



Avifaunal Diversity in and around NBRI (National Botanical Research Institute), Lucknow, Uttar Pradesh

Shiwali Tiwari¹, Ruchira Nigam², Asif Ahmad Siddiqui³, *Chitra Singh⁴

^{1,2,4}Department of Zoology, Isabella Thoburn College, University of Lucknow, Lucknow, Uttar Pradesh, India

³Department of Environmental Science, Integral University, Lucknow, Uttar Pradesh, India

*Corresponding email: csingh19@gmail.com

ABSTRACT

*The present study is the first preliminary checklist of Birds from National Botanical Research Institute (NBRI), Lucknow, Uttar Pradesh. It is a botanical garden located at 26.8563° N and 80.9499° E in Lucknow. The survey was carried out from January 2023 to April 2023. A total number of 45 bird species were observed and photographed. The identification was done using field guides, relevant literature, and online bird data depositories. Avifaunal Diversity is one of the most important ecological indicators to evaluate the status of habitats. Birds are the crucial animal group of an ecosystem which maintains a trophic level. Therefore, detail study on avifauna and their ecology is important to protect them. They are one of the biological control tools to control pests in gardens, on farms, and other places. They abet in the pollination of plants. Birds are also good seed dispersal. Surveys were carried out seasonally and observations were done using Line Transect Method with the aid of 10x50 binoculars and Camera (Canon EOS 100D, Super Zoom Lens 55X). NBRI Avifaunal Assessment which comprised of 45 bird species was from 15 orders and 26 families. The order **Passeriformes** had maximum 20 bird species; Insectivorous birds (22%) were the most numerous, followed by Carnivores species (22%), Omnivores species (22%), Frugivores (16%), Granivores (14%), Scavengers (2%) and Nectivorous (2%).*

Keywords: Ecological indicators, NBRI, Avifaunal Diversity, Bird data depositories, Seed dispersal

INTRODUCTION

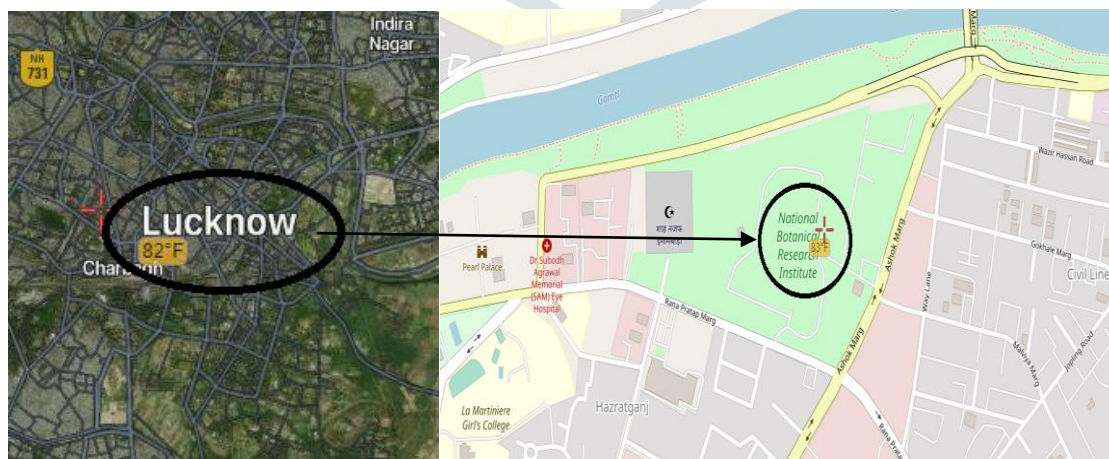
Ornithology, which is a branch of biology and zoology that focuses with the study of birds and more especially, the Aves class of animals, derives from the Greek words ornithes, which means "chicken," and "logos," which means "word" or "knowledge." Aristotle mentions more than 170 different birds, making him possibly the first author to explore ornithology. Carolus Linnaeus was the first to develop a classification scheme for animals and birds (1758). He proposed classifying organisms into species according to characteristics they shared. His scientific classification system is still in use today with certain adjustments. **Dr. Salim Ali** was a well known ornithologist and bird watcher in India.

Since birds have warm blood, their bodies are covered in non-conducting feathers, which aid in thermoregulation. They have a greater metabolic rate than mammals and no sweat glands (Ali, 2017). Comparatively speaking to other vertebrates, aves have a far wider geographic distribution. The avifauna is divided into different groups based on behavior, habitat, and eating habits. Nearly everywhere on earth, from pole to equator, there are birds, and they are incredibly diverse in terms of habitat and geographic location. Both are significant ecological elements of the world's biodiversity. Aves are among the most well-known and environmentally sensitive animals on Earth, according to Agarwal (2015). Ecologists frequently employ certain metrics, such as species richness, abundance, and community composition, to comprehend the diversity of organisms in natural environments. Singh, (2018) An important ecological tool for assessing both the qualitative and quantitative quality of various habitats is the study of avifaunal diversity. (Helm, 2002). It also serves a variety of ecological purposes. There are currently about 9000 bird species, 1250 of which are found in India, according to various scientific classifications. Since the arrival of humans, nearly 150 bird species have gone extinct.

Birds are an excellent pest-control agents and consume a lot of insects (and their larva), including several that are extremely hazardous to people. Countless birds eat mice and rodents, both of which are quite harmful to farmers all over the world. Crows, kites, egrets, and vultures all consume carrion and garbage from dumps. These birds are essential to maintaining a healthy and disease-free habitat. Humans rely heavily on birds as a source of food. Birds are key seed dispersers and aid in the growth of numerous tree and plant species.

STUDY AREA

NBRI Botanical Garden, also known as the CSIR-National Botanical Research Institute, is located in Lucknow. It is a botanic garden located at 26.8563° N and 80.9499° E in Lucknow, Uttar Pradesh, India. The garden was renamed "Government Horticultural Garden" and "National Botanic Garden" in the years that followed. Spanning 65 acres in size, the garden contains more than 6000 significant plant species and variations that were gathered from various locations in India and overseas. It is a historic garden that was built in the year 1789. The garden of National Botanical Research Institute (NBRI) has been preserved to provide for the long-term use of plants with educational, recreational, taxonomic, decorative, horticultural, biological, and ecological purposes. It contains more than 6000 significant plant species and variations that were gathered from various locations in India and overseas. Every day, more than a thousand people go for morning walks. Meditation and relaxation are made possible by the peaceful environment created by the enormous Banyan tree.



Map 1: Satellite map of National Botanical Research Institute (NBRI), Lucknow

MATERIALS AND METHODS

From January to April 2023, fieldwork was done in and around NBRI. Observations were made between 7:00.a.m. to 10:00 a.m. in the morning and 4:00 p.m. to 6:00 p.m. in the evening. The birds were identified using standard field guide books of Ali & Ripley, 1995, Grimmett et al., 1998, Salim Ali, 2002. Additionally, identification was accomplished with the aid of websites, mobile applications like **Merlin**. The birds were captured by **Camera Canon EOS 100D (Super zoom lenses)**. The survey was conducted using the **Line Transect Method** at regular intervals of 250 meters. **Binoculars** are used to watch far- off sitting birds.

RESULT AND DISCUSSION

The study of Birds in and around the Botanical Garden of NBRI includes 45 **species**, including **15 order** and **26 families**. Orders such as Accipitriformes, Bucerotiformes, Passeriformes, Gruiformes , Strigiformes ,Cuculiformes, Piciformes, Psittaciformes, Charadriiformes, Pelecaniformes, Charadriiformes, Coraciiformes were observed. Maximum no. of Birds belong to order Passeriformes, the percentage of bird belonging to Passeriformes was 48%. The no. of birds belonging to this order is 20. The percentage of Birds in different orders is as follows: Order Columbiformes constitute 10%. Order Charadriiformes, Pelecaniformes, Piciformes and Galliformes constitute 5%. while orders like Strigiformes, Gruiformes constitute 2% respectively.

OBSERVATION TABLE

S.No.	Family	Common Name	Zoological Name	Order	IUCN Status
1.	Alcedinidae	White-throated Kingfisher	<i>Halcyon symmenies</i>	Coraciiformes	Least concern
2.	Accipitridae	Hawk	-	Accipitriformes	Least concern
3.	Accipitridae	Black Kite	<i>Milvus migrans</i>	Accipitriformes	Least concern
4.	Accipitridae	Shikra	<i>Accipiter badius</i>	Accipitriformes	Least concern
5.	Apodidae	House Swift	<i>Apus nipalensis</i>	Apodiformes	Least concern
6.	Ardeidae	Cattle egret	<i>Bubulcus ibis</i>	Pelecaniformes	Least concern
7.	Ardeidae	Indian pond Heron	<i>Ardeola grayii</i>	Pelecaniformes	Least concern
8.	Bucerotidae	Indian Grey Hornbill	<i>Ocyrceros birostris</i>	Bucerotiformes	Least concern
9.	Charadriidae	Red wattled lapwing	<i>Vanellus indicus</i>	Charadriiformes	Least concern
10.	Charadriidae	Yellow wattled lapwing	<i>Vanellus malabaricus</i>	Charadriiformes	Least concern
11.	Cisticolidae	Kali Phutki	<i>Prinia socialis</i>	Passeriformes	Least concern
12.	Cisticolidae	Plain Prinia	<i>Prinia inornata</i>	Passeriformes	Least concern
13.	Columbidae	Eurasian collared Dove	<i>Streptopelia decaocto</i>	Columbiformes	Least concern

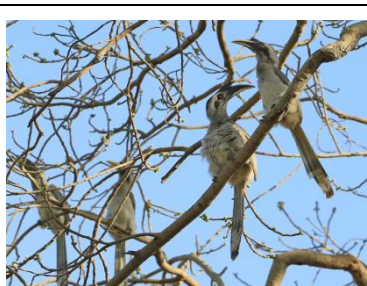
14.	Columbidae	Feral Pigeon	<i>Columba livia</i>	Columbiformes	Least concern
15.	Columbidae	Laughing Dove	<i>Spilopelia senegalensis</i>	Columbiformes	Least concern
16.	Columbidae	Spotted Dove	<i>Spilopelia chinensis</i>	Columbiformes	Least concern
17.	Corvidae	House Crow	<i>Corvus splendens</i>	Passeriformes	Least concern
18.	Corvidae	Large Billed Crow	<i>Corvus macrorhynchos</i>	Passeriformes	Least concern
19.	Corvidae	Rufous treepie	<i>Dendrocitta vagabunda</i>	Passeriformes	Least concern
20.	Cuculidae	Asian Koel	<i>Eudynamis scolopaceus</i>	Cuculiformes	Least concern
21.	Cuculidae	Greater coucal	<i>Centropus sinensis</i>	Cuculiformes	Least concern
22.	Dicruridae	Black Drongo	<i>Dicrurus macrocercus</i>	Passeriformes	Least concern
23.	Esterilidade	Scaly Breasted Munia	<i>Lonchura punctulata</i>	Passeriformes	Least concern
24.	Leiognathidae	Jungle Babbler	<i>Turtoides striata</i>	Passeriformes	Least concern
25.	Leiognathidae	Large gray Babbler	<i>Turtoides malcolmi</i>	Passeriformes	Least concern
26.	Megalaimidae	Brown headed barbet	<i>Psilopogon zeylanicus</i>	Piciformes	Least concern
27.	Megalaimidae	Coppersmith Barbet	<i>Megalaima haemacephala</i>	Piciformes	Least concern
28.	Meropidae	Asian Green bee-eater	<i>Merops orientalis</i>	Coraciiformes	Least concern
29.	Muscicapidae	Brown Rock Chat	<i>Oenanthe fusca</i>	Passeriformes	Least concern
30.	Muscicapidae	Indian Robin	<i>Copsychus fulicatus</i>	Passeriformes	Least concern
31.	Muscicapidae	Oriented Magpie Robin	<i>Copsychus saularis</i>	Passeriformes	Least concern
32.	Nectariniidae	Purple Sunbird	<i>Cinnyris asiaticus</i>	Passeriformes	Least concern
33.	Passeridae	House Sparrow	<i>Passer domesticus</i>	Passeriformes	Least concern
34.	Phasianidae	Indian Peafowl (Peacock)	<i>Pavo cristatus</i>	Galliformes	Least concern
35.	Phasianidae	Indian Peafowl (Peahen)	<i>Pavo cristatus</i>	Galliformes	Least concern
36.	Pistaculidae	Rose-ringed Parakeet (Parrot)	<i>Psittacula krameri</i>	Psittaciformes	Least concern
37.	Pycnonotidae	Red whiskered Bulbul	<i>Pycnonotus jocosus</i>	Passeriformes	Least concern
38.	Pycnonotidae	Red vented Bulbul	<i>Pycnonotus cafer</i>	Passeriformes	Least concern

39.	Rallidae	White Breasted Waterhen	<i>Amaurornis phoenicurus</i>	Gruiformes	Least concern
40.	Strigidae	Spotted owl	<i>Athene brama</i>	Passeriformes	Least concern
41.	Sturnidae	Brahminy Starling	<i>Sturnia pagodarum</i>	Passeriformes	Least concern
42.	Sturnidae	Common Myna	<i>Acridotheres tristis</i>	Passeriformes	Least concern
43.	Sturnidae	Indian pied Myna	<i>Gracupica contra</i>	Passeriformes	Least concern
44.	Upupidae	Common Hoopoe	<i>Upupa epops</i>	Bucerotiformes	Least concern
45.	Zosteropidae	Oriental white eye	<i>Zosterops palpebrosus</i>	Passeriformes	Least concern

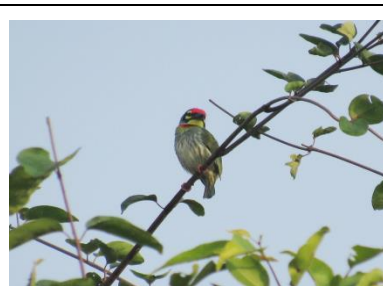




Ashy Prinia



Indian Grey Hornbill



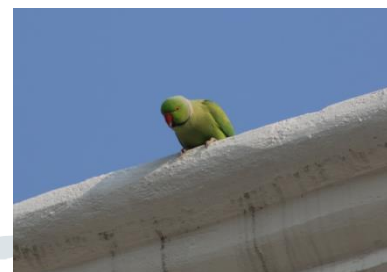
Coppersmith Barbet



Greater Coucal



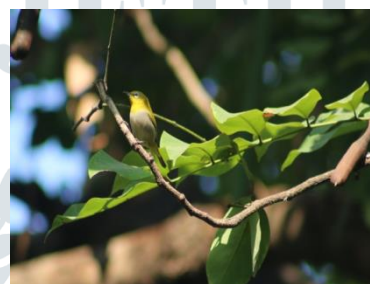
Black Drongo



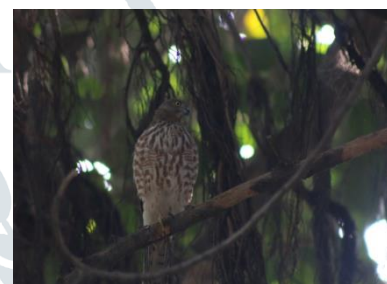
Rose-Ringed Parakeet



Rufous Treepie



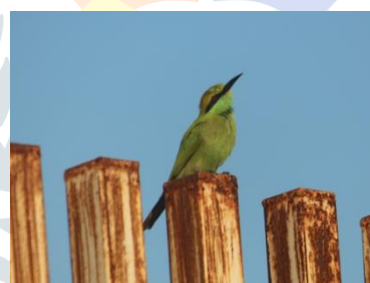
Oriental White Eye



Shikra



Brown Headed Barbet



Green Bee-eater



Eurasian Colored Dove



Asian Koel (Female)



Large Billed Crow



Eurasian Sparrow Hawk



Jungle Owlet



Asian Pied Starling



Brahminy Starling



Red Whiskered Bulbul



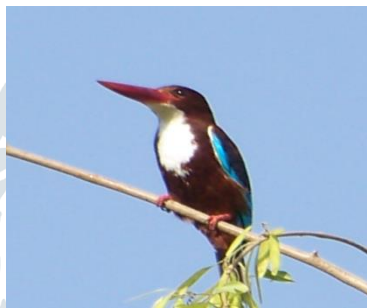
Large Grey Babbler



Plain Prinia



Indian Robin



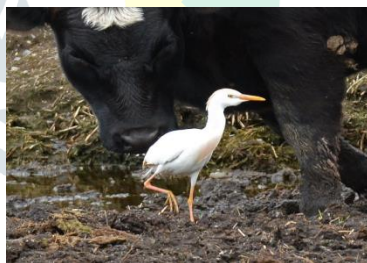
White Throated Kingfisher



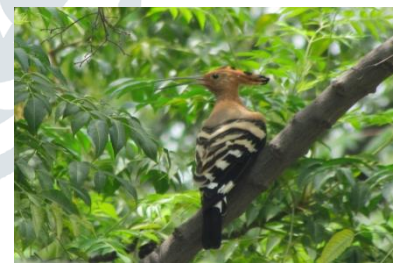
Pond Heron



Red-wattled Lapwing



Cattle Egret



Common Hoopoe



White Breasted Waterhen



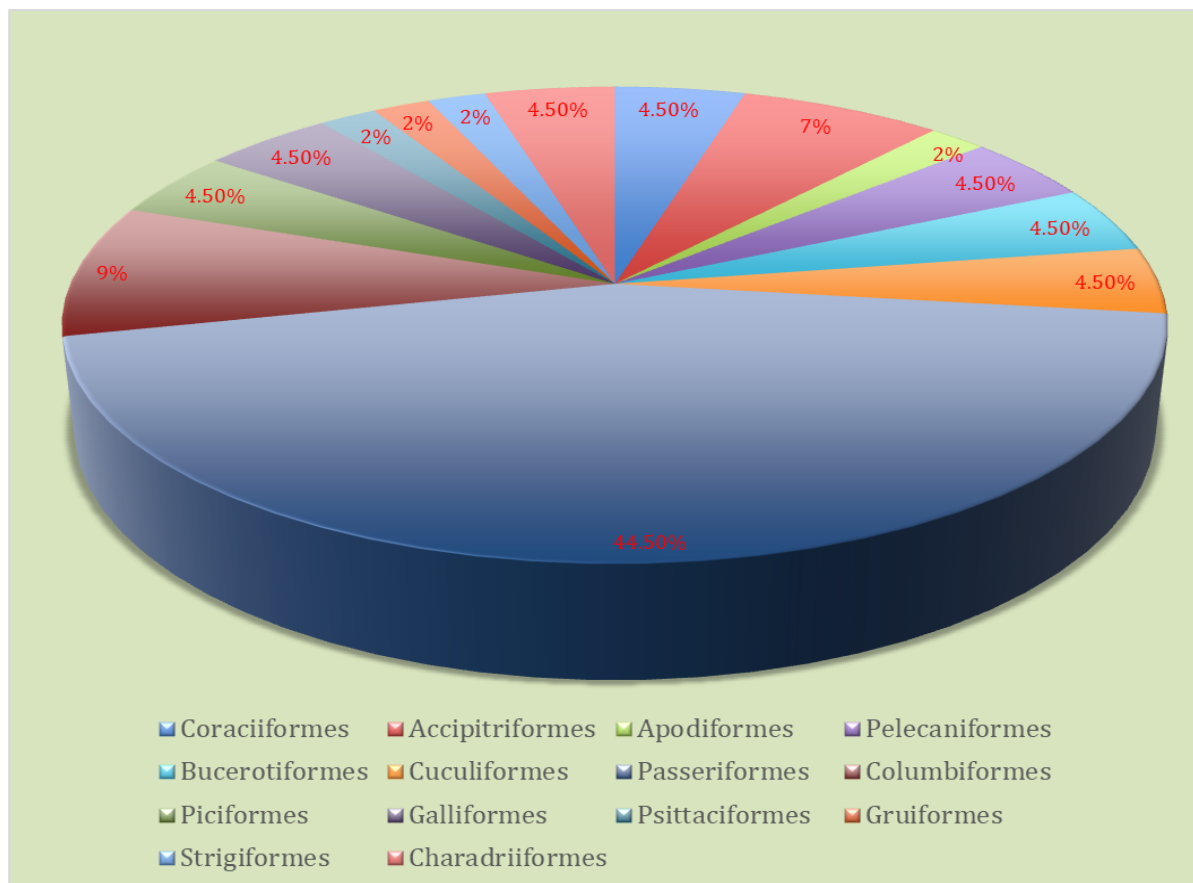
Indian Peacock



Purple Sunbird



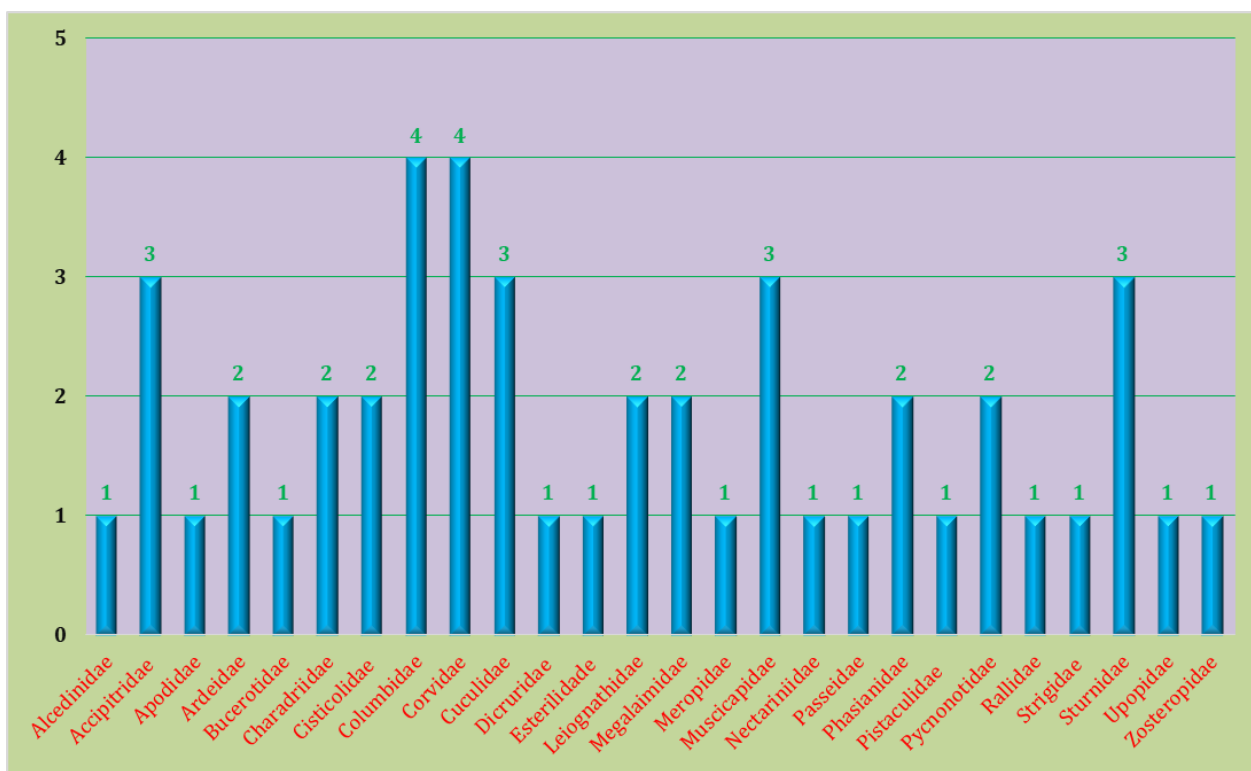
Table.2. Photographs of the Avifaunal Diversity in and around NBRI Campus



Graph.1. Pie chart showing Avifaunal Distribution according to their order (in %)

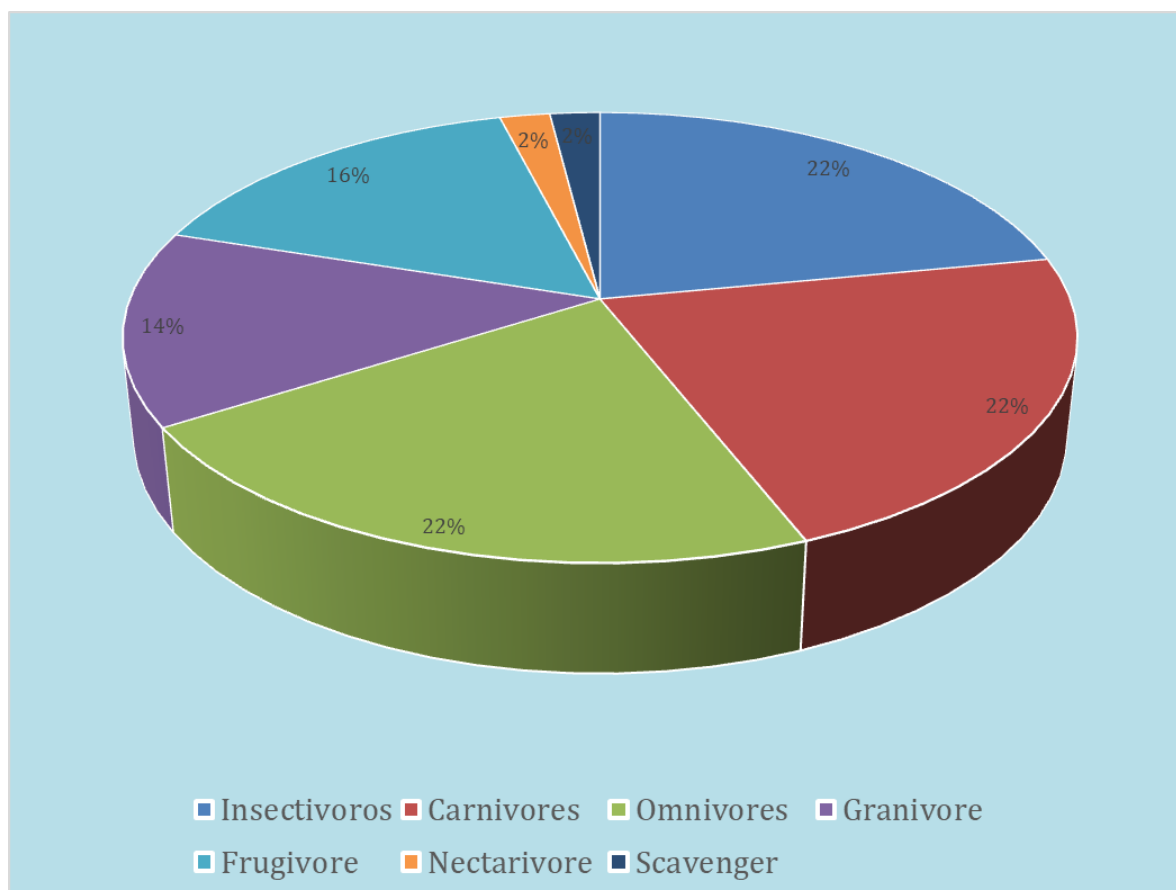
Birds belonged to **26 different families**, which were observed in NBRI. Maximum no. of species observed belonged to **Columbidae**, i.e. 4 species. **Rock Pigeon, Eurasian collared Dove, Spotted Dove, Laughing Dove**; followed by **3 species** of family **Corvidae** i.e. **Rufous Treepie, House Crow, Large billed Crow**; **3 species** of the family **Accipitridae** i.e. **Hawk , Black Kite and Shikra**. In the family **Cisticolidae** **2 species** were found; **Ashy Prinia** and **Plain Prinia**. Family **Charadriidae** had **2 species** namely **Yellow wattled Lapwing** and **Red wattled Lapwing**. Family **Ardeidae** consists of **2 species**: **Cattle Egret** and **Indian Pond Heron**. Families **Apodidae, Bucerotidae, Alcedinidae, Cuculidae, Dicururidae, Esterilidade. Jungle Babbler** and **Large gray Babbler** belong to the family **Leiognathidae** consist of **1 species**. Family **Megalaimidae** had **2 species** namely **Brown-headed Barbet** and **Coppersmith Barbet**. Family **Muscicapidae** with **3 members** i.e. **Indian Robin, Rock chat** and **Oriental Magpie-Robin**. **Purple Sunbird** belongs to the family **Nectariniidae**. **House Sparrow** belongs to Family **Passeridae**. Family **Phasianidae** consist of **Indian Peafowl (Peacock)** and **Indian Peafowl (Peahen)**. **Rose ringed Parakeet** belongs to the family **Pistaculidae**. **Red vented Bulbul** and **Red whiskered Bulbul** are the

2 species of family **Pycnonotidae**. Family **Rallidae** has only 1 species i.e. **White Breasted Waterhen**. **Spotted owl's family** name is **Strigidae**. Family **Sturnidae** has 3 species - **Brahminy Starling**, **Indian pied Myna** and **Common Myna**. **Common Hoopoe** belongs to the family **Upupidae**. **Oriental white eye** is a species belonging to the family **Zosteropidae**. **Asian Green bee-eater** belongs to the Meropidae family.



Graph.2. Bar diagram showing Avifaunal Distribution according to Family

S.N.	Food Preference	No. of species	%
1.	Insectivorous	10	22%
2.	Carnivorous	10	22%
3.	Omnivorous	10	22%
4.	Granivorous	6	14%
5.	Frugivorous	7	16%
6.	Nectivorous	1	2%
7.	Scavengers	1	2%



Graph.3. Pie chart showing % composition according to Avifaunal Food Preferences

CONCLUSION

Birds are the most attractive, diversified, and gorgeous animals, and they also support ecological processes. They contribute significantly to the food chain by transmitting materials and energy. Additionally, birds control the overabundance of tiny insects and they help to disperse the pollen. The floral richness of the surrounding area has a direct or indirect impact on the diversity of the avifauna. It offers a variety of food sources as well as a location where they can live, procreate, and defend themselves from potential predators.

However, environmental elements like food scarcity, increased competition, temperature, humidity, rainfall, etc. may have a greater impact on the diversity and density of avian species. To assess the variety of birds in and around the National Botanical Research Institute, Lucknow a **preliminary study from January to April 2023** was performed in the discussed area which would reveal a baseline data important for further research and conservation.

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