

## Studies on avian diversity of Shri Krishna University campus, Chhatarpur, Madhya Pradesh, India

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### ABSTRACT

An ecosystem's health is greatly influenced by the diversity of its Avifauna, particularly in anthropogenically altered landscapes. The current study was conducted at Shri Krishna University, Chhatarpur, Madhya Pradesh, which constitutes a micro habitat next to National Highway-86. The purpose of this study was to determine the Avian diversity of the Shri Krishna University Campus in Chhatarpur, from February 2022 to July 2022. During the study period, a total of 77 bird species from 35 families were identified. The research revealed seven distinct feeding patterns among the listed species. In order to determine species which predominate in a given area, the Relative Diversity Index of the multiple species was determined. The current result revealed that Muscicapidae family was most diverse family in this campus. The SKU campus bird checklist was created for the first time ever as part of this project, which also documented a representative sample of the University's Avian variety.

Figures : 04

References : 20

Tables : 02

KEY WORDS : Avian diversity, Bird diversity, Feeding habit, Relative Diversity Index (RDi), Residential status.

### Introduction

The animal taxa with the greatest geographic diversity, birds may be found on all seven continents. They exhibit a wide range of distribution patterns and frequently choose to reside in diverse settings. Birds typically settle in areas with the resources they need to survive while carrying out a variety of functional tasks and contributing significantly to the health of different ecosystems<sup>13,18,19</sup>. The species makeup of bird communities varies across wide geographic areas and is influenced by the resources that are available. Predictions regarding the ecological health and potential variations in ecosystem functions are made possible by characteristic bird assemblages in landscapes<sup>13, 19</sup>.

Humans have always been fascinated by Birds because of how they appear and are found in various ecosystems. These include pollination, pest control, seed distribution, scavenging, nutrient deposition, etc. They carry out essential ecological services<sup>4, 20</sup>. The best environmental change monitors are birds. The most popular method for examining the long-term effects of habitat fragmentation has been to look at changes in their population, behavioural habits, and reproductive capacity<sup>7</sup>. Birds exhibit a wide range of distribution patterns, and "frequently opt to live in varied surroundings," according

to one study<sup>11, 12</sup>. The species composition in bird assemblages is influenced by resource availability, topographical differences, environmental conditions, anthropogenic activities, including urbanisation of natural habitats, over vast geographic areas<sup>8, 12</sup>.

Most often, diversity is utilised as a sign of an ecological system that is stable and sustainable. Due to habitat degradation and human disturbances, the variety of the avifauna has been declining recently. The destruction of natural habitats at random, including nesting trees and foraging habitats, for the purpose of commercial exploitation of forests and lands, is the main cause of the decline in bird foraging environment and nesting sites<sup>5</sup>. As a result, periodic monitoring of the bird biodiversity in this area is necessary. Several states in the Indian Himalayan region are well known for their extensive vegetation. Studies on the avian community are useful for developing conservation measures in regions with significant human pressure and for monitoring urban ecosystems.

The creation of a species list is essential to understand the bird species present in a given location because it demonstrates species diversity. Numerous research on bird variety in nature reserves and other wildlife ecosystems have been published; however, there are lack

TABLE-1 : List of birds recorded in Shri Krishna University campus

S.No.	Family	Scientific Name	Common English Name	IUCN status	Residential status	Relative abundance	Feeding habits
1.	Accipitridae	<i>Milvus migrans</i>	Black Kite	LC	R	C	Carnivorous
2.		<i>Spilornis cheela</i>	Crested serpent Eagle	LC	R	C	Carnivorous
3.		<i>Aquila rapax</i>	Tawny Eagle	VU	R	UC	Carnivorous
4.		<i>Neophron percnopterus</i>	Egyptian Vulture	E	R	UC	Carnivorous
5.		<i>Accipiter badius</i>	Shikra	LC	R	C	Carnivorous
6.		<i>Butastur teesa</i>	White-eyed Buzzard	LC	R	C	Carnivorous
7.	Alaudidae	<i>Mirafra erythroptera</i>	Indian Bushlark	LC	R	UC	Omnivorous
8.		<i>Eremopterix griseus</i>	Ashy-crowned Sparrow Lark	LC	R	C	Insectivorous
9.	Alcedinidae	<i>Alcedo atthis</i>	Common Kingfisher	LC	R	UC	Carnivorous
10.		<i>Ceryle rudis</i>	Pied Kingfisher	LC	R	UC	Carnivorous
11.		<i>Halcyon smyrnensis</i>	White-throated Kingfisher	LC	R	C	Carnivorous
12.	Apodidae	<i>Apus affinis</i>	Little Swift	LC	R	Ra	Insectivorous
13.	Ardeidae	<i>Ardea cinerea</i>	Grey Heron	LC	R	UC	Carnivorous
14.		<i>Egretta garzetta</i>	Little Egret	LC	R	VC	Carnivorous
15.		<i>Bubulcus ibis</i>	Cattle Egret	LC	R	VC	Carnivorous

S.No.	Family	Scientific Name	Common English Name	IUCN status	Residential status	Relative abundance	Feeding habits
16.		<i>Mesophoyx intermedia</i>	Intermediate Egret	NE	R	UC	Carnivorous
17.		<i>Ardeola grayii</i>	Indian Pond Heron	LC	R	VC	Carnivorous
18.		<i>Ardea purpurea</i>	Purple Heron	LC	R	UC	Carnivorous
19.	Bucerotidae	<i>Ocyrceros birostris</i>	Indian Grey Hornbill	LC	R	Ra	Omnivorous
20.	Vangidae	<i>Tephrodornis pondicerianus</i>	Common Woodshrike	LC	R	UC	Insectivorous
21.	Campephagidae	<i>Pericrocotus cinnamomeus</i>	Small Minivet	LC	R	C	Insectivorous
22.	Capitonidae	<i>Megalaima haemacephala</i>	Coppersmith Barbet	LC	R	UC	Omnivorous
23.	Caprimulgidae	<i>Caprimulgus asiaticus</i>	Indian Nightjar	LC	R	Ra	Insectivorous
24.	Charadriidae	<i>Vanellus indicus</i>	Red-wattled Lapwing	LC	R	VC	Omnivorous
25.	Columbidae	<i>Columba livia</i>	Common Pigeon	LC	R	C	Granivorous
26.		<i>Stigmatopelia chinensis</i>	Spotted Dove	LC	R	Ra	Granivorous
27.		<i>Stigmatopelia senegalensis</i>	Laughing dove	LC	R	VC	Granivorous
28.		<i>Streptopelia decaocto</i>	Eurasian Collared Dove	LC	R	VC	Granivorous
29.	Coraciidae	<i>Coracias benghalensis</i>	Indian Roller	LC	R	UC	Carnivorous
30.	Corvidae	<i>Corvus splendens</i>	House Crow	LC	R	C	Carnivorous
31.		<i>Corvus macrorhynchos</i>	Indian Jungle Crow	LC	R	C	Carnivorous

S.No.	Family	Scientific Name	Common English Name	IUCN status	Residential status	Relative abundance	Feeding habits
32.		<i>Dendrocitta vagabunda</i>	Rufous Treepie	LC	R	C	Frugivorous
33.		<i>Dendrocitta formosae</i>	Grey Treepie	LC	R	C	Frugivorous
34.	Cuculidae	<i>Eudynamis scolopacea</i>	Asian Koel	LC	R	C	Omnivorous
35.		<i>Cuculus canorus</i>	Eurasian Cuckoo	LC	PV	UC	Insectivorous
36.		<i>Centropus sinensis</i>	Greater Coucal	LC	PV	UC	Insectivorous
37.	Dicruridae	<i>Dicrurus macrocercus</i>	Black Drongo	LC	R	VC	Insectivorous
38.	Hirundinidae	<i>Cecropis daurica</i>	Red-rumped Swallow	LC	PV	C	Insectivorous
39.	Aegithinidae	<i>Aegithina tiphia</i>	Common Iora	LC	R	C	Insectivorous
40.	Laniidae	<i>Lanius schach</i>	Long-tailed shrike	LC	R	VC	Carnivorous
41.		<i>Lanius vittatus</i>	Bay-backed Shrike	LC	R	C	Insectivorous
42.		<i>Lanius excubitor</i>	Great Grey shrike	LC	PV	Ra	Carnivorous
43.	Meropidae	<i>Merops orientalis</i>	Green Bee-eater	LC	R	C	Insectivorous
44.	Motacillidae	<i>Motacilla flava</i>	Yellow Wagtail	LC	WV	UC	Insectivorous
45.		<i>Motacilla citreola</i>	Citrine Wagtail	LC	WV	UC	Insectivorous
46.		<i>Anthus rufulus</i>	Paddyfield pipit	LC	R	VC	Insectivorous
47.	Muscicapidae	<i>Saxicoloides fulicata</i>	Indian Robin	LC	R	C	Insectivorous

S.No.	Family	Scientific Name	Common English Name	IUCN status	Residential status	Relative abundance	Feeding habits
48.		<i>Copsychus saularis</i>	Oriental Magpie Robin	LC	R	C	Insectivorous
49.		<i>Turdoides caudate</i>	Common Babbler	LC	R	Ra	Omnivorous
50.		<i>Turdoides striata</i>	Jungle Babbler	LC	R	Ra	Omnivorous
51.		<i>Abroscopus superciliosus</i>	Yellow-bellied Warbler	LC	R	UC	Insectivorous
52.		<i>Cercomela fusca</i>	Brown Rock Chat	LC	R	C	Insectivorous
53.		<i>Prinia socialis</i>	Ashy Prinia	LC	R	VC	Insectivorous/ Nectarivorous
54.		<i>Prinia inornata</i>	Plain Prinia	LC	R	C	Insectivorous / Nectarivorous
55.		<i>Orthotomus sutorius</i>	Common Tailorbird	LC	R	C	Insectivorous/ Nectarivorous
56.		<i>Dicaeum erythrorhynchos</i>	Pale – billed Flowerpecker	LC	R	VC	Nectarivorous
57.	Nectariniidae	<i>Cinnyris asiaticus</i>	Purple Sunbird	LC	R	VC	Nectarivorous
58.	Oriolidae	<i>Oriolus oriolus</i>	Eurasian Golden Oriole	LC	PV	VC	Omnivorous
59.	Paridae	<i>Parus major</i>	Great Tit	LC	R	UC	Omnivorous
60.	Phalacrocoracidae	<i>Phalacrocorax niger</i>	Little Cormorant	LC	WV	C	Carnivorous
61.	Phasianidae	<i>Francolinus pondicerianus</i>	Grey Francolin	LC	R	Ra	Omnivorous
62.		<i>Coturnix coturnix</i>	Common Quail	LC	WV	Ra	Omnivorous

S.No.	Family	Scientific Name	Common English Name	IUCN status	Residential status	Relative abundance	Feeding habits
63.		<i>Pavo cristatus</i>	Indian Peafowl	LC	R	Ra	Omnivorous
64.	Picidae	<i>Dendrocopos mahrattensis</i>	Yellow-crowned Woodpecker	LC	R	UC	Insectivorous
65.	Ploceidae	<i>Passer domesticus</i>	House Sparrow	LC	R	VC	Granivorous
66.		<i>Ploceus philippinus</i>	Baya Weaver	LC	R	UC	Omnivorous
67.		<i>Euodice malabarica</i>	Indian Silverbill	LC	R	C	Omnivorous
68.	Psittacidae	<i>Psittacula cyanocephala</i>	Plum-headed Parakeet	LC	R	C	Frugivorous
69.		<i>Psittacula krameri</i>	Rose-ringed Parakeet	LC	R	C	Frugivorous
70.	Pycnonotidae	<i>Pycnonotus cafer</i>	Red-vented Bulbul	LC	R	VC	Frugivorous
71.	Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged stilt	LC	R	C	Omnivorous
72.	Strigidae	<i>Bubo bubo</i>	Eurasian Eagle Owl	LC	R	Ra	Carnivorous
73.		<i>Athene noctua</i>	Spotted Owllet	LC	R	Ra	Carnivorous
74.	Sturnidae	<i>Acridotheres tristis</i>	Common Myna	LC	R	VC	Granivorous
75.		<i>Acridotheres ginginianus</i>	Bank Myna	LC	R	Ra	Granivorous
76.		<i>Sturnus pagodarum</i>	Brahminy Starling	LC	R	C	Granivorous
77.	Upupidae	<i>Upupa epops</i>	Common Hoopoe	LC	R	UC	Insectivorous

C-Common; CE - Critically Endangered; E- Endangered; LC-Least Concerned; NE- Not Evaluated; NT-Near Threatened; R- Resident; Ra-Rare; S.no.-Species Number; UC-Uncommon, VU-Vulnerable; Wv-Winter visitor

of such studies from university campuses. Therefore, attempts were made to create a checklist of the campus' bird species as well as perform this study on the avian diversity of the Shri Krishna University campus in Chhatarpur.

### Material and Methods

#### Study area

At NH 86 Sagar road Chhatarpur MP, Shri Krishna University is located in a pleasant, green environment far from the crowded, polluted metropolis. Campus is fully surrounded by forest area. The area is bounded by latitudes of 24.8372° N and longitudes of 79.5214° E. Shri Krishna University have more than 100 acres land area. It is located 8 km away from the main city Chhatarpur. Chhatarpur is a city in central India's Madhya Pradesh state. It is located 19 kilometres to the east of the Dhasan River (a tributary of the Betwa River) in a region of low, scattered hills. The city functions as a major crossroads and a centre for the trade of agricultural products and textile materials. Between the Dhasan and Ken rivers, a rich plain surrounds the area, and scattered hills covered with trees rise to elevations of roughly 1,500 feet (450 metres) towards the south. The main crops are rice, sorghum, wheat, barley and legumes.

The study was conducted from February 2022 to July 2022 during a 06-months period. Walking around the campus allowed us the direct count approach of recording the bird species. The birds were seen in the morning between 7:00 and 10:00 AM and in the evening between 3:30 and 6:00 PM, when they were most active<sup>2,14</sup>. The 16x52 Nikon binoculars were used for all

sightings and observations. The feeding habits of various bird species and the habitats in which they might be found were also studied during the field investigation. On the basis of their preferred forms of food, the birds were divided into several groups, including frugivores, carnivores, insectivores, graminivores, omnivores, and nectarivores. The local and global status were compared using the International Union for the Conservation of Nature (IUCN) classification system. The terminology for birds was standard<sup>6</sup>. Using the following formula, Families' relative diversity (RDi) was calculated.<sup>17</sup>

$$RDi = \frac{\text{Number of bird species in a family}}{\text{Total number of species}} \times 100$$

### Results and Discussion

According to the study, there were 77 different bird species in the study area, spread between 35 different bird families (Table-1). Observations made by other workers in the field were compared. In their study, they observed 62 species of birds from 11 orders and 38 families between January 2013 and December 2014 in and around the Laxminarayan Institute of Technology campus in Nagpur, Central India<sup>3</sup>. Others identified 61 bird species across 15 orders and 31 families on the BUAT campus, which is roughly 383.64 hectares<sup>15</sup>. With 370 species, India's largest bird family is the Muscicapidae<sup>10</sup>. The results of the current study showed that the avifauna in this campus was dominated by the Muscicapidae family (10 species). The study also revealed that there are 20 families with only one species in each family (Fig. 2).

The most diverse families (10 species, RDi= 12.99)

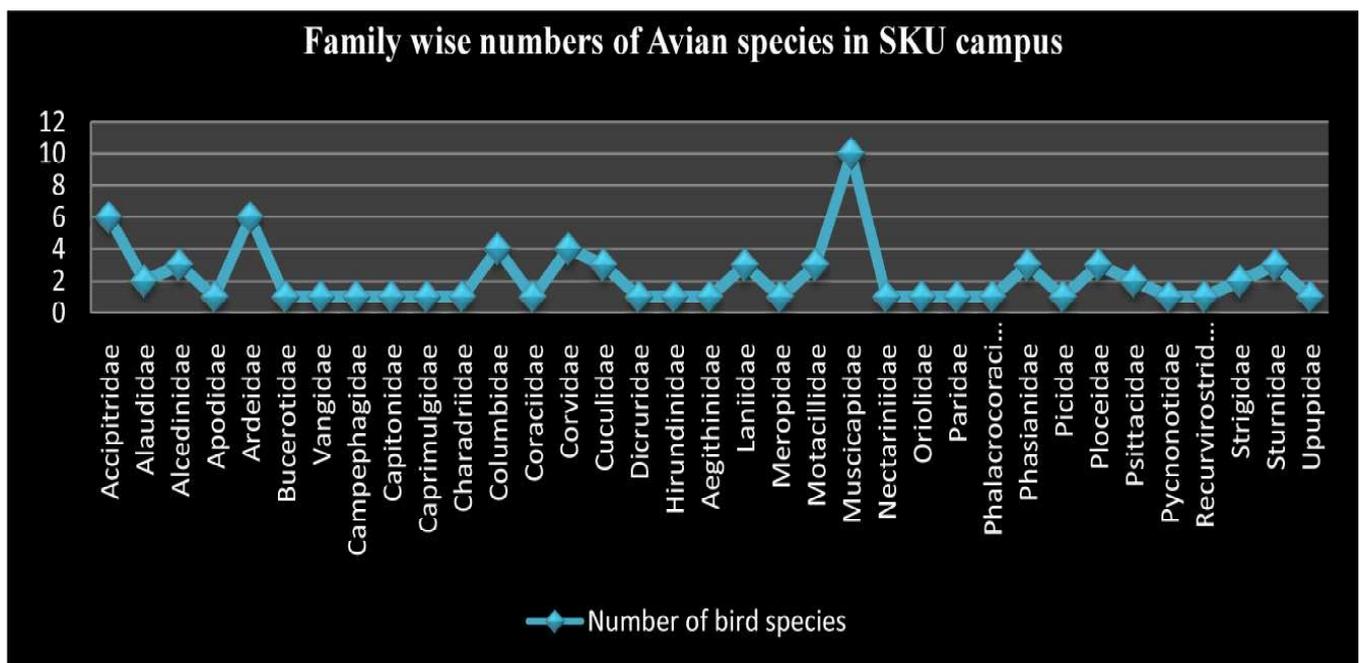


Fig. 1 : Family wise numbers of avian species in SKU campus

TABLE-2. Relative diversity (RDi) of various avian families at SKU campus

S. No.	Family	Number of bird species	RDi	S. No.	Family	Number of bird species	RDi
1	Accipitridae	6	7.79	19	Laniidae	3	3.90
2	Alaudidae	2	2.60	20	Meropidae	1	1.30
3	Alcedinidae	3	3.90	21	Motacillidae	3	3.90
4	Apodidae	1	1.30	22	Muscicapidae	10	12.99
5	Ardeidae	6	7.79	23	Nectariniidae	1	1.30
6	Bucerotidae	1	1.30	24	Oriolidae	1	1.30
7	Vangidae	1	1.30	25	Paridae	1	1.30
8	Campephagidae	1	1.30	26	Phalacrocoracidae	1	1.30
9	Capitonidae	1	1.30	27	Phasianidae	3	3.90
10	Caprimulgidae	1	1.30	28	Picidae	1	1.30
11	Charadriidae	1	1.30	29	Ploceidae	3	3.90
12	Columbidae	4	5.19	30	Psittacidae	2	2.60
13	Coraciidae	1	1.30	31	Pycnonotidae	1	1.30
14	Corvidae	4	5.19	32	Recurvirostridae	1	1.30
15	Cuculidae	3	3.90	33	Strigidae	2	2.60
16	Dicruridae	1	1.30	34	Sturnidae	3	3.90
17	Hirundinidae	1	1.30	35	Upupidae	1	1.30
18	Aegithinidae	1	1.30				

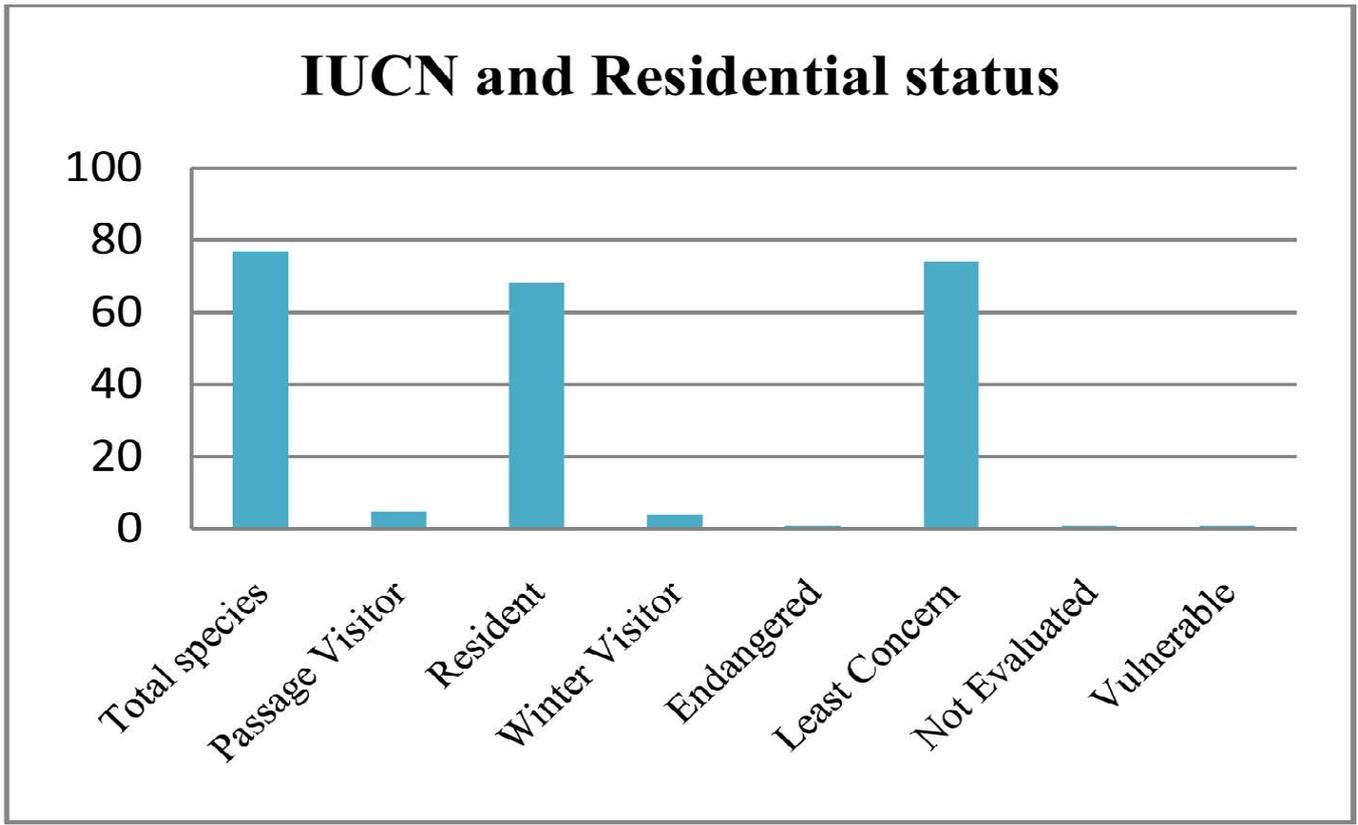


Fig. 2 : IUCN and Residential status of bird species

were Muscicapidae, followed by Accipitridae and Ardeidae (6 species each, RDi= 7.79), Columbidae and Corvidae (4 species each, RDi= 5.19), Alcedinidae, Cuculidae, Laniidae, Motacillidae, Phasianidae, Ploceidae and Sturnidae (3 species each, RDi= 3.90), Alaudidae, Psittacidae and Strigidae (2 species each, RDi= 2.60). On the other hand there are 20 families whose RDi value is 1.30 (Table-2). Similarly other workers observed in their study that Muscicapidae were the most diverse family (11 species, RDi= 7.91) in eastern Uttar Pradesh<sup>20</sup>.

Out of 77 species, 68 were found to be residents, According to a study of the residential status data, while the remaining 9 species demonstrated passage visitor (5 species) and winter visitor (4 species). Birds' residential status revealed variations in their relative abundance (Figs. 3 & 4). Further investigation of relative abundance revealed that 36% species were classified as common, 26% species as uncommon, 21% species as vulnerable, and 17% species as rare.

The study of Bird feeding behaviour is crucial for comprehending the intricate structure of the ecosystem and for providing details on each type of habitat therein<sup>1</sup>. The main determinant of the spatiotemporal distribution and relative abundance of birds in a given habitat is the quality and amount of food available<sup>11</sup>. Seven main feeding guilds were found to be present in the research area with

regard to the foraging behaviours of birds (Fig. 5). The majority of bird species in campus were Carnivorous (31%). Many insectivorous species found in the research area are important biocontrol agents for pests in agriculture, horticulture and forestry<sup>16</sup>.

There are several Bird species in the research

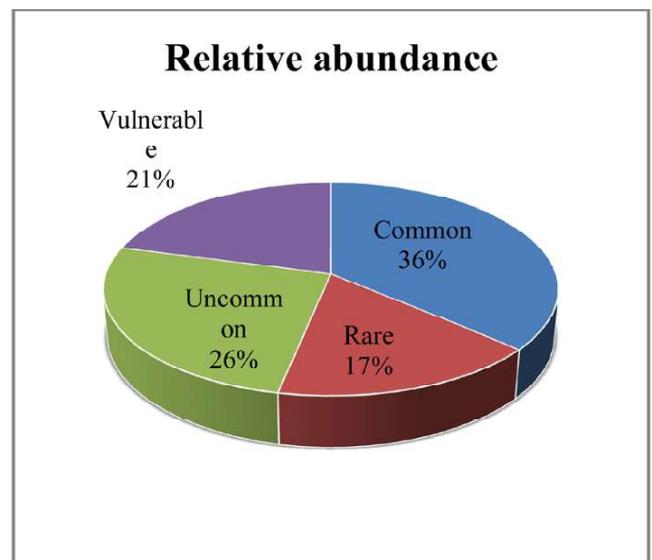
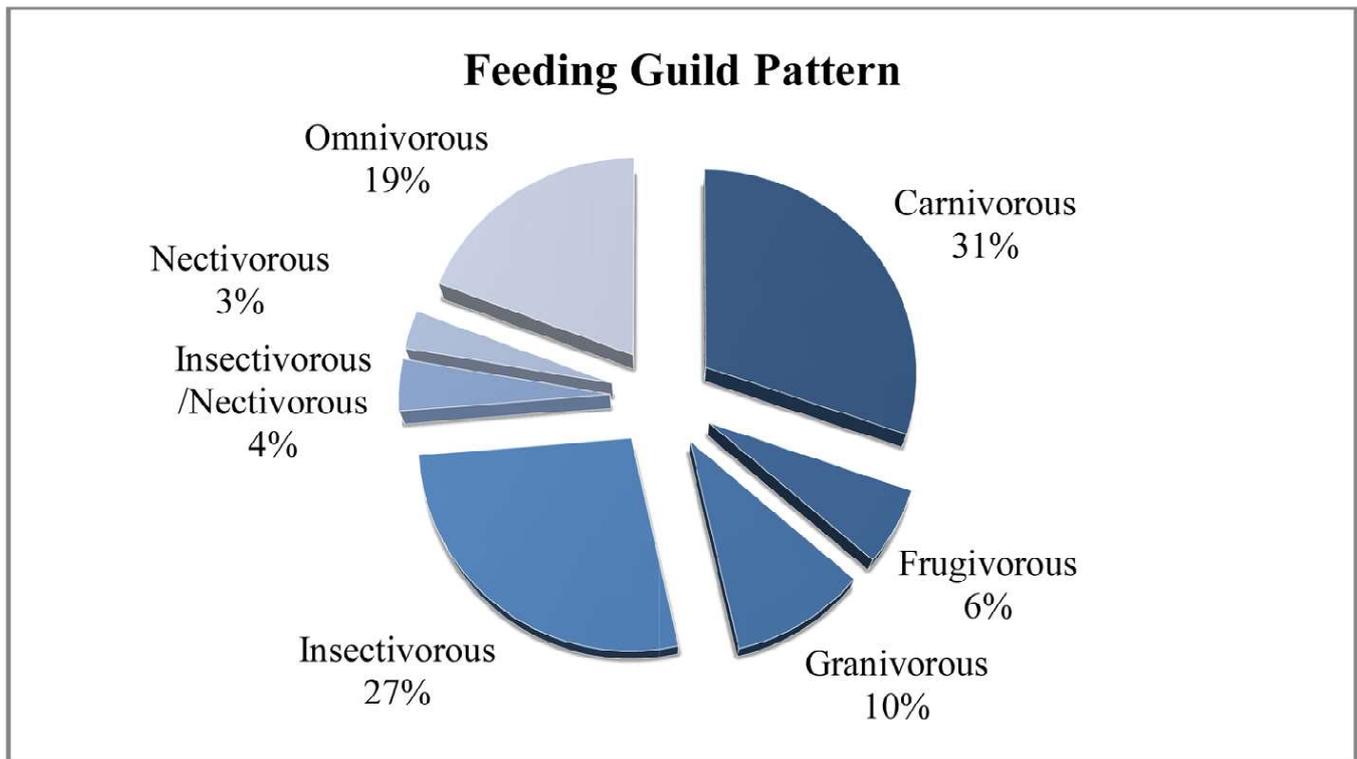


Fig. 3 : Relative abundance of bird species found in SKU campus



**Fig.4 : Feeding Guild pattern of avian species in SKU campus**

region that the IUCN has classed as being in various threat categories, as has been discovered<sup>9</sup>. According to the result one species (*Neophron percnopterus*) was found in endangered species, one species (*Aquila rapax*) found in vulnerable species category (Fig. 3). Both species belong to the Accipitridae family. Rests of the species are categorized as least concerned category in IUCN list<sup>9</sup>. The IUCN has not yet assessed one species, namely *Mesophoyx intermedia*.

### Conclusion

According to the study, the University campus's geographic position and habitat structure are responsible for the birds' wide diversity. The region appears to offer a variety of habitats for resident birds as well as a route for

migratory birds. In order to sustain the diversity and ecological balance of the bird population, it is necessary to protect the habitat structure and variety found on university campuses. In general, urbanization reduces species variety, with only a few species being more common while others are rare, but the SKU campus is still relatively undeveloped and supports a wide range of bird species. In order to preserve ecological balance and avian diversity, this study emphasises the importance of keeping open or greener area on college campuses and in neighbouring communities. This research represents the first attempt of its sort to compile a thorough database of the birds observed at the Shri Krishna University campus.

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