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Cover: A bag worm with its beautiful heap of junk. Acrylics on 300 GSM paper by Dupati Poojitha based on a picture by Sanjay Molur.

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COMMUNICATION

Preliminary checklist of avifauna from All India Institute of Medical Sciences, Guwahati, Assam, India

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Abstract: Bird diversity in various types of habitats, including institutional campuses, underlines the importance of these green areas for preserving ecological integrity and providing necessary havens for avian species. The present study presents the first preliminary checklist of avifaunal species within the AIIMS Guwahati campus. A total of 75 bird species were recorded in this study from April 2024 to July 2024. Fifty species were observed in wetland habitat and 40 in built-up areas, with 15 species occurring in both habitats. About 73 species are classified as 'Least Concern', and two as 'Near Threatened', according to the IUCN Red List. The present study highlights the importance of natural habitats like wetlands, which are more favourable for bird foraging and nesting than built-up areas.

Keywords: AIIMS, birds, built-up land, campus, greenspace, habitat connectivity, Kamrup, Near Threatened, point count, wetland.

Assamese: পক্ষীবৈচিত্ৰতাই, বিভিন্ন প্ৰকাৰৰ বাসস্থানকে ধৰি প্ৰতিষ্ঠানিক চৌহদৰ ভিতৰত অৱস্থিত সেউজীয়া অঞ্চলসমূহে যে সিহঁতক প্ৰয়োজনীয় আশ্ৰয়স্থল প্ৰদান কৰাৰ উপৰিও পৰিৱেশগত অখণ্ডতা সংৰক্ষণ কৰাত বিশেষ গুৰুত্ব প্ৰদান কৰে, তাৰে এক নিদৰ্শন ডাঙি ধৰে। বৰ্তমানৰ অধ্যয়নৰ যোগেদি AIIMS গুৱাহাটীৰ চৌহদৰ ভিতৰত পৰিলক্ষিত হোৱা বিভিন্ন পক্ষী প্ৰজাতিসমূহৰ এখন প্ৰাৰম্ভিক তালিকা প্ৰস্তুত কৰা হৈছে, য' ত 2024 চনৰ এপ্ৰিল মাহৰ পৰা আৰম্ভ কৰি জুলাই মাহলৈকে সৰ্বমুঠ 75 টা প্ৰজাতিৰ পক্ষী তালিকাবদ্ধ কৰা হৈছে। তাৰে ভিতৰত মুঠ 50 টা প্ৰজাতি জলাশয় অঞ্চলত, 40 টা প্ৰজাতি নিৰ্মিত অঞ্চলত আৰু 15 টা প্ৰজাতি দুয়োটা অঞ্চলত পৰিলক্ষিত হৈছিল। IUCN ৰেড লিষ্ট অনুসৰি উক্ত তালিকাৰ 73 টা প্ৰজাতি " Least Concern " (অতি কম সংকটাপন্ন) আৰু 2 টা প্ৰজাতি " Near Threatened" (প্ৰায় সংকটাপন্ন) হিচাপে শ্ৰেণীবদ্ধ কৰা হৈছে। উক্ত অধ্যয়নৰ জৰিয়তে প্ৰাকৃতিক অঞ্চলসমূহ যেনে জলাশয় যে নিৰ্মিত অঞ্চলসমূহৰ তুলনাত পক্ষীবোৰৰ কাৰণে খাদ্য সংগ্ৰহ কৰিবলৈ আৰু বাঁহ সাজিবলৈ অধিক অনুকূল তাক দৃষ্টিগোচৰ কৰা হৈছে।

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Author contributions: NA and VC conceptualized the study and designed the methodology. NA, VC, and MB were involved in data collection and analysis, ensuring the accuracy and reliability of the results. All authors (NA, VC, PKS, and MB) participated in writing, reviewing, and editing the manuscript. All authors have read and approved the final version of the manuscript.

INTRODUCTION

Avian diversity on built-up land provides insights into the ecological health of the region (Latta et al. 2013; Bajagain et al. 2020). Avifaunal diversity observed within an institute's premises highlights the importance of maintaining suitable habitats for birds, as they fulfil numerous ecological functions, serve as bioindicators and contribute to migration and adaptation processes (Rajashekara & Venkatesha 2017). Their presence and diversity can be used to assess the environmental quality of the institute's surroundings.

Assam, a northeastern state of India, is known for its rich and diverse avifaunal population. The region's unique geographic location, encompassing the eastern Himalaya and the Brahmaputra River basin, provides a habitat for many birds. Assam is home to around 700 bird species in recognised Important Bird and Biodiversity Areas (IBAs), and also in urban and semi-urban settings including institutional campuses (Rahmani et al. 2016; Bhaduri & Rathod 2022; BirdLife International 2022). Research has shown that educational campuses host significant avian diversity, with surveys reporting an average of 66 to 88 bird species per campus, including some threatened species (Devi et al. 2012; Aggarwal et al. 2015; Chakdar et al. 2016; Liu et al. 2021; Guthula et al. 2022; Kumar et al. 2024; Singh et al. 2024). These campuses serve as significant habitats for birds due to their abundant greenery, food resources, and relatively low levels of disturbance (Bhaduri & Rathod 2022).

The All India Institute of Medical Sciences (AIIMS) in Guwahati, situated near significant birding sites like Deepor Beel Wildlife Sanctuary, Dighali Beel, and Jendia Beel, is a potential habitat for birds. This study is focused on documenting the avian diversity within the AIIMS Guwahati campus.

MATERIALS AND METHOD

Study area

Bird observations were conducted in and around the All India Institute of Medical Sciences (AIIMS), Guwahati. The institute is located at 26.253 °N and 91.696 °E in Changsari, a locality of Kamrup District, Assam, and spans 189.2 ac (Image 1). The campus features built-up land featuring the hospital, institute and residential campus with newly created green space. A significant portion of the campus includes a marshy wetland habitat that spans around 85 ac, while the built-up urban area is approximately 95 ac. The marsh areas are mainly composed of rooted vegetation such as *Nymphaea stellata*, *Pontederia hastata* and free-floating plants like *Eichhornia crassipes*. The nearest forest, Dirgheswari Reserve Forest, a moist deciduous hill forest, is about 1.5 km to the northeastern side of the campus.

Data collection

This study was carried out from April 2024 to July 2024. The point count method was used, which lasted 15 min per point count (Drapeau et al. 1999). As the primary goal of the study was to record the list of species, a point count with an unlimited radius was used (Bibby et al. 2000). All birds observed and heard were noted. Most observations were conducted in the morning between 0600 h and 0900 h, except a few in the evening (between 1500 h and 1700 h) to count some species that usually roost in marshy wetlands. Field surveys were undertaken twice a week from April to July. Birds encountered during other than census period were also considered during the study. Birds were observed using a pair of binoculars (Nikon 8 × 40), and field identification was done based on Grimmett et al. (2016). Taxonomy was followed as per Clements Checklist v2023 (Clements et al. 2023).

RESULTS

During the study period, 75 species belonging to 16 orders and 42 families of birds were observed (Table 1). Among the recorded species, 29 were passerine, while 44 were non-passerine. Among the 42 families, the highest species (6 species) belonged to the Ardeidae family. The point count surveys recorded an average of 7.5 ± 2.4 (mean ± SD) species per survey. According to the IUCN Red List, 73 species are listed as Least Concern, while two species, namely Lesser Adjutant *Leptoptilos javanicus*, and Oriental Darter *Anhinga melanogaster*, are classified as Near Threatened.

Among the two Near Threatened species observed, the Lesser Adjutant had the highest count, with a maximum of three individuals recorded in a single survey. This was followed by the Oriental Darter, with two individuals. Two winter migratory species, Dusky Warbler *Phylloscopus fuscatus* and Brown Shrike *Lanius cristatus* were also observed in the wetland habitat during the study. Higher numbers of species (n = 50) were observed in the wetland habitat relative to built-up land (n = 40), and 15 species were observed in both habitats (Figure 1).

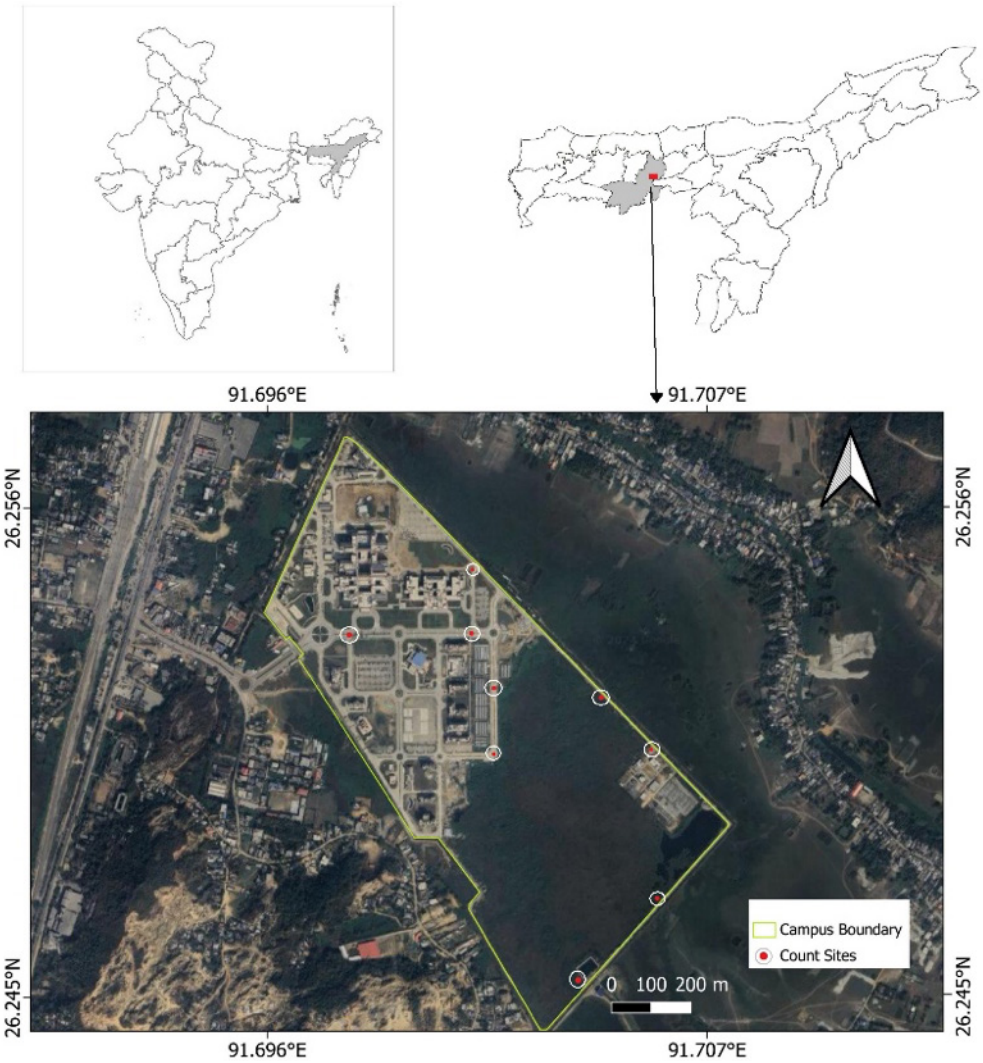

Image 1. Location of point count sites within the study area. Map data: Google, 2024 Airbus.

DISCUSSION

The wetland habitat on the AIIMS Guwahati campus supports a greater diversity of bird species compared to built-up areas, primarily due to its varied vegetation, including tall grasses (e.g., *Saccharum* sp.), free-floating plants like Water Hyacinth *Pontederia crassipes*, rooted aquatic species such as Lotus *Nelumbo nucifera*, and abundant food resources. This rich habitat attracts bird species, including the Chestnut Munia *Lonchura atricapilla*, Grey-headed Swamphen *Porphyrio poliocephalus,* and Bronze-winged Jacana *Metopidius indicus*, which use the area for nesting, foraging, and roosting. Numerous studies have highlighted the importance of wetlands in supporting high bird species richness (Zhu & Wang 2022; Cristaldi et al. 2023; Zhang et al. 2023). Also, wetlands, the transition between terrestrial and aquatic habitats, often host a wide array of resident and migratory bird species (Khatri et al. 2019). The presence of two near-threatened species of waterbirds in the campus wetlands is particularly noteworthy, as it highlights the biodiversity value of these habitats and the need for their conservation to safeguard the regional avifauna (Kumdet et al. 2021).

Low species number in the campus might be due to the newly-constructed built-up land, as they often lack tree cover, which results in the loss of vital nesting and foraging habitat for birds (Bajagain et al. 2020). Additionally, the short duration of the study, which did not cover the winter season, might have contributed to the observed lower species number, as some migratory bird species are present during specific times of the year. Similar results were also obtained on the campuses of the Indian Institute of Technology, Guwahati (Bhaduri

Table 1. List of avian species observed from AIIMS, Guwahati campus. B—Built-up land | W—Wetland | IUCN— International Union for Conservation of Nature | LC—Least Concern | NT—Near Threatened.

	Order / Family/ Scientific name	Common name	IUCN Red List status	Habitat
	Anseriformes			
	Anatidae			
1	*Dendrocygna javanica*	Lesser Whistling Duck	LC	W
	Columbiformes			
	Columbidae			
2	*Streptopelia chinensis*	Spotted Dove	LC	B
3	*Streptopelia tranquebarica*	Red Collared-Dove	LC	B
4	*Streptopelia decaocto*	Eurasian Collared-Dove	LC	B
5	*Columba livia*	Rock Pigeon	LC	B
	Cuculiformes			
	Cuculidae			
6	*Centropus bengalensis*	Lesser Coucal	LC	W
7	*Centropus sinensis*	Greater Coucal	LC	W
8	*Hierococcyx varius*	Common Hawk-Cuckoo	LC	W
9	*Eudynamys scolopaceus*	Asian Koel	LC	B, W
10	*Cacomantis merulinus*	Plaintive Cuckoo	LC	W
	Caprimulgiformes			
	Apodidae			
11	*Cypsiurus balasiensis*	Asian Palm-Swift	LC	B, W
	Gruiformes			
	Rallidae			
12	*Amaurornis phoenicurus*	White-breasted Waterhen	LC	W
13	*Gallinula chloropus*	Eurasian Moorhen	LC	W
14	*Porphyrio poliocephalus*	Grey-headed Swamphen	LC	W
	Charadriiformes			
	Charadriidae			
15	*Vanellus indicus*	Red-wattled Lapwing	LC	W
	Jacanidae			
16	*Metopidius indicus*	Bronze-winged Jacana	LC	W
17	*Hydrophasianus chirurgus*	Pheasant-tailed Jacana	LC	W
	Ciconiiformes			
	Ciconiidae			
18	*Anastomus oscitans*	Asian Openbill Stork	LC	W
19	*Leptoptilos javanicus*	Lesser Adjutant	NT	W
	Suliformes			
	Anhingidae			
20	*Anhinga melanogaster*	Oriental Darter	NT	W
	Phalacrocoracidae			
21	*Microcarbo niger*	Little Cormorant	LC	W
	Pelecaniformes			
	Ardeidae			
22	*Ardea purpurea*	Purple Heron	LC	W
23	*Ardea intermedia*	Medium Egret	LC	W
24	*Ardeola grayii*	Indian Pond Heron	LC	W
25	*Bubulcus ibis*	Cattle Egret	LC	B, W
26	*Nycticorax nycticorax*	Black-crowned Night-Heron	LC	W
27	*Ixobrychus cinnamomeus*	Cinnamon Bittern	LC	W
	Threskiornithidae			
28	*Threskiornis melanocephalus*	Black-headed Ibis	LC	W
29	*Plegadis falcinellus*	Glossy Ibis	LC	W
	Accipitriformes			
	Accipitridae			
30	*Elanus caeruleus*	Black-winged Kite	LC	B
31	*Milvus migrans*	Black Kite	LC	W
32	*Pernis ptilorhynchus*	Oriental Honey-buzzard	LC	W
33	*Spilornis cheela*	Crested Serpent-Eagle	LC	B, W
34	*Hieraaetus pennatus*	Booted Eagle	LC	B, W
	Strigiiformes			
	Strigidae			
35	*Athene brama*	Spotted Owlet	LC	B
	Bucerotiformes			
	Upupidae			
36	*Upupa epops*	Eurasian Hoopoe	LC	B
	Coraciiformes			
	Alcedinidae			
37	*Halcyon smyrnensis*	White-throated Kingfisher	LC	B, W
38	*Alcedo atthis*	Common Kingfisher	LC	W
	Meropidae			
39	*Merops leschenaulti*	Chestnut-headed Bee-eater	LC	B
40	*Merops orientalis*	Green Bee-eater	LC	B
	Coraciidae			
41	*Coracias affinis*	Indochinese Roller	LC	B
	Piciformes			
	Megalaimidae			
42	*Psilopogon asiaticus*	Blue-throated Barbet	LC	B
43	*Psilopogon lineatus*	Lineated Barbet	LC	B

	Order / Family/ Scientific name	Common name	IUCN Red List status	Habitat
	Picidae			
44	*Dendrocopos macei*	Fulvous-breasted Woodpecker	LC	B
	Psittaciformes			
	Psittaculidae			
45	*Psittacula krameri*	Rose-ringed Parakeet	LC	B
	Passeriformes			
	Oriolidae			
46	*Oriolus xanthornus*	Black-hooded Oriole	LC	B
	Artamidae			
47	*Artamus fuscus*	Ashy Wood Swallow	LC	B, W
	Aegithinidae			
48	*Aegithina tiphia*	Common Iora	LC	B, W
	Dicruridae			
49	*Dicrurus macrocercus*	Black Drongo	LC	B, W
	Laniidae			
50	*Lanius cristatus*	Brown Shrike	LC	W
51	*Lanius schach*	Long-tailed Shrike	LC	W
	Corvidae			
52	*Corvus splendens*	House Crow	LC	B
	Paridae			
53	*Parus cinereus*	Cinereous Tit	LC	B
	Alaudindae			
54	*Alauda gulgula*	Oriental Skylark	LC	B, W
55	*Mirafra assamica*	Bengal Bushlark	LC	W
	Cisticolidae			
56	*Orthotomus sutorius*	Common Tailorbird	LC	B
57	*Prinia inornata*	Plain Prinia	LC	W
	Hirundinidae			
58	*Hirundo rustica*	Barn Swallow	LC	W

	Order / Family/ Scientific name	Common name	IUCN Red List status	Habitat
	Pycnonotidae			
59	*Pycnonotus cafer*	Red-vented Bulbul	LC	B, W
	Phylloscopidae			
60	*Phylloscopus fuscatus*	Dusky Warbler	LC	W
	Timaliidae			
61	*Turdoides striata*	Jungle Babbler	LC	B
	Locustellidae			
62	*Megalurus palustris*	Striated Grassbird	LC	W
	Sturnidae			
63	*Gracupica contra*	Asian Pied Starling	LC	W
64	*Acridotheres tristis*	Common Myna	LC	B
65	*Acridotheres fuscus*	Jungle Myna	LC	B
66	*Acridotheres grandis*	Great Myna	LC	B, W
	Muscicapidae			
67	*Copsychus saularis*	Oriental Magpie Robin	LC	B
	Nectariniidae			
68	*Aethopyga siparaja*	Crimson Sunbird	LC	B
69	*Cinnyris asiaticus*	Purple Sunbird	LC	B, W
	Ploceidae			
70	*Ploceus philippinus*	Baya Weaver	LC	W
	Estrildidae			
71	*Lonchura punctulata*	Scaly-breasted Munia	LC	B, W
72	*Lonchura atricapilla*	Chestnut Munia	LC	B, W
	Passeridae			
73	*Passer domesticus*	House Sparrow	LC	B
74	*Passer montanus*	Eurasian Tree Sparrow	LC	B
	Motacillidae			
75	*Anthus rufulus*	Paddyfield Pipit	LC	W

& Rathod 2022) and Assam University (Chakdar et al. 2016). As the AIIMS campus was constructed on a wetland, many common urban bird species such as Rufous Treepie *Dendrocitta vagabunda*, Large-billed Crow *Corvus macrorhynchos* and Black-rumped Flameback *Dinopium benghalense* were missing during the study period. The ongoing green space landscaping might attract those species in future once there is sufficient tree cover to support them.

Studies have shown that institutional campuses with well-developed greenspaces can support a surprising diversity of avifauna, likely due to the availability of suitable habitat features such as vegetation cover, water

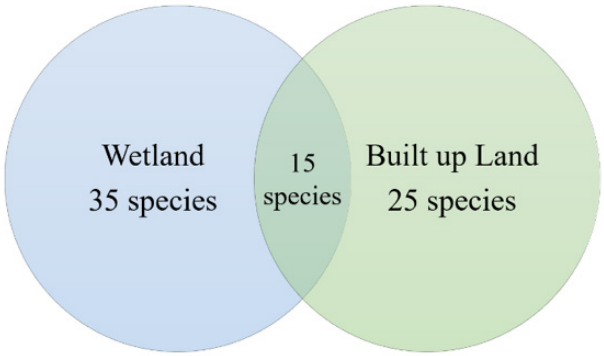

Figure 1. Species richness unique to each of the two habitats and the species shared between them.

sources, and reduced disturbance (Mardiastuti 2020). Understanding the factors that shape bird distribution in wetland and urban greenspace environments is crucial for informing effective conservation strategies. Habitat size, connectivity, and vegetation composition are identified as critical drivers of avian diversity in urban greenspaces (Aronson et al. 2014). The expansion of built-up areas can lead to a decline in bird diversity, as urbanisation often results in the fragmentation and loss of natural habitats that are essential for the survival and reproduction of many avian species. Newly created built-up land with planned green space can gradually attract more birds and support higher bird diversity over time, as seen in some institutional campuses, provided the green spaces are well-designed and maintained (Ibáñez-Álamo et al. 2020; Kumdet et al. 2021). Such landscapes play a vital role in supporting biodiversity in urban areas.

To conserve the existing wetland habitat on campus, it is essential to maintain water quality by controlling pollution and managing runoff from the built-up areas. Sustainable campus management practices, such as increasing green spaces and reducing impervious surfaces, which minimise environmental impact and support habitat conservation. Additionally, planting native trees including fig (Banyan and other Ficus species) can promote bird diversity by providing essential food sources and nesting habitats (Caughlin et al. 2012). Creating green corridors that link the marshland areas to the nearby Dirgheswari Reserve forest can promote biodiversity and enhance habitat connectivity for birds and smaller fauna.

REFERENCES

Aggarwal, A., G. Tiwari & S. Harsh (2015). Avian diversity and density estimation of birds of the Indian Institute of Forest Management campus, Bhopal, India. *Journal of Threatened Taxa* 7(2): 6891–6902. https://doi.org/10.11609/jott.o3888.6891-902

Aronson, M.F.J., F.A. La Sorte, C.H. Nilon, M. Katti, M.A. Goddard, C.A. Lepczyk, P.S. Warren, N.S.G. Williams, S. Ciliers, B. Clarkson, C. Dobbs, R. Dolan, M. Hedblom, S. Klotz, I. Kühn, I.M. Fors, M. McDonnell, U. Mörtberg, P. Pyšek, S. Siebert, J. Sushinsky, P. Werner & M. Winter (2014). A global analysis of the impacts of 0urbanization on bird and plant diversity reveals key anthropogenic drivers. *Proceedings of the Royal Society B: Biological Sciences* 281(1780): 20133330. https://doi.org/10.1098/rspb.2013.3330

Bajagain, S., S. Pokhrel, S. Baniya, A. Pradhan, S. Paudel & I.D. Joshi (2020). Avifaunal diversity of Institute of Forestry Complex, Hetauda Metropolis, Nepal. *Forestry Journal of Institute of Forestry, Nepal* 17: 83–101. https://doi.org/10.3126/forestry.v17i0.33624

Bhaduri, R. & U. Rathod (2022). Avifaunal diversity in Indian Institute of Technology Guwahati Campus, Assam, India. *Journal of Threatened Taxa* 14(12): 22293–22308. https://doi.org/10.11609/jott.8010.14.12.22293-22308

Bibby, C., N. Burgess, D. Hill & S. Mustoe (2000). *Bird Census Techniques, 2nd Edition*. Academic Press, London, 302 pp.

BirdLife-International (2022). http://www.birdlife.org. Accessed on 9 July 2024.

Caughlin, T.T., T. Ganesh & M.D. Lowman (2012). Sacred Fig trees promote Frugivore visitation and tree seedling abundance in south India. *Current Science* 102(6): 918–22.

Chakdar, B., P. Choudhury & H. Singha (2016). Avifaunal diversity in Assam University Campus, Silchar, India. *Journal of Threatened Taxa* 8(1): 8369. https://doi.org/10.11609/jott.2524.8.1.8369-8378

Clements, J.F., P.C. Rasmussen, T.S. Schulenberg, M.J. Iliff, T.A. Fredericks, J.A. Gerbracht, D. Lepage, A. Spencer, S.M. Billerman, B.L. Sullivan & C.L. Wood (2023). The eBird/Clements checklist of birds of the world. Downloaded from https://www.birds.cornell.edu/clementschecklist/download/

Cristaldi, M.A., I.N. Godoy & L.M. Leveau (2023). Responses of urban bird assemblages to land-sparing and land-sharing development styles in two Argentinian Cities. *Multidisciplinary Digital Publishing Institute* 13(5): 894. https://doi.org/10.3390/ani13050894

Devi, O.S., M. Islam, J. Das & P.K. Saikia (2012). Avian-fauna of Gauhati University Campus, Jalukbari, Assam. *The Ecoscan* 6(12): 165–70.

Drapeau, P., A. Leduc & R. McNeil (1999). Refining the use of point counts at the scale of individual points in studies of bird-habitat relationships. *Journal of Avian Biology* 30(4): 367–382. https://doi.org/10.2307/3677009

Grimmett, R., C. Inskipp, T. Inskipp & R. Allen (2016). *Birds of the Indian Subcontinent. Helm Field Guides*. Christopher Helm, London, 528 pp.

Guthula, V.B., S. Shrotriya, P. Nigam, S.P. Goyal, D. Mohan & B. Habib (2022). Biodiversity significance of small habitat patches: more than half of Indian bird species are in academic campuses. *Landscape and Urban Planning* 228: 104552. https://doi.org/10.1016/j.landurbplan.2022.104552

Ibáñez-Álamo, J.D., F. Morelli, Y. Benedetti, E. Rubio, J. Jokimäki, T. Pérez-Contreras, P. Sprau, J. Suhonen, P. Tryjanowski, M. Kaisanlahti-Jokimäki, A.P. Møller & M. Díaz (2020). Biodiversity within the city: effects of land sharing and land sparing urban development on avian diversity. *Science of the Total Environment* 707: 135477. https://doi.org/10.1016/j.scitotenv.2019.135477

Khatri, N.D., B. Neupane, Y.P. Timilsina & S. Ghimire (2019). Assessment of avifaunal diversity and threats to them in Phewa Wetland, Nepal. *Journal of Institute of Forestry, Nepal* 16(16): 31–47. https://doi.org/10.3126/forestry.v16i0.28352

Kumar, P., B. Parmar & P. Kumar (2024). Checklist and comparison of the bird diversity from the Himachal Pradesh Agricultural University, India. *Journal of Threatened Taxa* 16(4): 25069–25081. https://doi.org/10.11609/jott.8192.16.4.25069-25081

Kumdet, P S., S.T. Ivande & F.D. Dami (2021). Key drivers of avifauna in greenspace of institutional campuses in a state in western Africa. *Urban Forestry & Urban Greening* 61: 127092. https://doi.org/10.1016/j.ufug.2021.127092

Latta, S.C., L.J. Musher, K.N. Latta & T.E. Katzner (2013). Influence of human population size and the built environment on avian assemblages in urban green spaces. *Urban Ecosystems* 16: 463–479. https://doi.org/10.1007/s11252-012-0282-z

Liu, J., Y. Zhao, X. Si, G. Feng, F. Slik & J. Zhang (2021). University campuses as valuable resources for urban biodiversity research and conservation. *Urban Forestry and Urban Greening* 64: 127255. https://doi.org/10.1016/j.ufug.2021.127255

Mardiastuti, A. (2020). Urban park design for bird diversity: theory and application in landscape and site scales. *IOP Conference Series: Earth and Environmental Science* 501(1): 012026. https://doi.org/10.1088/1755-1315/501/1/012026

Rahmani, A.R., M.Z. Islam & R.M. Kasambe (2016). *Important Bird and Biodiversity Areas in India Priority Sites for Conservation*. Bombay Natural History Society, Indian Bird Conservation Network, Royal Society for the Protection of Birds and BirdLife International, United Kingdom, 1992 pp.

Rajashekara, S. & M.G. Venkatesha (2017). Seasonal incidence and diversity pattern of avian communities in the Bangalore University campus, India. *Proceedings of the Zoological Society* 70: 178–193. https://doi.org/10.1007/s12595-016-0175-x

Singh, R., A.K. Tiwari, S. Kumar & G.S. Singh (2024). Avifaunal diversity in managed urban ecosystem: a case study of Banaras Hindu University, Varanasi. *Ecological Questions* 35(3): 1–25. https://doi.org/10.12775/EQ.2024.038

Zhang, Y., E. Ye, F. Liu, N. Lai, X. You, J. Dong & J. Dong (2023). The relationship between landscape construction and bird diversity: a bibliometric analysis. *International Journal of Environmental Research and Public Health* 20(5): 455. https://doi.org/10.3390/ijerph20054551

Zhu, J. & Y. Wang (2022). The value of urban wetland parks and suggestions for development countermeasures. *Open Journal of Social Sciences* 10(5): 345–350. https://doi.org/10.4236/jss.2022.105022

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