Avian Diversity in the Naseera Botanical Garden at Dr. Moopen's Medical College, Wayanad, Kerala, India

Mr. Sabu V.U.[1*], Mr. Athul U.K[2]; Mr. Ahammed Fayas K[3]; Mr. Arjun A.R[4]

[*1]Vayalarikil (H), Kalathuvayal (PO), Ambalavayal. 673593, Wayanad
[2]Modeth (H), Mele Arepetta Meppadi (PO) 673577. Wayanad.
[3]Kavungal (H), Pattikad (PO), 679325, Malappuram,
[4]Alakkamittam (H), Anjukunnu post, 670645, Manathavady, Wayanad
Institution: - Naseera Botanical Garden at Dr. Moopen's Medical College.
*Corresponding Author

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Abstract— *This study surveys the avian diversity within the Naseera Botanical Garden at Dr. Moopen's Medical College, South Wayanad, Kerala, situated in the ecologically rich Western Ghats. Given the urgent need to document biodiversity in urbanizing landscapes, this research aims to establish a baseline understanding of bird species composition in the region.*

Over one year, we employed point count and line transect methods to systematically survey bird populations throughout the botanical garden. This approach enabled consistent monitoring of various habitats, documenting the diversity and abundance of avian species while tracking seasonal variations and migratory patterns. A thorough checklist was compiled, detailing each species observed along with species-specific counts.

In total, we identified 166 bird species, highlighting the garden's significance as a habitat for avifauna amidst urban expansion. Notably, several endemic species were recorded, including the Wayanad Laughing Thrush (Trochalopteron fairbanki) and Jerdon's Baza (Aviceda jerdoni).

This study serves as the first comprehensive checklist of bird species in the Naseera Nagar Botanical Garden, offering a valuable reference for future research. It underscores the essential role of botanical gardens and educational campuses in preserving biodiversity by providing suitable habitats for both native and migratory birds. Such spaces not only support avian conservation but also engage students and the public in learning about biodiversity, emphasizing the need for sustainable management practices in educational institutions.

Keywords— Avian Diversity, Naseera Botanical Garden at Dr. Moopen's Medical College Wayanad, Western Ghats Endemics, Bird Species Checklist, Point Count Method' Line Transect Survey, Semi-urban Biodiversity, Conservation in Educational Campuses.

I. INTRODUCTION

Biodiversity is a fundamental component of ecosystem health, serving as a critical indicator of ecological stability and resilience. Birds, in particular, play an essential role in ecosystem functioning, participating in food webs and acting as natural indicators of habitat health. Their presence, diversity, and population dynamics offer invaluable insights into environmental conditions, as bird communities often reflect underlying changes in vegetation structure and respond with sensitivity to both natural and anthropogenic disturbances. These responses highlight birds' unique role in maintaining ecological resilience and promoting ecosystem stability, making avian studies vital for conservation and environmental monitoring efforts.

Documenting bird diversity within specific habitats is therefore important for understanding habitat quality, assessing ecological health, and tracking long-term environmental changes. While extensive research has been conducted on avian diversity in protected areas and untouched natural habitats, studies on bird populations within urban and semi-urban environments are comparatively limited. In particular, botanical gardens and educational institutions provide green spaces that can serve as refuges for various bird species, offering shelter, food sources, and breeding sites. Yet, these spaces are often

overlooked in biodiversity assessments, despite their potential to support significant avian populations, particularly in rapidly urbanizing regions.

The Naseera Botanical Garden at Dr. Moopen's Medical College, South Wayanad, Kerala, represents one such semi-urban green space within the ecologically rich and biodiverse region of the Western Ghats. The Western Ghats are known for their remarkable endemism and diverse flora and fauna, yet semi-urban areas within this biodiversity hotspot remain understudied, particularly regarding avian diversity. The botanical garden has thus far not been examined for its avian population, making it an unexplored yet potentially significant site for local bird species.

This research aims to fill this gap by conducting a systematic survey of bird diversity within the Naseera Botanical Garden, establishing a baseline checklist of species within this environment. Over the course of a year, we employed standardized point count and line transect methods to document bird species and population counts, allowing for a detailed analysis of avian diversity in this educational campus setting. Our study not only provides the first inventory of bird species within the botanical garden but also adds valuable data on the composition and abundance of bird populations in a semi-urban habitat, contributing to a broader understanding of avian ecology with Naseera Botanical Garden at Dr. Moopen's Medical College, South Wayanad, Kerala.

This work emphasizes the importance of preserving biodiversity in educational campuses and botanical gardens, which can serve as important green spaces amidst urban expansion. By fostering avian diversity, such spaces provide ecological value, contribute to environmental education, and offer opportunities for future research on biodiversity conservation in urbanized landscapes. Ultimately, this study highlights the potential for botanical gardens within educational institutions to act as microhabitats supporting diverse bird populations and underscores the need for sustainable management practices that enhance their ecological function.

II. MATERIALS AND METHODS

2.1 Study Area:

This study was conducted within the diverse landscape of Dr. Moopen's Medical College, located in the South Wayanad Forest Division in Kerala, India, at latitude 11.56°N and longitude 76.16°E. The campus spans approximately 50 acres and includes the Naseera Botanical Garden, which serves as a significant ecological resource for studying bird diversity. The campus features a variety of landscapes, including administrative and academic buildings, residential quarters, ponds, agricultural fields, ornamental plantings, coffee plantations, and patches of forested areas. This diverse ecological mosaic provides a range of habitats conducive to a wide array of bird species.

The combination of the botanical garden and surrounding environments supports a rich variety of vegetation and microhabitats, allowing for a flourishing bird population. The unique setting of the Naseera Botanical Garden within a semi-urban educational context offers a valuable opportunity to explore avian ecology, making it an ideal location for this research.

2.2 Methodology:

Observing and identifying birds requires precision and attentiveness, given the active and often elusive behavior of many species. This study was conducted over a full year, ensuring seasonal coverage and allowing for a comprehensive view of avian diversity across different times of the year. Daily observations were recorded systematically, with an emphasis on capturing consistent data for analysis. We utilized a Nikon 34X digital zoom camera and Solognac 500 8×42 binoculars to aid in capturing clear images and details necessary for accurate species identification.

To effectively assess avian diversity across the varied campus landscapes, we employed both point count and line transect methods. The point count method involved selecting fixed points within various zones on campus, such as forest patches, water bodies, and landscaped areas, and recording bird observations from these spots. This technique is well-suited for capturing data in specific habitats and was complemented by line transect surveys, in which the observer walked predefined paths through different campus sections, documenting bird sightings systematically along the transect line. Together, these methods allowed for comprehensive coverage of all habitat types on campus, minimizing bias and ensuring that all bird species present were detected.

2.3 Identification Protocol:

Bird identification was based on a combination of visual and auditory cues, providing a robust framework for accurate documentation. Visual identification criteria included key characteristics such as body size and shape, coloration (including

distinctive patches and stripes), eye lines, nape and eye coloration, and bill size. Field observations included additional descriptors, such as feeding habits, foraging behavior, and general activity, which helped to distinguish similar species and provided insights into their ecological roles. Species-specific vocalizations, including calls and songs, were also critical to the identification process, as many birds could be detected by sound alone, particularly in densely vegetated areas.

This detailed and systematic protocol for observation and identification not only ensured accuracy in recording the avian species present but also facilitated deeper insights into the behavioral patterns, habitat preferences, and resource utilization by different bird species within the campus environment. The use of high-quality optical devices, such as the Solognac 500 8×42 binoculars, further enhanced observation quality, enabling closer scrutiny of fine morphological features that are essential for reliable species identification.

Overall, this methodological approach allowed us to compile a comprehensive checklist of bird species inhabiting the botanical garden and surrounding areas, contributing valuable data on avian diversity within a semi-urban educational campus in the Western Ghats.

The IUCN categories are typically classified as follows:

- LC: Least Concern
- NT: Near Threatened
- VU: Vulnerable
- EN: Endangered
- CR: Critically Endangered
- EX: Extinct
- EW: Extinct in the Wild

"Below is the list of birds in the Naseera Botanical Garden at Dr. Moopen's Medical College, Wayanad, along with their corresponding IUCN status."

TABLE 1
LIST OF BIRDS IN THE NASEERA BOTANICAL GARDEN AT DR. MOOPEN'S MEDICAL COLLEGE, WAYANAD

Common Name	Scientific Name	IUCN Status
Lesser Whistling-Duck	Dendrocygna javanica	LC
Indian Spot-billed Duck	Anas poecilorhyncha	LC
Indian Peafowl	Pavo cristatus	LC
Red Spurfowl	Galloperdix spadicea	LC
Gray Junglefowl	Gallus sonneratii	LC
Rock Pigeon	Columba livia	LC
Spotted Dove	Spilopelia chinensis	LC
Asian Emerald Dove	Chalcophaps indica	LC
Gray-fronted Green-Pigeon	Treron affinis	LC
Malabar Imperial-Pigeon	Ducula cuprea	LC
Greater Coucal	Centropus sinensis	LC
Pied Cuckoo	Clamator jacobinus	LC
Asian Koel	Eudynamys scolopaceus	LC
Banded Bay Cuckoo	Cacomantis sonneratii	LC
Gray-bellied Cuckoo	Cacomantis passerinus	LC
Fork-tailed Drongo-Cuckoo	Surniculus dicruroides	LC
Common Hawk-Cuckoo	Hierococcyx varius	LC
White-rumped Spinetail	Zoonavena sylvatica	LC
Brown-backed Needletail	Hirundapus giganteus	LC
Indian Swiftlet	Aerodramus unicolor	LC
Alpine Swift	Tachymarptis melba	LC

Little Swift	Apus affinis	LC
Asian Palm Swift	Cypsiurus balasiensis	LC
White-breasted Waterhen	Amaurornis phoenicurus	LC
Ruddy-breasted Crake	Zapornia fusca	LC
Red-wattled Lapwing	Vanellus indicus	LC
Yellow-legged Buttonquail	Turnix tanki	LC
Little Grebe	Tachybaptus ruficollis	LC
Asian Openbill	Anastomus oscitans	LC
Asian Woolly-necked Stork	Ciconia episcopus	LC
Oriental Darter	Anhinga melanogaster	LC
Little Cormorant	Microcarbo niger	LC
Indian Cormorant	Phalacrocorax fuscicollis	LC
Black-headed Ibis	Threskiornis melanocephalus	LC
Cinnamon Bittern	Botaurus cinnamomeus	LC
Black-crowned Night Heron	Nycticorax nycticorax	LC
Little Egret	Egretta garzetta	LC
Striated Heron	Butorides striata	LC
Indian Pond-Heron	Ardeola grayii	LC
Eastern Cattle-Egret	Ardea coromanda	LC
Great Egret	Ardea alba	LC
Medium Egret	Ardea intermedia	LC
Purple Heron	Ardea purpurea	LC
Jerdon's Baza	Aviceda jerdoni	VU
Oriental Honey-buzzard	Pernis ptilorhynchus	LC
Crested Serpent-Eagle	Spilornis cheela	LC
Rufous-bellied Eagle	Lophotriorchis kienerii	LC
Black Eagle	Ictinaetus malaiensis	LC
Crested Goshawk	Lophospiza trivirgata	LC
Shikra	Tachyspiza badia	LC
Brahminy Kite	Haliastur indus	LC
Eastern Barn Owl	Tyto javanica	LC
Indian Scops-Owl	Otus bakkamoena	LC
Brown Fish-Owl	Ketupa zeylonensis	LC
Jungle Owlet	Glaucidium radiatum	LC
Brown Boobook	Ninox scutulata	LC
Eurasian Hoopoe	Upupa epops	LC
Malabar Gray Hornbill	Ocyceros griseus	VU
Blue-bearded Bee-eater	Nyctyornis athertoni	LC
Asian Green Bee-eater	Merops orientalis	LC
Chestnut-headed Bee-eater	Merops leschenaulti	LC
Common Kingfisher	Alcedo atthis	LC
Stork-billed Kingfisher	Pelargopsis capensis	LC
White-throated Kingfisher	Halcyon smyrnensis	LC
Indian Roller	Coracias benghalensis	LC
Dollarbird	Eurystomus orientalis	LC
Malabar Barbet	Psilopogon malabaricus	LC
White-cheeked Barbet	Psilopogon viridis	LC
Speckled Piculet	Picumnus innominatus	LC
Heart-spotted Woodpecker	Hemicircus canente	LC
Brown-capped Pygmy Woodpecker	Yungipicus nanus	LC
Malabar Flameback	Chrysocolaptes socialis	LC
Rufous Woodpecker	Micropternus brachyurus	LC

Black-rumped Flameback	Dinopium benghalense	LC
Lesser Yellownape	Picus chlorolophus	LC
Streak-throated Woodpecker	Picus xanthopygaeus	LC
White-bellied Woodpecker	Dryocopus javensis	LC
Peregrine Falcon	Falco peregrinus	LC
Rose-ringed Parakeet	Psittacula krameri	LC
Plum-headed Parakeet	Psittacula cyanocephala	LC
Malabar Parakeet	Psittacula columboides	NT
Vernal Hanging-Parrot	Loriculus vernalis	LC
Indian Pitta	Pitta brachyura	LC
Small Minivet	Pericrocotus cinnamomeus	LC
Orange Minivet	Pericrocotus flammeus	LC
Black-headed Cuckooshrike	Lalage melanoptera	LC
Indian Golden Oriole	Oriolus kundoo	LC
Ashy Woodswallow	Artamus fuscus	LC
Malabar Woodshrike	Tephrodornis sylvicola	LC
Bar-winged Flycatcher-shrike	Hemipus picatus	LC
Asian Fairy-bluebird	Irena puella	LC
Common Iora	Aegithina tiphia	LC
Black Drongo	Dicrurus macrocercus	LC
Ashy Drongo	Dicrurus leucophaeus	LC
Bronzed Drongo	Dicrurus aeneus	LC
Greater Racket-tailed Drongo	Dicrurus paradiseus	LC
Black-naped Monarch	Hypothymis azurea	LC
Indian Paradise-Flycatcher	Terpsiphone paradisi	LC
Common Rosefinch	Carpodacus erythrinus	LC
Brown Shrike	Lanius cristatus	LC
Bay-backed Shrike	Lanius vittatus	LC
Long-tailed Shrike	Lanius schach	LC
House Crow	Corvus splendens	LC
Large-billed Crow	Corvus macrorhynchos	LC
Asian Tit	Parus cinereus	LC
Indian Yellow Tit	Machlolophus aplonotus	LC
Common Tailorbird	Orthotomus sutorius	LC
Gray-breasted Prinia	Prinia hodgsonii	LC
Ashy Prinia	Prinia socialis	LC
Thick-billed Warbler	Arundinax aedon	LC
Blyth's Reed Warbler	Acrocephalus dumetorum	LC
Clamorous Reed Warbler	Acrocephalus stentoreus	LC
Dusky Crag-Martin	Ptyonoprogne concolor	LC
Hill Swallow	Hirundo domicola	LC
Eastern Red-rumped Swallow	Cecropis daurica	LC
Yellow-browed Bulbul	Acritillas indica	LC
Red-whiskered Bulbul	Pycnonotus jocosus	LC
Red-vented Bulbul	Pycnonotus cafer	LC
Green Warbler	Phylloscopus nitidus	LC
Greenish Warbler	Phylloscopus trochiloides	LC
Large-billed Leaf Warbler	Phylloscopus magnirostris	LC
Lesser Whitethroat	Curruca curruca	LC
Indian White-eye	Zosterops palpebrosus	LC
Tawny-bellied Babbler	Dumetia hyperythra	LC
Dark-fronted Babbler	Dumetia atriceps	LC

Indian Scimitar-Babbler	Pomatorhinus horsfieldii	LC
Puff-throated Babbler	Pellorneum ruficeps	LC
Brown-cheeked Fulvetta	Alcippe poioicephala	LC
Rufous Babbler	Argya subrufa	LC
Jungle Babbler	Argya striata	LC
Wayanad Laughingthrush	Pterorhinus delesserti	NT
Velvet-fronted Nuthatch	Sitta frontalis	LC
Southern Hill Myna	Gracula indica	LC
Brahminy Starling	Sturnia pagodarum	LC
Chestnut-tailed Starling	Sturnia malabarica	LC
Malabar Starling	Sturnia blythii	VU
Common Myna	Acridotheres tristis	LC
Jungle Myna	Acridotheres fuscus	LC
Orange-headed Thrush	Geokichla citrina	LC
Indian Blackbird	Turdus simillimus	LC
Asian Brown Flycatcher	Muscicapa dauurica	LC
Brown-breasted Flycatcher	Muscicapa muttui	LC
Oriental Magpie-Robin	Copsychus saularis	LC
Verditer Flycatcher	Eumyias thalassinus	LC
Tickell's Blue Flycatcher	Cyornis tickelliae	LC
Indian Blue Robin	Larvivora brunnea	LC
Malabar Whistling-Thrush	Myophonus horsfieldii	LC
Rusty-tailed Flycatcher	Ficedula ruficauda	LC
Blue-capped Rock-Thrush	Monticola cinclorhyncha	LC
Pied Bushchat	Saxicola caprata	LC
Pale-billed Flowerpecker	Dicaeum erythrorhynchos	LC
Nilgiri Flowerpecker	Dicaeum concolor	LC
Purple-rumped Sunbird	Leptocoma zeylonica	LC
Crimson-backed Sunbird	Leptocoma minima	LC
Purple Sunbird	Cinnyris asiaticus	LC
Loten's Sunbird	Cinnyris lotenius	LC
Little Spiderhunter	Arachnothera longirostra	LC
Scaly-breasted Munia	Lonchura punctulata	LC
Black-throated Munia	Lonchura kelaarti	LC
White-rumped Munia	Lonchura striata	LC
House Sparrow	Passer domesticus	LC
Forest Wagtail	Dendronanthus indicus	LC
Gray Wagtail	Motacilla cinerea	LC
White-browed Wagtail	Motacilla maderaspatensis	LC
Paddyfield Pipit	Anthus rufulus	LC

2.4 Summary of IUCN Status:

- Least Concern (LC): Most species listed fall into this category.
- Near Threatened (NT): A few species, such as the Malabar Parakeet and Wayanad Laughingthrush.
- Vulnerable (VU): Jerdon's Baza, Malabar Gray Hornbill, and Malabar Starling.

III. RESULTS AND DISCUSSION

During the study, a total of 166 species were documented. Key findings include several endemic species of the Western Ghats, such as the Wayanad Laughing Thrush and Jerdon’s Baza, underscoring the ecological significance of the Naseera Botanical

Garden as a habitat for both resident and migratory species. The diversity of birds recorded reflects the rich habitats available within the campus, which supports a wide variety of avian species.

Bird species richness within the study area suggests a robust ecological environment, attributed to the variety of vegetation types and habitat patches present within the campus. The botanical garden serves as an important refuge for avifauna, providing food sources, nesting sites, and protection from urban disturbances. Observations align with previous studies that underscore the role of semi-urban green spaces in maintaining avian diversity.

This baseline checklist provides essential information for future conservation efforts and habitat management in the **Naseera Botanical Garden at Dr. Moopen's Medical College, Wayanad**. Additionally, it establishes a foundation for long-term avian studies within the educational campus setting, contributing to broader efforts to conserve Western Ghats biodiversity. This research highlights the importance of preserving and enhancing green spaces in semi-urban areas, offering insights into how academic institutions can support biodiversity conservation.

IV. CONCLUSION

The assessment of avian diversity within the **Naseera Botanical Garden at Dr. Moopen's Medical College** has revealed a rich tapestry of bird species, underscoring the ecological importance of this habitat in the Western Ghats. Our findings indicate that most species observed fall under the Least Concern (LC) category, suggesting a stable population status for the majority of birds within the garden. However, the presence of Near Threatened (NT) species such as the Malabar Parakeet and Wayanad Laughingthrush highlights the need for continued monitoring and conservation efforts in the region.

Additionally, the identification of Vulnerable (VU) species, including Jerdon's Baza, Malabar Gray Hornbill, and Malabar Starling, serves as a crucial indicator of the pressures these birds face in their natural habitats. This underscores the necessity for proactive conservation strategies to safeguard these species and their ecosystems.

Overall, this study emphasizes the significance of the **Naseera Botanical Garden at Dr. Moopen's Medical College** as a vital sanctuary for avian diversity. It is essential to maintain and enhance such green spaces, not only for the birds they support but also for the broader ecological health of the Western Ghats. Further research and targeted conservation actions will be imperative to protect vulnerable species and ensure the sustainability of bird populations in this biodiverse region.

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