

Avifaunal diversity in the campus of Mehr Chand Mahajan DAV College for Women, Chandigarh, India

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ABSTRACT

A total of 53 bird species belonging to 11 orders and 32 families of terrestrial and semi-aquatic birds were identified and recorded during the one-year study conducted during Covid-19 pandemic in the campus of Mehr Chand Mahajan DAV College for Women, Chandigarh. Out of the 53 bird species observed, 40 were resident whereas 13 were migratory with 04 summer migrants and 09 winter migrants. Maximum number of bird species was observed in the winter season with their abundance in the wooded areas. 30 species of birds were found to be protected under Schedules I, IV and V of Wildlife Protection Act, 1972. The analysis of feeding habits showed that 26 bird species were omnivorous, 12 insectivorous, 10 carnivorous, 03 frugivorous, and 02 granivorous. The survey revealed the presence of an amicable habitat in the college campus to encourage stay or visit of birds throughout the year. Regular monitoring can further aid in establishing an avian baseline data in the campus for future references.

Figures : 04

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KEY WORDS : Birds, Chandigarh, College campus, Diversity

Introduction

Birds are considered as the bio indicators of ecological health^{21, 24}. They provide various ecosystem services like pest control, pollination, dispersal of seeds, and scavenging carcasses. From the point of view of an ecosystem, birds play an important role as linkers, movers and makers²⁵. Anthropogenic activities have severely destroyed the habitats and as a result, have led to a decline in the bird population all over the world¹¹. Therefore, documentation on bird diversity is necessary to study the effects of human activities on avian communities.

Avifaunal survey in Chandigarh was undertaken from July, 1982 to November, 1983¹⁰. They reported the presence of 129 avian species belonging to 15 orders and 42 families including local migratory birds from adjoining states of Himachal Pradesh, Haryana and Punjab²². A study conducted on the avian population in Chandigarh revealed the presence of 239 bird species

belonging to 54 families and 17 orders. The Chandigarh Bird Club records frequent observations of birds in the city, and has reported and listed 443 species of birds as observed in Chandigarh as well as adjoining areas of Himachal Pradesh, Punjab and Haryana (<https://www.chandigarhbirdclub.com/checklist/>).

The present study was set out to obtain information on the presence, richness and activities of bird species on the campus of Mehr Chand Mahajan DAV College for Women, Sector 36 A, Chandigarh. The objective of the present study was to prepare a checklist of the avifaunal diversity, and to gather information about the habitat and habits of the birds visiting or residing in the college campus.

Materials and Methods

2.1 Study Area

Mehr Chand Mahajan DAV College for Women is situated in Sector 36 A, Chandigarh (30° 44' 4.686" N,

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TABLE-1- List of habitats in the campus

| HABITAT | DESCRIPTION |
|------------------------|--|
| Wooded Area (WA) | <i>Eucalyptus</i> , Banyan, Mango, Cheeku, Bamboo, Palm, Jamun, Kadam, Rudraksh, Pine, Palm, Peepal trees |
| Garden Area (GA) | Rose, Tulsi, Marigold, Dahlia, <i>Euphorbia</i> , Pomegranate, <i>Cycas</i> , seasonal vegetables- Brinjal, Bittergourd, Coriander |
| Concrete Buildings(CB) | Classrooms, hostels, canteen with potted plants |
| Water Bodies (WB) | Artificial ponds with <i>Gambusia</i> fish and a few molluscs |
| Lawn Area (LA) | Australian grass |
| Barren Area (BA) | No vegetation |

76° 45' 25.2" E) with an average elevation of 304-365 meters above Mean Sea Level (MSL) with 1% drainage gradient. The college is spread over 11400 hectares of land and has about 19.32% forest cover. The South-eastern side of the college is in the vicinity of scattered forest of the Fragrance Garden through which the freshwater stream N-Choe flows, and the remaining sides are adjoining the main road. The college campus, because of its location, encounters four seasons in a year- Summer (mid-March to late July), Monsoon (late July- late September), Autumn (late September- mid November) and Winter (mid-November to mid-March), with average annual rainfall of 106.8 cm.

Methods

The survey was carried out for a year from January 2021- January 2022 during the Covid-19 pandemic when the institute was closed for the students and there was minimal human interference. The year-long survey during the pandemic helped to ensure optimal species coverage in all the seasons. The campus was monitored for two weeks before commencing the survey to get familiar with the birds visiting and residing in the college.

The college campus has a variety of trees, shrubs, grasses, water bodies and therefore for the study, the college area was stratified into 6 habitat types on the basis of vegetation (Table-1) using stratified random sampling technique³. This technique allowed collection of the data in an efficient manner with accurate scientific information.

A team of two members surveyed the selected sites 3 days a week for approximately 1 hour each in the morning (8:30 am- 9:30 am) and in the afternoon

(12:00 pm- 1.00 pm). The team walked along the given path covering the habitats and clicked photographs of any bird encountered, using a Nikon D3400 camera. Identification of the birds was done by using standard field guides^{8, 15} and Bird Checklist available with Chandigarh Bird Club. Birds were listed according to the order and family, the habitat they occupied and their status of being migratory/ resident of the habitat (Table- 2).

The relative diversity index (RDi) of bird families present was deduced by using the following formula¹²:

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

Results and Discussion

After the year-long survey, a total of 53 bird species were recorded at the college campus occupying several habitats (<https://sites.google.com/view/department-of-zoology-mcmdav/menu>).

Family wise analysis showed that four species each were recorded from the families Columbidae, Phylloscopidae, Strigidae and Muscicapidae, three species from family Corvidae, and two each from the families Megalimidae, Dicruridae, Psittaculidae, Accipitridae, Nectariniidae, Cuculidae and Motacillidae. Rest of the 20 families- Leiothrichidae, Picidae, Cisticolidae, Pycnonotidae, Paridae, Zosteropidae, Sturnidae, Charadriidae, Bucerotidae, Rhipiduridae, Rhipiduridae, Fringillidae, Rhipiduridae, Fringillidae, Alcedinidae, Rhipiduridae, Fringillidae, Alcedinidae, Phasianidae, Hirundinidae, Upupidae, Meropidae and Meropidae were represented by one species each (Fig. 1). Columbidae, Phylloscopidae, Strigidae and

TABLE-2: Observed bird species with their habitats, feeding habits and conservation status

| ORDER ACCIPITRIFORMES | | | | | | |
|-----------------------|--------------|---|----------------------------|-----------------------------|---------|----------------|
| S. No. | FAMILY | SCIENTIFIC NAME | COMMON NAME | MIGRATORY/ RESIDENT BIRD | HABITAT | FEEDING HABITS |
| 1. | Accipitridae | <i>Accipiter badius</i> ^{#*} | Shikra | RB | WA | Carnivore |
| 2. | Accipitridae | <i>Milvus migrans</i> | Black Kite | RB | WA, LA | Carnivore |
| ORDER BUCEROTIFORMES | | | | | | |
| 3. | Bucerotidae | <i>Ocyrceros birostris</i> [#] | Indian Grey Hornbill | RB | WA | Omnivore |
| 4. | Upupidae | <i>Upupa epops</i> | Hoopoe | RB | BA | Insectivore |
| ORDER CHARADRIIFORMES | | | | | | |
| 5. | Charadriidae | <i>Vanellus indicus</i> | Red-wattled Lapwing | RB | CB, LA | Omnivore |
| ORDER COLUMBIFORMES | | | | | | |
| 6. | Columbidae | <i>Columba livia</i> [#] | Rock Pigeon | RB | CB, GA | Omnivore |
| 7. | Columbidae | <i>Streptopelia chinensis</i> | Spotted Dove | RB | CB, WA | Granivore |
| 8. | Columbidae | <i>Streptopelia tranquebarica</i> | Red Collared Dove | RB | CB, LA | Granivore |
| 9. | Columbidae | <i>Treron phoenicopterus</i> [#] | Yellow-footed Green Pigeon | RB | WA | Frugivore |
| ORDER CORACIIFORMES | | | | | | |
| 10. | Alcedinidae | <i>Halcyon smyrnensis</i> [#] | White-throated Kingfisher | RB | WA, WB | Carnivore |
| ORDER CUCULIFORMES | | | | | | |
| 11. | Cuculidae | <i>Centropus sinensis</i> [#] | Greater Coucal | RB | WA | Carnivore |
| 12. | Cuculidae | <i>Eudynamys scolopaceus</i> | Asian Koel | RB | WA | Omnivore |
| ORDER GALLIFORMES | | | | | | |
| 13. | Phasianidae | <i>Pavo cristatus</i> ^{#*} | Indian Peafowl | RB | WA | Omnivore |

ORDER GRUIFORMES

| | | | | | | |
|-----|----------|-------------------------------|-------------------------|----|--------|----------|
| 14. | Rallidae | <i>Amaurornis phoenicurus</i> | White-breasted Waterhen | RB | WB, LA | Omnivore |
|-----|----------|-------------------------------|-------------------------|----|--------|----------|

ORDER PASSERIFORMES

| | | | | | | |
|-----|----------------|--|----------------------------|----|----------------|-------------|
| 15. | Cisticolidae | <i>Orthotomus sutorius</i> | Common Tailor bird | RB | LA, GA | Insectivore |
| 16. | Corvidae | <i>Corvus macrorhynchos</i> | Indian Jungle Crow | RB | LA, GA | Omnivore |
| 17. | Corvidae | <i>Corvus splendens</i> [#] | House Crow | RB | CB, LA, WA, BA | Omnivore |
| 18. | Corvidae | <i>Dendrocitta vagabunda</i> [#] | Rufous Treepie | RB | WA, GA | Omnivore |
| 19. | Dicruridae | <i>Dicrurus hottentottus</i> [#] | Hair-crested Drongo | RB | WA, GA | Insectivore |
| 20. | Dicruridae | <i>Dicrurus macrocercus</i> [#] | Black Drongo | RB | WA, GA | Insectivore |
| 21. | Fringillidae | <i>Carpodacus erythrinus</i> ^{**} | Scarlet Rosefinch | RB | WA | Omnivore |
| 22. | Hirundinidae | <i>Hirundo smithii</i> | Wire-tailed Swallow | SM | BA | Insectivore |
| 23. | Leiothrichidae | <i>Argya striata</i> [#] | Jungle Babbler | RB | CB, WA, LA, GA | Omnivore |
| 24. | Megalaimidae | <i>Psilopogon haemacephalus</i> [#] | Coppersmith Barbet | RB | WA | Frugivore |
| 25. | Megalaimidae | <i>Psilopogon zeylanicus</i> [#] | Brown-headed Barbet | RB | WA | Omnivore |
| 26. | Meropidae | <i>Merops orientalis</i> | Asian Green Bee-eater | SM | WA | Insectivore |
| 27. | Monarchidae | <i>Terpsiphone paradisi</i> [#] | Indian Paradise Flycatcher | SM | WA | Insectivore |
| 28. | Motacillidae | <i>Motacilla alba</i> | White wagtail | WM | LA | Carnivore |
| 29. | Motacillidae | <i>Motacilla cinerea</i> | Gray wagtail | RB | LA, WB | Carnivore |
| 30. | Muscicapidae | <i>Copsychus saularis</i> | Oriental Magpie Robin | RB | WA, GA, LA | Omnivore |

| | | | | | | |
|-----|----------------|--|---------------------------------|----|------------------------|-------------|
| 31. | Muscicapidae | <i>Eumyias thalassinus</i> [#] | Verditer Flycatcher | WM | WA | Insectivore |
| 32. | Muscicapidae | <i>Muscicapa dauurica</i> ^{#*} | Asian Brown Flycatcher | SM | LA | Insectivore |
| 33. | Muscicapidae | <i>Phoenicurus ochruros</i> | Black Redstart | WM | WA | Omnivore |
| 34. | Nectariniidae | <i>Aethopyga siparaja</i> [#] | Crimson Sunbird | RB | LA, WA | Omnivore |
| 35. | Nectariniidae | <i>Cinnyris asiaticus</i> [#] | Purple Sunbird | RB | LA, WA | Omnivore |
| 36. | Paridae | <i>Parus cinereus</i> [#] | Cinereous Tit | RB | LA, GA | Omnivore |
| 37. | Phylloscopidae | <i>Phylloscopus chloronotus</i> | Lemon-rumped Warbler | RB | WA, GA | Omnivore |
| 38. | Phylloscopidae | <i>Phylloscopus griseolus</i> | Sulphur-bellied Warbler | WM | WA, LA | Omnivore |
| 39. | Phylloscopidae | <i>Phylloscopus humei</i> | Hume's Warbler | WM | LA | Omnivore |
| 40. | Phylloscopidae | <i>Phylloscopus xanthoschistos</i> | Grey-hooded Warbler | WM | WA, LA | Omnivore |
| 41. | Picidae | <i>Dinopium benghalense</i> [#] | Lesser Golden-backed Woodpecker | RB | WA | Omnivore |
| 42. | Pycnonotidae | <i>Pycnonotus cafer</i> [#] | Red-vented Bulbul | RB | CB, WA, LA | Omnivore |
| 43. | Rhipiduridae | <i>Rhipidura albicollis</i> | White-throated Fantail | WM | WA, GA | Insectivore |
| 44. | Stenostiridae | <i>Culicicapa ceylonensis</i> [#] | Grey-headed Canary Flycatcher | WM | WA | Insectivore |
| 45. | Sturnidae | <i>Acridotheres tristis</i> [#] | Common Myna | RB | CB, WA, LA, BA, WB, CB | Omnivore |
| 46. | Sylviidae | <i>Curruca curruca</i> | Lesser White-throat | WM | WA | Omnivore |
| 47. | Zosteropidae | <i>Zosterops palpebrosus</i> [#] | Indian White-eye | RB | LA, WA | Insectivore |

ORDER PSITTACIFORMES

| | | | | | | |
|-----|---------------|----------------------------|----------------------|----|--------|-----------|
| 48. | Psittaculidae | <i>Psittacula krameri</i> | Rose-ringed Parakeet | RB | CB, WA | Frugivore |
| 49. | Psittaculidae | <i>Palaeornis eupatria</i> | Alexandrine Parakeet | RB | CB | Omnivore |

ORDER STRIGIFORMES

| | | | | | | |
|-----|-----------|---------------------------|----------------------------------|----|--------|-----------|
| 50. | Strigidae | <i>Athene brama</i> ** | Spotted Owlet | RB | WA, CB | Carnivore |
| 51. | Strigidae | <i>Ninox scutulata</i> ** | Brown Hawk Owl/ Brown Boobook | RB | WA | Carnivore |
| 52. | Strigidae | <i>Otus bakkamoena</i> ** | Indian Scops Owl | RB | WA | Carnivore |
| 53. | Strigidae | <i>Tyto alba</i> ** | Barn Owl | RB | CB | Carnivore |

WA: Wooded Area; GA- Garden Area; CB: Concrete Buildings; WB: Water Bodies; LA: Lawn Area; BA: Barren Area (no vegetation)

RB: Resident Bird; WM: Winter Migrant; SM: Summer Migrant

Protected under Schedules I, IV and V of Wildlife Protection Act, 1972

*Species listed under Appendix II of CITES

Muscicapidae were the families with highest relative density.

Out of the 53 bird species observed, 40 were resident birds whereas 13 were migratory birds (Fig. 2). The residential and migratory status of birds was ascertained using a checklist provided by the Chandigarh Bird Club (<https://www.chandigarhbirdclub.com/checklist/>). Resident birds like- *Accipiter badius*, *Milvus migrans*, *Ocyrceros birostris*, *Columba livia*, *Treron phoenicopterus*, *Amaurornis hoenicurus*, *Acridotheres tristis*, *Cinnyris asiaticus*, *Corvus splendens*, *Dinopium benghalense*, *Orthotomus sutorius*, *Psilopogon haemacephalus*, *Psittacula krameri*, *Athene brama*, *Otus bakkamoena* were seen nesting in the college premises. The summer migrants- *Hirundo smithi*, *Merops orientalis*, *Terpsiphone paradisi* and *Muscicapa dauurica* were seen in the campus during the months of March, April, July, September, and October. Winter migrants, *Culicicapa ceylonensis*, *Curruca curruca*, *Eumyias thalassinus*, *Motacilla alba*, *Phoenicurus ochruros*, *Phylloscopus griseolus*, *Phylloscopus humei*, *Phylloscopus xanthoschistos*, *Rhipidura albicollis* visited the college during the months of April, May, October, November and December.

Further, 37 species of birds were found to be

protected under Schedules I, IV and V of Wildlife Protection Act, 1972. 8 out of these 30 species were listed under Appendix II of CITES (species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled). 6 out of 37 protected species have been recognised as protected in CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna) (<https://cites.org/sites/default/files/eng/app/2021/E-Appendices-2021-02-14.pdf>). 23 species were found to be of least concern.

The Alexandrine parakeet (*Psittacula eupatria*) whose population is on the decline has been categorised as a near-threatened species. Two birds of rare sighting in Chandigarh, *Ninox scutulata* and *Muscicapa dauurica* were also observed in the campus. The overall analysis of feeding habits of observed bird species showed that a maximum number of bird species (26) were omnivorous, 12 were insectivorous, 10 were carnivorous, 03 were frugivorous, and 02 were granivorous.

Birds occupy several habitats in order to fulfil their needs. The more varied the habitat, the more variety of avian population will be occupying an area¹⁶. Most birds prefer to occupy green areas with ample amount of shade and cover. During the present study, maximum

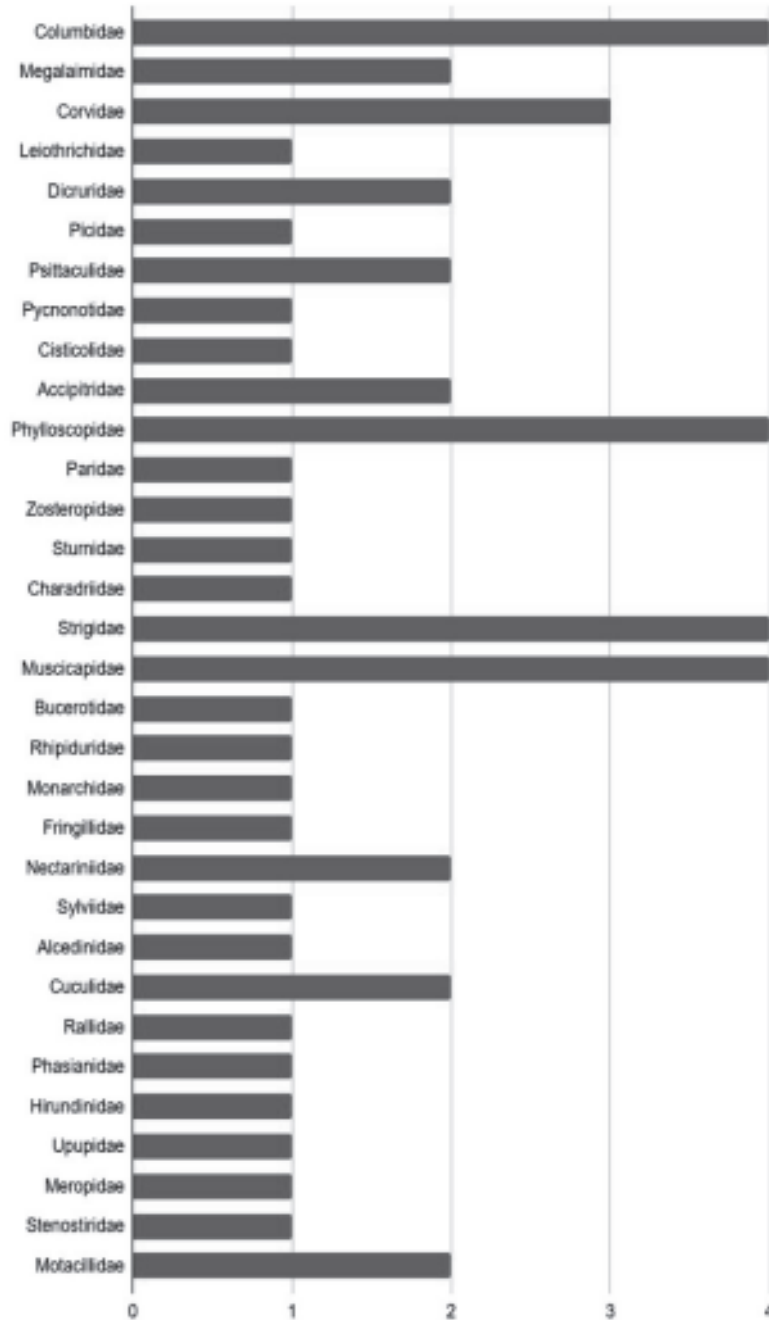


Fig. 1: Family wise count of observed bird species

numbers of birds were observed in the wooded area and least in the barren area (Fig. 3). This choice of occupying trees and vegetation can be attributed to ease of locating food (fruits, seeds, insects), gathering material for constructing nests, and protection from predators¹³.

Further, the number of bird species observed was highest during the winter season (mid-November to mid-March) when 40 species of birds were seen (Fig. 4). Studies^{7,9} reported that Shivalik Hill ranges attract a large number of migrants from the Himalayas owing to scarcity of food there during the winter months^{1,17,19,23}.

Knowledge of the bird diversity in a particular area is important for determining the health of the ecosystem^{20,26}. Proximity of the campus to thick vegetation of fragrance garden favours the high diversity of birds found in the college. Moreover, the study period overlapped with the lockdown due to COVID-19 pandemic. This period could have had a positive impact on the avian fauna because of minimal human interference. Bird species have been reported to reclaim their habitat sites during the COVID-19 lockdown all over the world^{5,6}. The lockdown acted as “anthropause” which

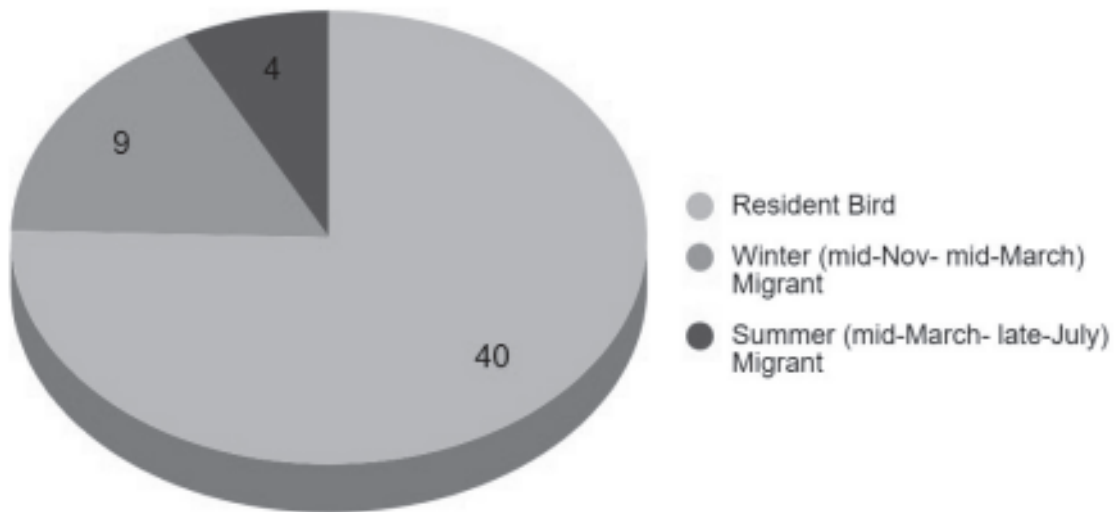


Fig. 2: Pie chart showing the number of resident and migratory birds in campus

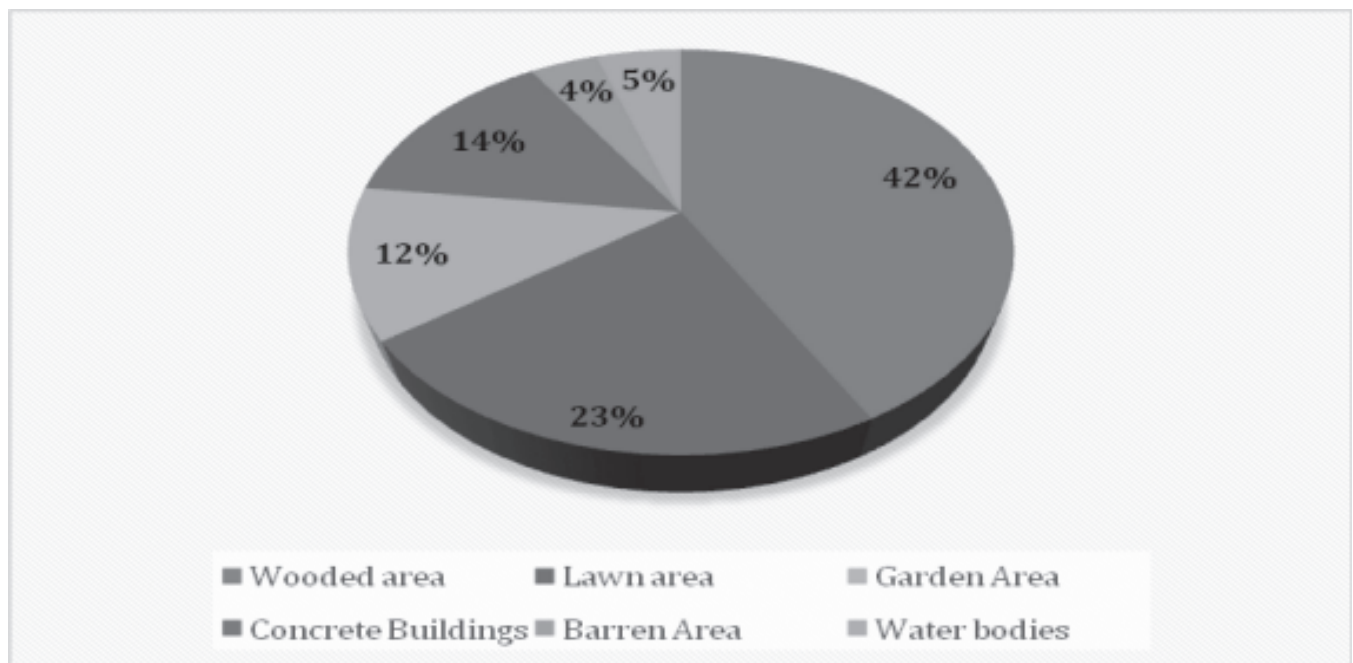


Fig. 3: Pie chart showing habitat wise distribution of bird species

brought down the noise and air pollution to safer limits. Such a scenario may have allowed the native avifauna to explore more of the urban space in terms of breeding and perching sites^{2,14,18}. Further systematic surveys need to be planned to compare the avian fauna over the next few years which would help to establish an avian baseline data in the campus for future references.

Conclusion

The current study on avian biodiversity is the first of its kind in the college and no published checklist of

the birds of the college exists till date. The forest patches, parks and gardens, and waterbodies play an important role in supporting avifauna. The survey revealed the presence of amicable habitats in the college campus to encourage stay or visit of birds throughout the year. It is therefore suggested that such habitats should be conserved inside the campus to protect native avifaunal diversity. Regular monitoring can further aid in directing efforts towards creating new habitats or improving the present ones to help birds live some part of their life cycle in the campus.

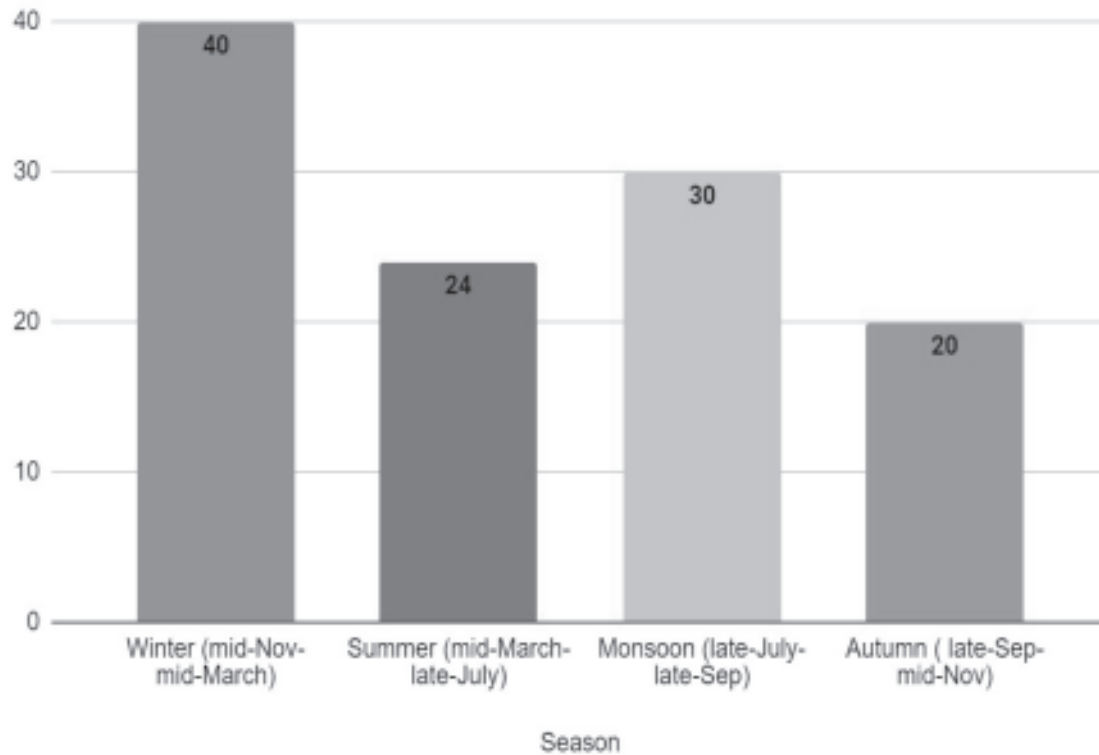


Fig. 4: Bar chart showing the number of bird species observed in each season

Declaration

The authors declare that there is no conflict of

interest and there is no financial or non-financial interest to report.

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