

Avifauna Diversity in and Around Kaiga in Uttara Kannada District of Karnataka State

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Abstract

The natural forests of Uttara Kannada district range from evergreen through dry deciduous types. The characteristic species of such forests are *Tectona grandis*, *Xylia xylocarpa*, *Terminalia paniculata* and *Meliosma tomentosa*.

The diversity of avifauna was critically studied within an area of 30 km radius of Kaiga in Uttara Kannada during summer season. A total of 55 varieties of birds were encountered in 14 locations during the survey, of which 7.27% were inhabitants of aquatic ecosystems. While most of the types of birds were arboreal in habit, cattle egret was recorded as most dominant species (28.75 %), followed by house crow (12.55 %), little egret (9.42 %) and jungle crow (8.71 %). In terms of species richness, Kaiga was very rich with 19 species of birds followed by Chendiya and Yellapur with 17 species each. Majority of the birds were omnivorous in habit preferring insects, worms and arachnids as their principal food (36.52 %) items followed by frugivorous and granivorous birds comprising 12.1 and 11.8 % respectively.

Shannon-Weiner diversity index and evenness index values for the encountered birds were estimated to be 3.90 and 0.67 respectively, indicating better environment and rich diversity of the avifauna.

Introduction

Avifauna is an important component of the terrestrial and aquatic ecosystems and useful to the human beings in various ways. Their study is the vital step to understand the process of natural habitats.

The states of Karnataka consist of four geographically distinct regions, viz. coastal, malnad, northern maidan and southern maidan; with peculiar climates of their own. Coastal region of the state consists the districts of Uttara Kannada (North Kanara) and Dakshin Kannada (South Kanara). The natural vegetation of Uttara Kannada district ranges from evergreen through dry deciduous type (Prasad *et al.* 1985), while about 85 % of the forest area has been stock-mapped under deciduous type. The characteristic species of this type is *Tectona grandis*, and often it is mixed with *Xylia xylocarpa*, *Terminalia paniculata* and *Meliosma tomentosa*.

The existing habitats in and around Kaiga of the Uttara Kannada district appear to be favourable for the growth and propagation of avifauna. In addition to two units (1&2), which are under construction, the nuclear power corporation of India has proposed to set up four additional units (3, 4, 5, and 6) of 235 MW each based on pressurized heavy water reactor system at Kaiga. The area within 10 km is predominantly a forestland

with dense growth of trees and vegetation. While about 85% of the area within 10 km comprised of forestland, around 9, 4 & 2 % of the area come under the water spread area of Kadra reservoir, agricultural field and barren land respectively. There is a wildlife sanctuary near Dandeli at a radial distance of 47 Km away from the site. In order to evaluate the impact of the proposed nuclear power plant on the surrounding environment, baseline studies towards monitoring of birds and their diversity at different locations surrounding the nuclear power station near Karwar, were undertaken and presented in this communication.

Uttara Kannada, with 60% of its land area covered by forests, harbouring 1741 species of flowering plants, is not only the most forested district of the Western Ghats but also harbours the most diverse avifauna. A total of 403 taxa of birds were reported over the century from this district, of which, 300 were terrestrial birds extensively using the forests (Daniels *et al.* 1991 and Gadgil 1992). It is believed that the bird fauna has changed little over the past century in spite of many changes in land use (Daniels *et al.* 1990).

Materials and Methods

Field data were collected during summer in different locations, viz. Kaiga, Kadra, Bhaire, Kodsalli, Ramanguli, Anshi, Kodalgadde, Gopshitta, Chendiya, Amadalli, Asgur, Mastikatte, Ankola and Yellapur (Fig.1) within 30 km radius from Kaiga in Uttara Kannada district. Roadside count of birds was made as per the standard procedures after traversing a given distance within which designated sampling areas occurred (Richter and Sondgerath 1990 and Clarke 1986). The millimeter of the vehicle was used to measure the stretch of study area. Birds were studied by direct observation with the help of 8 x 30 'Super Zenith' binocular and were identified by adopting available literature (Ali 1988 and Ali and Ripley 1983). The species list was prepared by walking through the area, listing taxonomic position of each species encountered, relative abundance and absolute number in each specific area. The data were subjected to detailed analysis. The dominance index, census index, Shannon-Wiener diversity index and evenness index were derived from the available data (Kotangale and Ghosh 1997).

Feeding habit of the birds was assessed on the basis of food items preferences, as recorded by Ali and Ripley 1987. Altogether 12 groups of food items, preferred by the avifauna, were demarcated from the literature. Depending on the feeding habit, each species of bird was placed in respective group. While a species opting 2 or more groups of food items, due weightage was given to each type of food and percentage of birds preferring different food items have been derived (Kotangale and Ghosh 1997).

Results and Discussion

A total of 55 birds, mostly the arboreal, were encountered during the present study, of which, 7.27 % were aquatic birds (Table 1). Cattle egret was found to be most dominant species (28.75%) followed by house crow (12.55%), little egret (9.24%), and jungle

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crow (8.71%). It has been observed that water birds were less in number probably due to scarcity of water in the study area. Shannon-Wiener diversity index and evenness index value for the encountered birds were 3.90 and 0.67 respectively, indicating better environment of the study area.

While vultures were not encountered during the present study, other scavengers recorded in the areas were house crow, jungle crow, pariah kite and common myna. The dominant and subdominant birds in the different localities are presented in Table 2. Common peafowl, an endangered bird was recorded as most dominant species in Anshi village. While dominance of jungle crow over other birds was exhibited in maximum (28%) study areas, the species did not emerge as subdominant in remaining areas. Census index for the total population in the study area ranged from 19/ km² at Kodalgadde to 64/ km² at Kadra and Bhaire (Table 2).

The birds encountered in the study area were further grouped on the basis of their habits preferring different type of foods. It revealed that the majority of the birds in the study area were insectivorous in habit preferring insects, worms and arachnids as their foods (36.5%) followed by frugivorous birds attracted on fruits, berries and buds (12.1%) and granivorous (11.8%) (Fig. 2). The importance of insects as the food in bird's life is very essential for their existence. Though some birds are strictly herbivorous in habit, animal food is of vital importance for their breeding and egg laying. Many species of tropical birds are said to be partly or wholly frugivorous, but on closer examination a few proved to be totally dependent on the plant food, while others are only facultative frugivores, foraging insects as an essential supplement to the protein which they cannot obtain from fruits (Snow and Snow 1971 and Foster 1978). This is especially true during the breeding season when protein becomes crucial to the successful raising of the young ones (Levey 1988). Female's reproductive success depends mostly on her access to proteinaceous food while male's on the access to female (White 1988). Very young birds of some species are compelled to eat the equivalent of more than half their own weight in food per day in order to satisfy their metabolic requirements and keep warm. Thus, most vegetarian species give their young at least a partially insectivorous diet during the early stages of growth (Parker and Haswell 1963). In view of such metabolic requirements, insectivorous birds were found in large number in the study area.

The birds, like other animals, also get affected by environmental pollution and therefore serve as bio-indicators. Earlier reports had shown that the roosting sites of birds and their population were adversely affected by human population pressure due to rapid urbanization and industrialization (Bhattacharjee and Hazarika 1985) as well as human disturbance and increased illumination (Sandhu and Dang 1980). Construction of nuclear power plants in association with the development of township in Kaiga may lead to have similar impacts on avifauna.

Table 1. Census of avifauna in the study area, Karwar, Karnataka

SI No.	Common Name	Scientific Name	Dominance Index	Census (no./Km ²)	Index
1.	Pond heron	<i>Ardeola grayii</i>	03.67	02.625	
2.	Cattle egret	<i>Bubulcus ibis</i>	28.75	20.625	
3.	Little egret	<i>Egretta garzetta</i>	09.42	06.750	
4.	Blackwinged kite	<i>Elanus caeruleus</i>	00.17	00.125	
5.	Pariah kite	<i>Milvus migrans govinda</i>	00.17	00.125	
6.	Sparrow-hawk	<i>Accipiter nisus</i>	00.35	00.250	
7.	Crested hawk eagle	<i>Spizaetus cirrhatius</i>	00.17	00.125	
8.	Greyheaded fishing eagle	<i>Ichthyophaga ichthyaetus</i>	00.17	00.125	
9.	Crested serpent eagle	<i>Spilornis cheela</i>	00.17	00.125	
10.	Painted spurfowl	<i>Galloperdix lunulata</i>	00.17	00.125	
11.	Common peafowl	<i>Pavo cristatus</i>	00.52	00.375	
12.	Whitebreasted waterhen	<i>Amaurornis phoenicurus</i>	00.17	00.125	
13.	Bronzewinged jacana	<i>Metopidius indicus</i>	00.35	00.250	
14.	Blue rock pigeon	<i>Columba livia</i>	02.80	02.000	
15.	Spotted dove	<i>Streptopelia chinensis</i>	01.22	00.875	
16.	Little brown dove	<i>Streptopelia senegalensis</i>	00.17	00.125	
17.	Roseringed parakeet	<i>Psittacula krameri</i>	00.17	00.125	
18.	Coucal	<i>Centropus sinensis</i>	00.17	00.125	
19.	Pied kingfisher	<i>Ceryle rudis</i>	00.17	00.125	
20.	Whitebreasted kingfisher	<i>Halcyon smyrnensis</i>	02.45	01.750	
21.	Small green bee-eater	<i>Merops orientalis</i>	04.90	03.500	
22.	Indian roller	<i>Coracias benghalensis</i>	00.17	00.125	
23.	Hoopoe	<i>Upupa epops</i>	00.17	00.125	
24.	Malabar pied hornbill	<i>Anthraceroceros coronatus</i>	02.97	02.125	
25.	Pigmy woodpecker	<i>Picoides nanus</i>	00.35	00.250	
26.	Indian pitta	<i>Pitta brachyura</i>	00.17	00.125	
27.	Grey shrike	<i>Lanius excubitor</i>	00.17	00.125	
28.	Baybacked shrike	<i>Lanius vittatus</i>	00.17	00.125	
29.	Rufousbacked shrike	<i>Lanius schach</i>	00.17	00.125	
30.	Golden oriole	<i>Oriolus oriolus</i>	00.17	00.125	
31.	Blackheaded oriole	<i>Oriolus xanthornus</i>	00.17	00.125	
32.	Black drongo	<i>Dicrurus adsimilis</i>	02.62	01.875	
33.	Whitebellied drongo	<i>Dicrurus caerulescens</i>	00.17	00.125	
34.	Racket-tailed drongo	<i>Dicrurus paradiseus</i>	00.52	00.375	
35.	Greyheaded myna	<i>Sturnus malabaricus</i>	00.70	00.500	
36.	Pied myna	<i>Sturnus contra</i>	00.17	00.125	
37.	Common myna	<i>Acridotheres tristis</i>	05.05	03.625	
38.	Jungle myna	<i>Acridotheres fuscus</i>	00.17	00.125	
39.	House crow	<i>Corvus splendens</i>	12.55	09.000	
40.	Jungle crow	<i>Corvus macrorhynchus</i>	08.71	06.250	
41.	Pied flycatcher shrike	<i>Hemipus picatus</i>	01.05	00.750	
42.	Common wood shrike	<i>Tephrodornis pondicerianus</i>	00.17	00.125	
43.	Scarlet minivet	<i>Pericrocotus flammeus</i>	00.35	00.250	
44.	Redwhiskered bulbul	<i>Pycnonotus jocosus</i>	00.17	00.125	
45.	Whitecheeked bulbul	<i>Pycnonotus leucogenys</i>	00.17	00.125	
46.	Redvented bulbul	<i>Pycnonotus cafer</i>	01.05	00.750	
47.	Jungle babbler	<i>Turdoides striatus</i>	00.17	00.125	
48.	Orphean warbler	<i>Sylvia hortensis</i>	01.93	01.375	
49.	Maggie robin	<i>Copsychus saularis</i>	01.57	01.125	
50.	Indian robin	<i>Saxicoloides fulicata</i>	00.17	00.125	
51.	Thickbilled flowerpecker	<i>Dicaeum agile</i>	00.35	00.250	
52.	Tickell's flowerpecker	<i>Dicaeum erythrorhynchos</i>	00.52	00.375	
53.	Purple sunbird	<i>Nectarinia asiatica</i>	00.17	00.125	
54.	House sparrow	<i>Passer domesticus</i>	00.35	00.250	
55.	Whitebacked munia	<i>Lonchura striata</i>	00.17	00.125	

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In general, wide varieties of avifauna were recorded in the study area around Kaiga. In order to improve the avifaunal diversity, which is likely to be affected due to anthropogenic activities in the region, emphasis should be given towards the habitat improvement. Recently, constructing a dam on Kali River close to the power plant has made a large reservoir. This will attract the birds preferring wetland habitats. In view of ecological changes, a database on avifauna needs to be generated during post commissioning phase of the nuclear power plant. The forests in this area have a potential for developing apiculture, which further needs to be systematically developed, alongwith the development of minor forests as suggested by Gadgil *et al.* 1987. The water bodies in the study area should also be stocked with fast growing commercial fishes to utilize the fish culture potential of the surrounding waters.

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Table 2. Dominance and Census of avifauna at different sites within the study area

Sr. No.	Site	Dominant		Subdominant		Census index for total population (no/ Km ²)
		Species	Index	Species	Index	
1	Kaiga	Orphean warbler	26.00	Magpie robin	09.18	52.00
2	Kadra	Jungle crow	45.55	House crow	15.91	64.00
3	Bhaire	House crow	31.97	Cattle egret	21.31	64.00
4	Kodsalli	House sparrow	29.43	House crow	17.72	57.00
5	Ramanguli	Malabar pied hornbill	35.87	Little brown dove	14.27	58.00
6	Anshi	Common peafowl	25.07	Malabar pied hornbill & Scarlet minivet	16.62 (each)	35.00
7	Kodalgadde	Jungle crow	22.74	Black drongo & Jungle babbler	13.72 (each)	19.00
8	Gopshitta	Cattle egret	41.50	Little egret & Pond heron	10.45 (each)	33.50
9	Chendiya	Cattle egret	41.49	House crow	22.13	61.40
10	Amadalli	Jungle babbler	18.10	Little egret, Pond heron & White breasted kingfisher	13.65 (each)	35.00
11	Asgur	Small green bee-eater	23.84	House sparrow	14.24	36.00
12	Mastikatte	Jungle crow & Roseringed parakeet	11.96 (each)	Little brown dove & Redvented bulbul	08.36 (each)	29.00
13	Ankola	Cattle egret	52.77	House sparrow & Little egret	10.50 (each)	56.80
14	Yellapur	Jungle crow	28.31	Blue rock pigeon	15.06	56.50

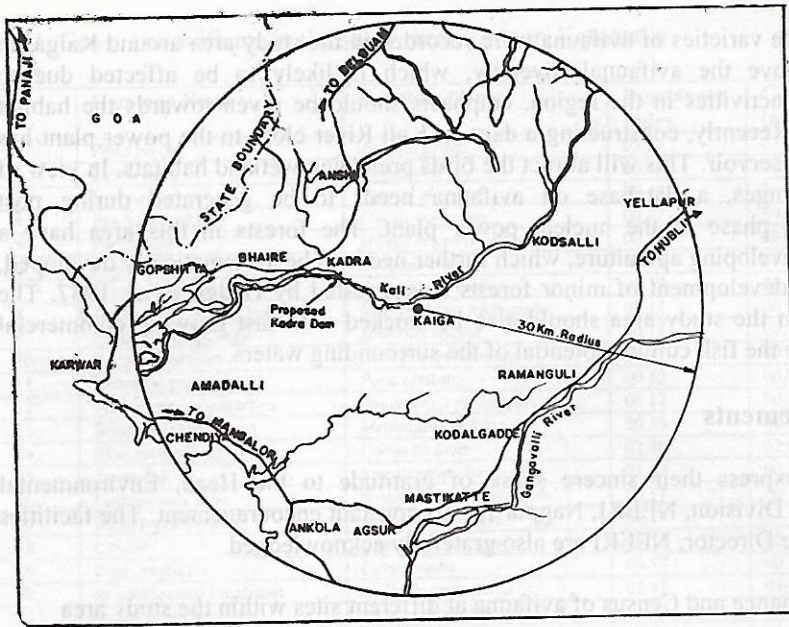


Fig. 1: Map showing different locations near Karwar for survey of Avifauna

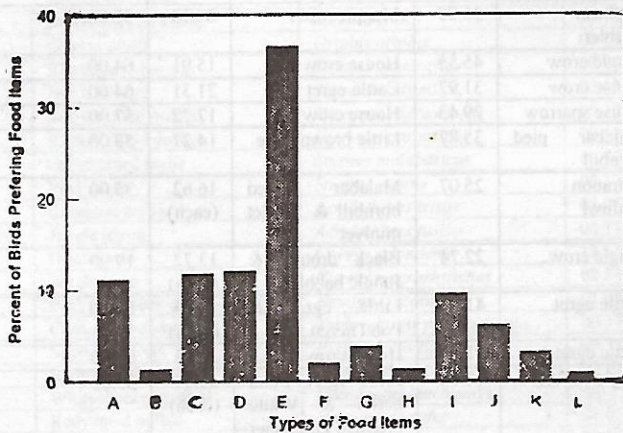


Fig. 2: Performance of food items by avifauna recorded at Kaiga (Legends A- Flower nectar, B- Vegetable shoot & Roots, C- Grains & Seeds, D- Fruits, Berries, & Buds, E- Insects, Worms & Arachnids, F- Fish, G- Frog & Tadpole, H- Molluscs, Crabs & Crustaceans, I- Small reptiles & Small mammals, J- Birds, their eggs & young ones, K- Garbage & Kitchen scrap, L- Offal & carrion)

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