



Assessment of seasonal variation of population of birds of Moradabad city (Uttar Pradesh)

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Abstract

The main aim of the present investigation was to study the seasonal variation of bird's species diversity at Moradabad City (Uttar Pradesh). Seasonal variation of bird's species was observed from the selected sites near Ramganga River, Ashiyana, Moradabad. In the present study, several species were observed in different seasons. Annual assessment of birds was conducted during different seasons *viz.* Summer, Rainy and Winter during 2024-25. Bird count of order Columbiformes (pigeon and doves) was maximum in summers followed by rainy and winter season. Similarly, second highest bird count was met with order Passeriformes of crows in summers followed by rainy and winter season. Bird count of bulbul (Order Passeriformes) was also found highest in summers. Seasonal Analysis bird count helps in mitigating conservational aspects of related avian species.

Keywords: Seasonal variations, birds, species, avian diversity

Introduction

Birds are colourful, economic important member of rich faunal biodiversity of the planet. They use to unite the food chains in the ecosystem (Singh *et al.*, 2018) ^[1]. Birds are unique cosmopolitan creature that play an important role in any ecosystem as they are potential bio-indicators, pollinators, seed-dispersers and scavengers (Chaube *et al.*, 2018) ^[2]. They are also economically beneficial in agriculture by checking the population of harmful pests which adversely affect productivity (Their seasonal migration lays many applications along with their personal benefits for any ecosystem. The Number of migratory birds visiting an area also indicates the health of that particular environment (Pawar and Salunkhe, 2014) ^[3]. Birds' visits periodically an area to fulfill needs of feeding and breeding. Some birds migrate a long distance for getting favourable surroundings for their survival. Sharma and Shukla, 2005 ^[4] reported avian diversity is in danger due to increase in population, pollution and climatic changes. Urbanization and Industrialization also affected biodiversity of Avian Fauna that even common birds like sparrow were once came in endangered zone and started seen very less number in

urban vicinity (Gupta, S., 2025) ^[5]

Present avian biodiversity study was done in Moradabad. Moradabad lies between 28 °21' to 28 °16' North Latitudes and 78 °4' to 79 ° East Longitude. This district of western Uttar Pradesh occupies a geographical area of 3493 sq. km (Maps of India). Moradabad is famous worldwide for export of brass wares and artisan handicrafts. Moradabad has rich biodiversity of Birds encompassing various orders and families.

Material and Method

An approachable site was selected near Ramganga River, Ashiyana, Moradabad for the annual assessment of different birds count in three main seasons *viz.* Winter, Summer and Rainy Season. Total count was also estimated and tabulated. Observations of Biodiversity of Avian fauna of Moradabad city were made with the aid of binoculars and data was recorded along with photography using DSLR cameras during 2024-25. The birds were identified using standard field guide books of Ali & Ripley, 1987 ^[7] and a checklist of different apps were also used to compare the biodiversity of urban birds.

Table 1: Seasonal variation of different birds at a site of Moradabad City during April 2024-March 2025

| S. No. | Name of bird | Order | Winter | Summer | Rainy | Total count | Standard deviation | Mean |
|--------|-----------------|----------------|--------|--------|-------|-------------|--------------------|-------|
| 1 | Pigeon and dove | Columbiformes | 81 | 133 | 116 | 330 | 7.75 | 27.5 |
| 2 | Bulbul | Passeriformes | 51 | 67 | 51 | 169 | 4.7 | 14.08 |
| 3 | Crow | Passeriformes | 79 | 99 | 77 | 255 | 8.29 | 21.25 |
| 4 | Purple sunbird | Passeriformes | 18 | 41 | 71 | 130 | 8.31 | 10.83 |
| 5 | Rufous treepie | Passeriformes | 11 | 11 | 15 | 37 | 1.73 | 3.08 |
| 6 | Coucal | Cuculiformes | 2 | 9 | 11 | 22 | 1.59 | 1.83 |
| 7 | Koel | Cuculiformes | 5 | 20 | 15 | 40 | 2.57 | 3.33 |
| 8 | Ashy prinia | Passeriformes | 15 | 27 | 15 | 57 | 3.4 | 5.18 |
| 9 | Kite | Ciconiiformes | 18 | 9 | 6 | 33 | 2.22 | 2.75 |
| 10 | Myna | Passeriformes | 37 | 27 | 50 | 114 | 4.62 | 9.5 |
| 11 | Yellow sunbird | Passeriformes | 16 | 37 | 51 | 104 | 7.25 | 8.67 |
| 12 | Babbler | Passeriformes | 64 | 55 | 36 | 155 | 8.28 | 12.92 |
| 13 | Parrot | Psittaciformes | 15 | 7 | 6 | 28 | 3.68 | 2.33 |
| 14 | Hoopoe | Upupiformes | 3 | 1 | 1 | 5 | 0.93 | 0.45 |
| 15 | Indian hornbill | Coraciiformes | 4 | 2 | 4 | 10 | 1.15 | 3.33 |
| 16 | Drongo | Passeriformes | 17 | 22 | 0 | 39 | 5.61 | 3.55 |

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|----|---------------------|-----------------|----|----|----|-----|------|-------|
| 17 | Kingfisher | Coraciiformes | 23 | 13 | 8 | 44 | 3.6 | 3.67 |
| 18 | Robin magpie | Passeriformes | 38 | 36 | 22 | 96 | 5.12 | 8 |
| 19 | Ashy prinia | Passeriformes | 20 | 23 | 16 | 59 | 2.35 | 4.92 |
| 20 | Oriole | Passeriformes | 4 | 3 | 6 | 13 | 1 | 1.08 |
| 21 | Barbet | Piciformes | 2 | 2 | 2 | 6 | 0.67 | 0.5 |
| 22 | Waterhen | Gruiformes | 3 | 7 | 7 | 17 | 1.56 | 1.42 |
| 23 | Lapwing | Charadriiformes | 22 | 10 | 3 | 35 | 3.92 | 2.92 |
| 24 | Cattle egret | Ciconiiformes | 41 | 39 | 51 | 131 | 5.14 | 10.92 |
| 25 | Pipit | Passeriformes | 7 | 10 | 1 | 18 | 1.51 | 1.5 |
| 26 | Starling | Passeriformes | 9 | 7 | 1 | 17 | 1.68 | 1.42 |
| 27 | Owl | Strigiformes | 5 | 1 | 1 | 7 | 1.44 | 0.58 |
| 28 | Wire tailed swallow | Passeriformes | 18 | 2 | 4 | 24 | 2.63 | 2 |
| 29 | Grey wagtail | Passeriformes | 25 | 12 | 12 | 49 | 2.43 | 4.08 |
| 30 | Sparrow | Passeriformes | 19 | 30 | 27 | 76 | 2.31 | 6.33 |

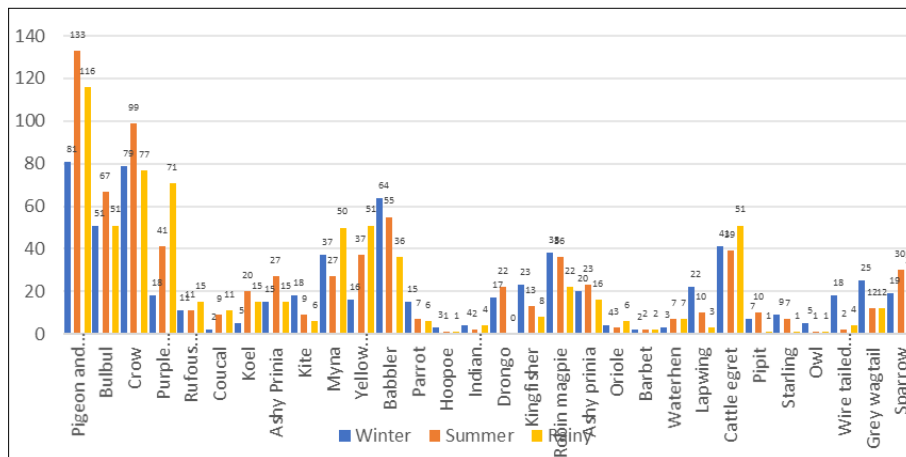


Fig 1: Bird Count of Different Species During Different Season (2024-2025)

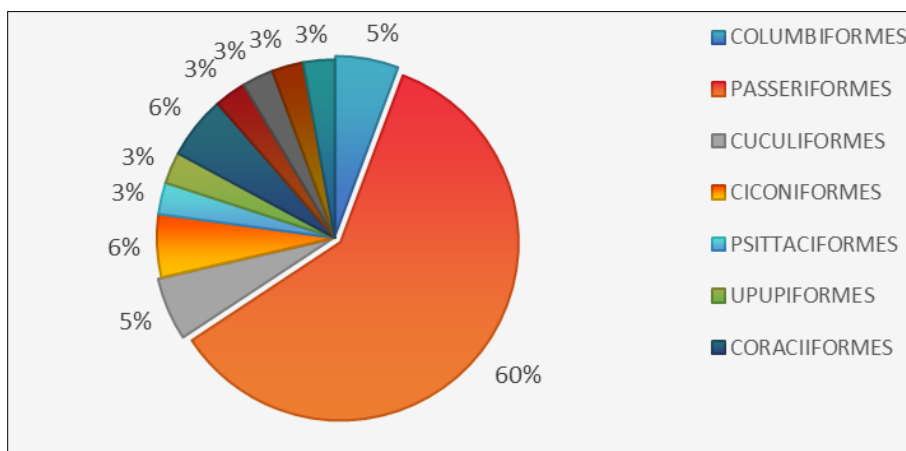


Fig 2: Avian Biodiversity of Different Orders

Result & Discussion

From the Perusal of Table-1, it was found that out of 60 birds observed in urban localities of Moradabad, 30 species were frequently found in the selected site round the year in different season viz summer, winter and Monsoon Biodiversity of birds which were found belongs to different order and families (Fig.-1). Highest bird count of pigeon and doves (Order Columbiformes) with mean value of 27.5 ± 7.75 standard deviation was found amongst others followed by crows (Order Passeriformes) 21.25 ± 8.29 (Mean Value \pm S.D). From the tabular analysis, it was found that Maximum count of Pigeons were found in summers than in rainy and winter season. Similar results were also of crows. Bulbul (Order Passeriformes) ranked third 14.08 ± 4.7 (Mean Value \pm S.D) in bird count in the city site of Moradabad.

Order Passeriformes has maximum number of birds which are found during seasonal studies of bird count at a selected area of Moradabad city [Fig.-2]. No prior studies related to seasonal bird count was reported in literature review of Moradabad city. Some birds are occasionally seen during their breeding period while birds like Hoopoe are rarely observed.

Rai *et al*, 2021 [8] recorded about 114 species of avian biodiversity from Haryana which belongs to 18 orders, 47 families and 91 generas. Shiu and lee, 2003 [9] found that the bird species richness declined with elevation above about 1500 m (with decrease in temperature). At normal level and topography species richness remained constant. Seasonal community structure is well studied by Pandey *et al*, 2020 [10] at Vindhyanchal forest Reserve, Khargone, MP who

reported thirty-six sp. in the summer season and forty-one species in the monsoon season and forty species were recorded in post monsoon season.

Conclusion

From the present analysis, it was found that Moradabad has rich Avian Diversity. Mostly birds are resident inhabitant while other are migratory. Some are winter breeder and other breeds in monsoon or summer season. All these birds in their different breeding, feeding, migrating behaviour make up total bird count of Moradabad city. It is envisaged that different climatic, urban planning, pollution, waterbodies and wetland restoration factors should be summed up for restoring biodiversity of these Avian species in Moradabad. For the abovesaid factors the study of seasonal variation of different birds along with their bird count is mandatory and primary requisite.

Future Scope of Study

The present study assessed the population dynamics of birds in Moradabad city, Uttar Pradesh. Future studies can build upon this research by:

1. **Long-term monitoring:** Conduct a long-term study (5-10 years) to assess the population trends, habitat preferences, and behavioral changes of bird species in Moradabad city.
2. **Impact of climate change:** Investigate the impact of climate change on the population dynamics, migration patterns, and breeding habits of bird species in the region.
3. **Habitat fragmentation:** Study the effects of habitat fragmentation on bird populations, including the impact of urbanization, deforestation, and infrastructure development.
4. **Bird-human conflict:** Investigate the conflicts between birds and humans in Moradabad city, including issues related to bird strikes, crop damage, and noise pollution.
5. **Conservation efforts:** Develop and implement conservation strategies to protect bird habitats, reduce bird-human conflict, and promote sustainable urban planning in Moradabad city.
6. **Comparative studies:** Conduct comparative studies with other cities in Uttar Pradesh or India to understand the regional variations in bird population dynamics and habitat preferences.
7. **Bird-friendly urban planning:** Collaborate with urban planners and policymakers to develop bird-friendly urban planning strategies, incorporating green spaces, bird habitats, and sustainable infrastructure development.

These future studies can provide valuable insights into the ecology, conservation, and management of bird populations in Moradabad city, contributing to the development of effective conservation strategies and sustainable urban planning practices.

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