

## Avifaunal Composition of Jawaharlal Nehru University Campus, New Delhi

MANOJ SINGH<sup>1</sup>, KRISHAN KUMAR<sup>1</sup>, T. K. ROY<sup>2</sup> and YASHMITA-ULMAN<sup>3\*</sup>

<sup>1</sup>School of Environmental Sciences, Jawaharlal Nehru University, New Delhi-110067, India.

<sup>2</sup>State Coordinator, Asian Waterbird Census, Wetlands International South Asia, New Delhi – 110024, India.

<sup>3</sup>Department of Forestry, NERIST, Nirjuli, Itanagar, Arunachal Pradesh 791109, India.

### Abstract

The Jawaharlal Nehru University campus is a unique campus which harbours not only the natural ridge ecosystem but also a huge avifaunal biodiversity. The survey was done for a period of three years from January 2013 to December 2016. Data was collected using line transects in different habitats all across the campus. A total of 114 bird species belonging to 19 orders and 52 families were identified during the study period, including 3 near threatened species, 2 vagrants, 3 summer visitors, 4 passage migrants, 26 winter visitors and 79 resident species. Of these, 47 species were insectivorous, 33 species were omnivorous, 14 species were carnivorous, 7 species were frugivorous, 6 species were granivorous, 4 species were herbivorous, 2 species were piscivorous and 1 species was nectarivorous. It was observed that the Jawaharlal Nehru University campus supported very rich and diverse avian fauna assemblages all year round due to the presence of the ridge ecosystems. Long-term conservation programmes must be adopted in order to protect the natural ecosystems and bird diversity present in the campus.



### Article History

Received: 10 July 2017  
Accepted: 25 July 2017

### Keywords:

Avian diversity,  
Jawaharlal Nehru  
University campus,  
Ridge ecosystem,  
Feeding guilds.

### Introduction


The ornithological history of Delhi, the capital of India, is relatively old. The foremost inventory of bird species in Delhi is made by Basil-Edwardes (1926)<sup>1</sup> who reported 204 species and sub-species. Thereafter there are many ornithologists<sup>2-7</sup> who

worked on similar lines. Apart from this, Kalpavriksh (1991)<sup>8</sup> recorded 444 species in Delhi and its surrounding areas and Satya (1993)<sup>9</sup> revealed 101 species remarkably affected both positively and negatively by urbanization in Delhi.

There are huge lands under university campuses

**CONTACT** Yashmita-Ulman ✉ [yashmita.forester@gmail.com](mailto:yashmita.forester@gmail.com) 📍 Department of Forestry, NERIST, Nirjuli, Itanagar, Arunachal Pradesh 791109, India.

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To link to this article: <http://dx.doi.org/10.12944/CWE.12.2.15>

supporting half the biodiversity of urban biota<sup>10</sup>. But the conservationists till now have ignored these areas and have not utilized these areas for conservation purposes. One such area is the Jawaharlal Nehru University (JNU) campus situated in the southern part of Delhi, (Lat 28°32'15.42"N, Long 77° 9'52.24"E). It is built on the Aravali Hill Ranges which extends upto Gujarat. The campus area encompasses around 400 ha. The unique feature of the campus are the vast areas of undisturbed ridge ecosystems which it still holds. These are connected with the adjoining Sanjay Van forest which again represents the ridge ecosystem. A previous study in ridge systems alone by Gaston (1978)<sup>11</sup> revealed 167 bird species. As Delhi comes under the subtropical belt, it experiences a semiarid climate. The temperature varies from 45 °C in summer to 1°C in winter<sup>12</sup>. The average rainfall is around 611 mm<sup>12</sup>. The campus has good areas of dense thorny deciduous species and fleshy evergreens. Though the vegetation is mainly xerophytic<sup>13</sup>, it does support a diverse variety of fauna. In addition to the ridge forest vegetation, the campus represents different habitats like small check-dams, gardens with ornamental shrubs, avenue trees along the roadsides etc. which are abode for the avifauna. Though there have been many bird watching activities in the campus, none of data is published. This will be the first published inventory of the bird species found in the JNU campus. This inventory will not only bring out the baseline information on the bird species diversity supported by the

campus, but also highlight about their presence and conservation status. This data can be further used by the campus authorities and city planners for planning developmental activities. This information will also come in handy to the conservationists for creating awareness for bird conservation in the campus.

### Materials and Methods

This work is an effort of compilation of observations done from 2013 to 2016 i.e. three years. Line transects were laid in different habitats of the campus area such that data representing all the habitats present in the survey area could be collected. The survey was carried out from 06:00 hrs to 10:00 during non rainy and non windy days. Survey was done twice a week in each season to get the data of seasonal variation. The birds feeding habits were also noted. Observations were done using a 8x42 binocular (Bushnell). Birds were identified using Grimmett *et al.* (1999)<sup>14</sup> and Ali and Ripley (1995)<sup>15</sup>. Birds were classified according to their presence status (season-wise) as residents (R), Passage migrants (PM), Summer visitors (SV) or Winter visitors (WV), Vagrant (VA) (Table 1). The conservation status of the birds recorded are also mentioned in Table 1. Further, they were also classified according to their feeding habits into different guilds like Granivorous (GR), Frugivorous (FR), Omnivorous (O), Insectivorous (I), Carnivorous (C), Nectarivorous (NI), Piscivorous (PI), Herbivorous (H) (Table 1).

**Table 1: Bird species sighted at JNU campus, their IUCN conservation status, visiting status and feeding guild**

S/N	Common name	Scientific name	IUCN status	Visitng status	Feeding guild
<b>I. Accipitriformes</b>					
<b>1. Accipitridae</b>					
1	Black Kite	<i>Milvus migrans</i> (Boddaert, 1783)	LC	R	O
2	Black-winged Kite	<i>Elanus caeruleus</i> (Desfontaines, 1789)	LC	R	C
3	Booted Eagle	<i>Hieraaetus pennatus</i> (Gmelin, 1788)	LC	WV	C
4	Eurasian Sparrowhawk	<i>Accipiter nisus</i> (Linnaeus, 1758)	LC	WV	C
5	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i> (Temminck, 1821)	LC	R	C
6	Shikra	<i>Accipiter badius</i> (Gmelin, 1788)	LC	R	C
<b>II. Anseriformes</b>					
<b>2. Anatidae</b>					
7	Common Teal	<i>Anas crecca</i> (Linnaeus, 1758)	LC	WV	H
8	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i> (Forster, 1781)	LC	R	O
<b>III. Bucerotiformes</b>					
<b>3. Upupidae</b>					

9	Common Hoopoe	<i>Upupa epops</i> (Linnaeus, 1758)	LC	R	I
10	Gadwall	<i>Anas strepera</i> (Linnaeus, 1758)	LC	WV	H
	<b>4. Bucerotidae</b>				
11	Indian Grey Hornbill	<i>Ocyrceros birostris</i> (Scopoli, 1786)	LC	R	O
	<b>IV. Caprimulgiformes</b>				
	<b>5. Apodidae</b>				
12	Little Swift	<i>Apus affinis</i> (Gray, 1830)	LC	R	I
	<b>V. Charadriiformes</b>				
	<b>6. Burhinidae</b>				
13	Indian Thick-knee	<i>Burhinus indicus</i> (Salvadori, 1865)	LC	R	I
	<b>7. Charadriidae</b>				
14	Red-wattled Lapwing	<i>Vanellus indicus</i> (Boddaert, 1783)	LC	R	I
15	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i> (Boddaert, 1783)	LC	R	I
	<b>8. Recurvirostridae</b>				
16	Black-winged Stilt	<i>Himantopus himantopus</i> (Linnaeus, 1758)	LC	WV	C
	<b>9. Scolopacidae</b>				
17	Common Greenshank	<i>Tringa nebularia</i> (Gunnerus, 1767)	LC	WV	C
18	Common Sandpiper	<i>Actitis hypoleucos</i> (Linnaeus, 1758)	LC	WV	C
19	Green Sandpiper	<i>Tringa ochropus</i> (Linnaeus, 1758)	LC	WV	I
	<b>VI. Ciconiiformes</b>				
	<b>10. Ciconiidae</b>				
20	Painted Stork	<i>Mycteria leucocephala</i> (Pennant, 1769)	NT	R	PI
	<b>VII. Columbiformes</b>				
	<b>11. Columbidae</b>				
21	Common Pigeon	<i>Columba livia</i> (Gmelin, 1789)	LC	R	GR
22	Eurasian Collared-Dove	<i>Streptopelia decaocto</i> (Frivaldszky, 1838)	LC	R	O
23	Laughing Dove	<i>Streptopelia senegalensis</i> (Linnaeus, 1766)	LC	R	GR
24	Red Collared-Dove	<i>Streptopelia tranquebarica</i> (Hermann, 1804)	LC	R	H
25	Spotted Dove	<i>Streptopelia chinensis</i> (Scopoli, 1786)	LC	R	GR
26	Yellow-footed Pigeon	<i>Treron phoenicopterus</i> (Latham, 1790)	LC	R	FR
	<b>VIII. Coraciiformes</b>				
	<b>12. Alcedinidae</b>				
27	White-throated Kingfisher	<i>Halcyon smyrnensis</i> (Linnaeus, 1758)	LC	R	I
	<b>13. Coraciidae</b>				
28	Indian Roller	<i>Coracias benghalensis</i> (Linnaeus, 1758)	LC	R	I
	<b>14. Meropidae</b>				
29	Green Bee-eater	<i>Merops orientalis</i> (Latham, 1802)	LC	R	I
30	Blue-tailed Bee-eater	<i>Merops philippinus</i> (Linnaeus, 1766)	LC	SV	I
	<b>IX. Cuculiformes</b>				
	<b>15. Cuculidae</b>				
31	Asian Koel	<i>Eudynamys scolopaceus</i> (Linnaeus, 1758)	LC	R	O
32	Common Hawk-Cuckoo	<i>Hierococcyx varius</i> (Vahl, 1797)	LC	R	O
33	Greater Coucal	<i>Centropus sinensis</i> (Stephens, 1815)	LC	R	C
34	Sirkeer Malkoha	<i>Taccocua leschenaultii</i> (Lesson, 1830)	LC	R	O
	<b>X. Falconiformes</b>				
	<b>16. Falconidae</b>				
35	Eurasian Hobby	<i>Falco subbuteo</i> (Linnaeus, 1758)	LC	WV	O
	<b>XI. Galliformes</b>				
	<b>17. Phasianidae</b>				
36	Grey Francolin	<i>Francolinus pondicerianus</i> (Gmelin, 1789)	LC	R	H
37	Indian Peafowl	<i>Pavo cristatus</i> (Linnaeus, 1758)	LC	R	O
	<b>XII. Gruiformes</b>				
	<b>18. Rallidae</b>				
38	Common Moorhen	<i>Gallinula chloropus</i> (Linnaeus, 1758)	LC	R	O

39	Eurasian Coot	<i>Fulica atra</i> (Linnaeus, 1758)	LC	R	O
40	White-breasted Waterhen	<i>Amaurornis phoenicurus</i> (Pennant, 1769)	LC	R	O
<b>XIII. Passeriformes</b>					
<b>19. Acrocephalidae</b>					
41	Blyth's Reed-Warbler	<i>Acrocephalus dumetorum</i> (Blyth, 1849)	LC	PM	I
<b>20. Alaudidae</b>					
42	Ashy-crowned Sparrow-Lark	<i>Eremopterix griseus</i> (Scopoli, 1786)	LC	R	O
<b>21. Campephagidae</b>					
43	Small Minivet	<i>Pericrocotus cinnamomeus</i> (Linnaeus, 1766)	LC	R	I
<b>22. Cisticolidae</b>					
44	Ashy Prinia	<i>Prinia socialis</i> (Sykes, 1832)	LC	R	I
45	Common Tailorbird	<i>Orthotomus sutorius</i> (Pennant, 1769)	LC	R	I
46	Grey-breasted Prinia	<i>Prinia hodgsonii</i> (Blyth, 1844)	LC	R	I
47	Plain Prinia	<i>Prinia inornata</i> (Sykes, 1832)	LC	R	I
<b>23. Corvidae</b>					
48	House Crow	<i>Corvus splendens</i> (Vieillot, 1817)	LC	R	O
49	Large-billed Crow	<i>Corvus macrorhynchos</i> (Wagler, 1827)	LC	VA	O
50	Rufous Treepie	<i>Dendrocitta vagabunda</i> (Latham, 1790)	LC	R	O
<b>24. Dicuridae</b>					
51	Black Drongo	<i>Dicrurus macrocercus</i> (Vieillot, 1817)	LC	R	I
<b>25. Emberizidae</b>					
52	Chestnut-breasted Bunting	<i>Emberiza stewarti</i> (Blyth, 1854)	LC	VA	O
<b>26. Estrildidae</b>					
53	Red Avadavat	<i>Amandava amandava</i> (Linnaeus, 1758)	LC	R	O
54	Indian Silverbill	<i>Euodice malabarica</i> (Linnaeus, 1758)	LC	R	O
55	Scaly-breasted Munia	<i>Lonchura punctulata</i> (Linnaeus, 1758)	LC	R	GR
<b>27. Fringillidae</b>					
56	Common Rosefinch	<i>Carpodacus erythrinus</i> (Pallas, 1770)	LC	WV	O
<b>28. Hirundinidae</b>					
57	Barn Swallow	<i>Hirundo rustica</i> (Linnaeus, 1758)	LC	WV	I
	Wire-tailed Swallow	<i>Hirundo smithii</i> (Leach, 1818)	LC	SV	I
<b>29. Laniidae</b>					
58	Long-tailed Shrike	<i>Lanius schach</i> (Linnaeus, 1758)	LC	R	I
<b>30. Leiostrichidae</b>					
59	Common Babbler	<i>Turdoides caudata</i> (Dumont, 1823)	LC	R	O
60	Jungle Babbler	<i>Turdoides striata</i> (Dumont, 1823)	LC	R	I
61	Large Grey Babbler	<i>Turdoides malcolmi</i> (Sykes, 1832)	LC	R	O
<b>31. Motacillidae</b>					
62	Citrine Wagtail	<i>Motacilla citreola</i> (Pallas, 1776)_	LC	WV	I
63	Grey Wagtail	<i>Motacilla cinerea</i> (Tunstall, 1771)	LC	WV	I
64	Tree Pipit	<i>Anthus trivialis</i> (Linnaeus, 1758)	LC	WV	I
65	White Wagtail	<i>Motacilla alba</i> (Linnaeus, 1758)	LC	WV	I
66	White-browed Wagtail	<i>Motacilla maderaspatensis</i> (Gmelin, 1789)	LC	R	I
67	Yellow Wagtail	<i>Motacilla flava</i> (Linnaeus, 1758)	LC	WV	I
<b>32. Muscipidae</b>					
68	Brown Rock Chat	<i>Cercomela fusca</i> (Blyth, 1851)	LC	R	I
69	Black Redstart	<i>Phoenicurus ochruros</i> (Gmelin, 1774)	LC	WV	O
70	Bluethroat	<i>Luscinia svecica</i> (Linnaeus, 1758)	LC	WV	I
71	Indian Robin	<i>Saxicoloides fulicatus</i> (Linnaeus, 1766)	LC	R	I
72	Oriental Magpie-Robin	<i>Copsychus saularis</i> (Linnaeus, 1758)	LC	R	I
73	Pied Bushchat	<i>Saxicola caprata</i> (Linnaeus, 1766)	LC	R	I
74	Red-breasted Flycatcher	<i>Ficedula parva</i> (Bechstein, 1792)	LC	WV	I

75	Verditer Flycatcher	<i>Eumyias thalassinus</i> (Swainson, 1838)	LC	PM	I
	<b>33. Nectariniidae</b>				
76	Purple Sunbird	<i>Cinnyris asiaticus</i> (Latham, 1790)	LC	R	NI
	<b>34. Oriolidae</b>				
77	Indian Golden Oriole	<i>Oriolus kundoo</i> (Sykes, 1832)	LC	SV	FR
	<b>35. Passeridae</b>				
78	Chestnut-shouldered Petronia	<i>Petronia xanthocollis</i> (Burton, 1838)	LC	R	GR
79	House Sparrow	<i>Passer domesticus</i> (Linnaeus, 1758)	LC	R	GR
	<b>36. Phylloscopidae</b>				
80	Common Chiffchaff	<i>Phylloscopus collybita</i> (Vieillot, 1817)	LC	WV	O
81	Greenish Warbler	<i>Phylloscopus trochiloides</i> (Sundevall, 1837)	LC	PM	I
82	Hume's Leaf Warbler	<i>Phylloscopus humei</i> (Brooks, 1878)	LC	WV	I
	<b>37. Pycnonotidae</b>				
83	Red-vented Bulbul	<i>Pycnonotus cafer</i> (Linnaeus, 1766)	LC	R	O
84	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i> (Linnaeus, 1758)	LC	R	O
85	White-eared Bulbul	<i>Pycnonotus leucotis</i> (Gould, 1836)	LC	R	FR
	<b>38. Rhipiduridae</b>				
86	White-browed Fantail	<i>Rhipidura aureola</i> (Lesson, 1830)	LC	R	I
	<b>39. Stenostiridae</b>				
87	Grey-headed Canary-Flycatcher	<i>Culicicapa ceylonensis</i> (Swainson, 1820)	LC	WV	I
	<b>40. Sturnidae</b>				
88	Asian Pied Starling	<i>Gracupica contra</i> (Linnaeus, 1758)	LC	R	O
89	Bank Myna	<i>Acridotheres ginginianus</i> (Latham, 1790)	LC	R	O
90	Brahminy Starling	<i>Sturnia pagodarum</i> (Gmelin, 1789)	LC	R	O
91	Common Myna	<i>Acridotheres tristis</i> (Linnaeus, 1766)	LC	R	O
92	Rosy Starling	<i>Pastor roseus</i> (Linnaeus, 1758)	LC	PM	I
	<b>41. Sylviidae</b>				
93	Lesser Whitethroat	<i>Sylvia curruca</i> (Linnaeus, 1758)	LC	WV	I
95	Yellow-eyed Babbler	<i>Chrysomma sinense</i> (Gmelin, 1789)	LC	R	I
	<b>42. Turdidae</b>				
96	Black-throated Thrush	<i>Turdus atrogularis</i> (Jarocki, 1819)	LC	WV	O
	<b>43. Vangidae</b>				
97	Common Woodshrike	<i>Tephrodornis pondicerianus</i> (Gmelin, 1789)	LC	R	I
	<b>44. Zosteropidae</b>				
98	Oriental White-eye XIV. Pelecaniformes	<i>Zosterops palpebrosus</i> (Temminck, 1824)	LC	R	O
	<b>45. Ardeidae</b>				
99	Cattle Egret	<i>Bubulcus ibis</i> (Linnaeus, 1758)	LC	R	I
100	Indian Pond-Heron	<i>Ardeola grayii</i> (Sykes, 1832)	LC	R	C
101	Intermediate Egret	<i>Ardea intermedia</i> (Wagler, 1829)	LC	R	C
	<b>46. Threskiornithidae</b>				
102	Black-headed Ibis	<i>Threskiornis melanocephalus</i> (Latham, 1790)		NT	R C
103	Red-naped Ibis	<i>Pseudibis papillosa</i> (Temminck, 1824)	LC	WV	C
	<b>XV. Piciformes</b>				
	<b>47. Megalaimidae</b>				
104	Brown-headed Barbet	<i>Psilopogon zeylanicus</i> (Gmelin, 1788)	LC	R	FR
105	Coppersmith Barbet	<i>Psilopogon haemacephalus</i> (Muller, 1776)	LC	R	O
	<b>48. Picidae</b>				
106	Eurasian Wryneck	<i>Jynx torquilla</i> (Linnaeus, 1758)	LC	WV	I
107	Lesser Goldenback	<i>Dinopium benghalense</i> (Linnaeus, 1758)	LC	R	I
108	Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i> (Latham, 1801)	LC	R	I
	<b>XVI. Podicioediformes</b>				

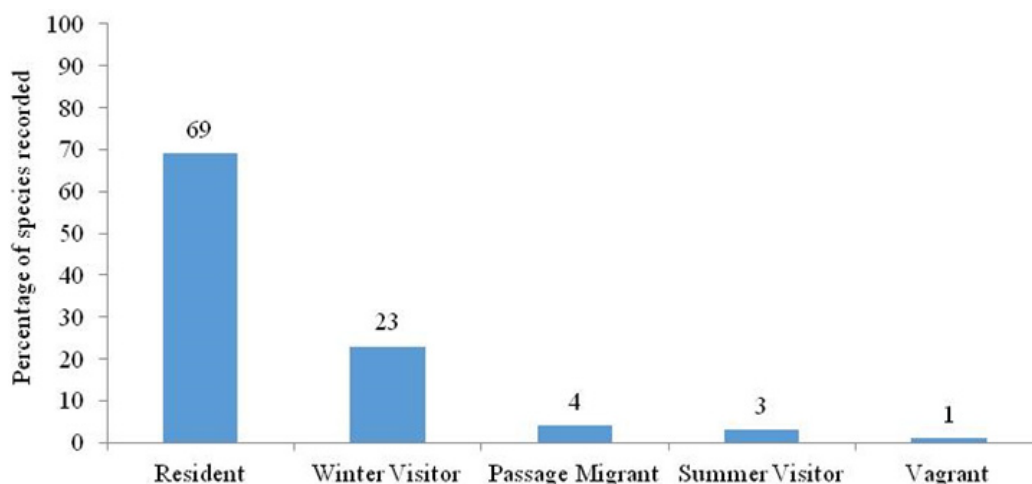
<b>49. Podicipedidae</b>				
109	Little Grebe	<i>Tachybaptus ruficollis</i> (Pallas, 1764)	LC	R I
<b>XVII. Psittaciformes</b>				
<b>50. Psittacidae</b>				
110	Alexandrine Parakeet	<i>Psittacula eupatria</i> (Linnaeus, 1766)	NT	R FR
111	Plum-headed Parakeet	<i>Psittacula cyanocephala</i> (Linnaeus, 1766)	LC	R FR
112	Rose-ringed Parakeet	<i>Psittacula krameri</i> (Scopoli, 1769)	LC	R FR
<b>XVIII. Strigiformes</b>				
<b>51. Strigidae</b>				
113	Spotted Owllet	<i>Athene brama</i> (Temminck, 1821)	LC	R C
<b>XIX. Suliformes</b>				
<b>52. Phalacrocoracidae</b>				
114	Little Cormorant	<i>Microcarbo niger</i> (Vieillot, 1817)	LC	R PI

IUCN Status: LC-Least Concern, NT-Near Threatened, Visiting status: R-Resident, WV-Winter Visitor, SV-Summer Visitor, PM-Passage Migrant, VA-Vagrant, Feeding guild: GR-Granivorous, FR-Frugivorous, O-Omnivorous, I-Insectivorous, C-Carnivorous, NI-Nectarivorous, PI-Piscivorous, H-Herbivorous

## Results

A total of 114 bird species belonging to 19 orders and 52 families were observed in three years duration (Table 1). Among the total birds reported, 79 species

(69%) were residents, 26 species (23%) were winter visitors, 4 species (4%) were passage migrants, 3 species (3%) were summer visitors and 2 species (1%) were vagrant (Fig. 1).



**Fig. 1: Visiting status of bird species recorded in JNU campus**

The study reported birds with diverse food habits. The highest observed bird species were insectivorous (47 species, 41%), followed by omnivorous (33 species, 29%), carnivorous (14 species, 12%), frugivorous (7 species, 6%), granivorous (6 species, 5%), herbivorous (4 species, 4%), piscivorous (2 species, 2%) and the least were nectarivorous (1 species, 1%) (Fig. 2). According to the IUCN status, 3 species (3%) were near threatened and the rest 111 species (97%) were least concern (Fig. 3).

Delhi is reported to support 434 avifaunal species

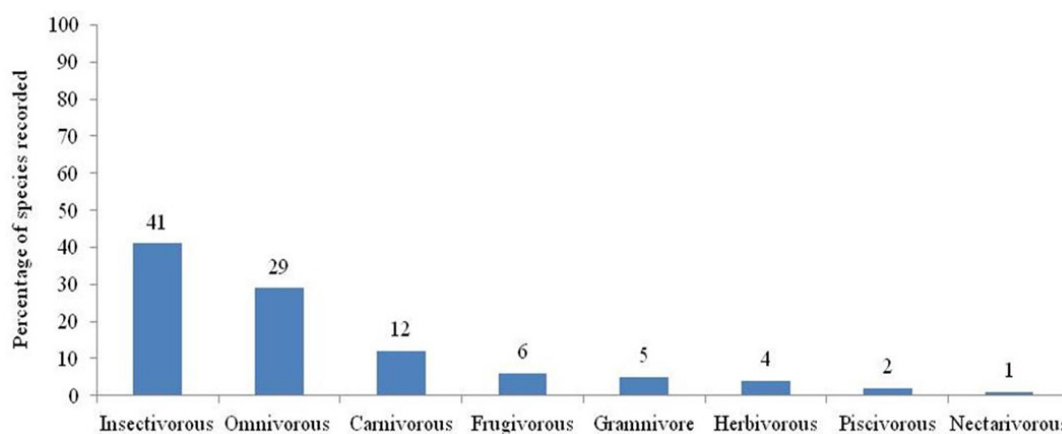
belonging to 17 orders and 59 families<sup>16</sup>. Thus, the campus accounts for 26% species, 89% orders and 88% families of birds of Delhi. The present study recorded a little lower bird species than that recorded by (Prakash and Manasvini, 2013)<sup>17</sup> (132 species) in a similar habitat of the southern ridge of Delhi. The bird species recorded in the JNU campus is comparatively more than that reported in areas with similar vegetation structure and composition like Aravali Hill (72 species)<sup>18</sup>, New campus of J.N.V. University, Jodhpur, Rajasthan (68

species)<sup>19</sup>. This high species diversity is because of ample number of thorny trees and shrubs which attract large numbers of birds<sup>20</sup>. The species like *Acacia leucophloea*, *Albizzia lebbeck*, *A. mollis*, *Alstonia scholaris*, *Azadirachta indica*, *Bauhinia variegata*, *Bombax ceiba*, *Caryota urens*, *Cassia fistula*, *C. siamea*, *Ficus religiosa*, *F. elastica*, *Leucaena leucocephala*, *Mangifera indica*, *Prosopis juliflora*, *Syzygium cumini* etc. are commonly found in the campus.

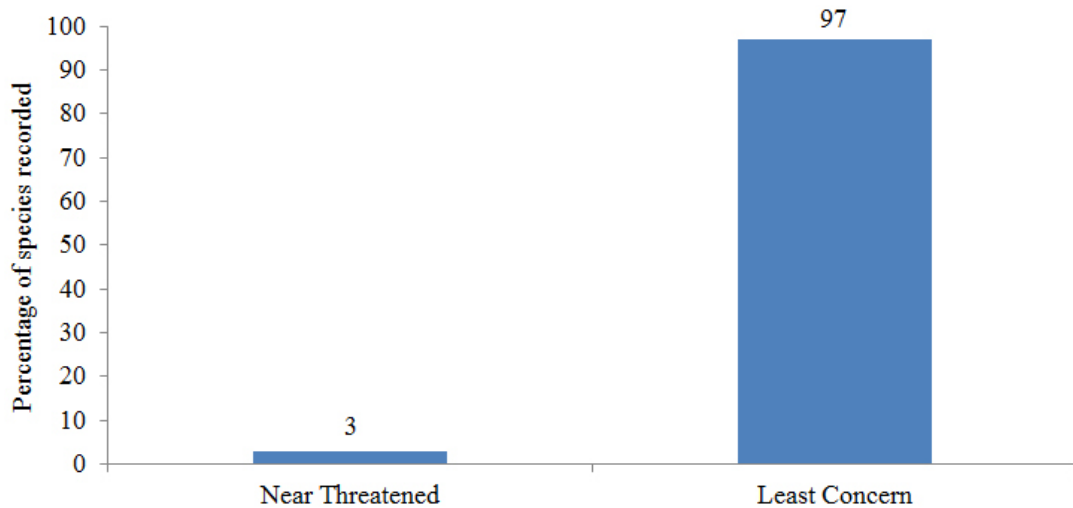
The fruits and flowers of shrubs like *Agave americana*, *Carrisa spinarum*, *Hibiscus rosa sinensis*, *Lantana camara*, *Zizyphus nummularia* support diverse varieties of birds. This is also the reason for such high diversity of birds in the campus. Three near threatened bird species, namely *Psittacula eupatria*, *Threskiornis melanocephalus* and *Mycteria leucocephala* are also recorded from the study area. The former two species are resident and are found frequently and abundantly in the area, whereas the later species is found only during the winter season but at a lower frequency rate. The species is mainly restricted only to the water reservoir in Paschimabad. This is a good indicator as the reservoir is near to the residential quarters of JNU, indicating that this species is human tolerant. Similarly, near threatened species such as *Buceros bicornis* and *Psittacula eupatria* were sighted in tea estates of Assam<sup>21</sup> and *Ploceus philippinus* was sighted in the homegardens of Assam<sup>22</sup>. Both these sites are closely associated with human habitation and have high human activity in them, but still have good sightings of species of

conservation importance. The study area not only supports the least concerned species, but also highly endangered species. Not only this, the campus also has recorded resident (79 species), migratory (33 species) and vagrant (2 species) species which indicates good and healthy ecosystem<sup>17</sup>. Thus, this study depicts the importance of semi urban habitats in biodiversity conservation. Another reason for high bird diversity in the JNU campus may be because the human disturbance and habitat modification is less in this area as compared to the other areas of the Delhi region. In addition to this, small water bodies are found in and around the ridge ecosystems which makes the area more suitable for different species of birds to survive and thrive on.

Through this paper, it can be highlighted that the campus area of JNU is still preserving the natural ecosystem which hardly can be seen in other ridge areas of Delhi as most of them are under immense anthropogenic pressure. Being an educational institute, there is a lot of scope to improve and conserve this highly biodiverse area through awareness programmes and institutional policies. It can therefore be concluded that JNU campus is a role model for conservation of fast vanishing ridge ecosystems. It can also be stated that these ecosystems are very crucial for the survival and continuity of the avifaunal diversity in the campus. Similar kind of studies can be taken up in other university campuses in and around Delhi. This will help in preparing a base line data and further help in conservation.



**Fig. 2: Classification of bird species recorded in JNU campus according to their feeding guilds**



**Fig. 3: IUCN status of bird species recorded in JNU campus**

#### Acknowledgement

We are thankful to Dean of School of Environmental Sciences and administration of Jawaharlal Nehru University, New Delhi for their administrative support. The authors are thankful to University

Grants Commission for awarding the Basic Sciences Research (BSR) Meritorious Student Fellowship which provided the financial support to carry out the fieldwork.

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