refuge for birds.

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