

Avifaunal Diversity and Abundance in the Mahamaya Hill Dokmoka Karbi Anglong, Assam, India

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ABSTRACT: Birds are one of the best-known classes of living organisms; they are important bio indicators of an ecosystem. Assam, being a unit of two biogeographic realm, the Indo Malayan and the Indo-Chinese is immensely rich in avifaunal diversity with more than 800 species and holds 55 Important Bird Areas. This study was undertaken to determine the diversity and abundance of birds in Mahamaya hill, a small hill area in Dokmoka town of Karbi Anglong, Assam. Intensive study was conducted from post winter to early spring i.e. February to April 2023 by line transect method. A total of 51 species of birds belonging to 20 families and 4 orders were recorded. Family Pyloscopidae dominated the area comprising of 12 species, followed by Cisticolidae, Corvidae and Dicruridae with 4 species in each group. Among all the species recorded, *Dicrurus macrocercus* has the highest abundance (15.15%), followed by *Passer montanus* (Eurasian Tree Sparrow) and *Acridotheres tristis* (common myna) with 14.42% and 8.91% each. Family-wise relative abundance revealed that Dicruridae has the highest relative abundance (24.43%), followed by Passeridae (18.55%) and saturnidae (16.98%). The area sustains a rich and diverse bird population, so improved management of the entire landscape is recommended.

Keywords: realm, bio indicators, zoogeographic, diversity, relative abundance and avifaunal.

INTRODUCTION

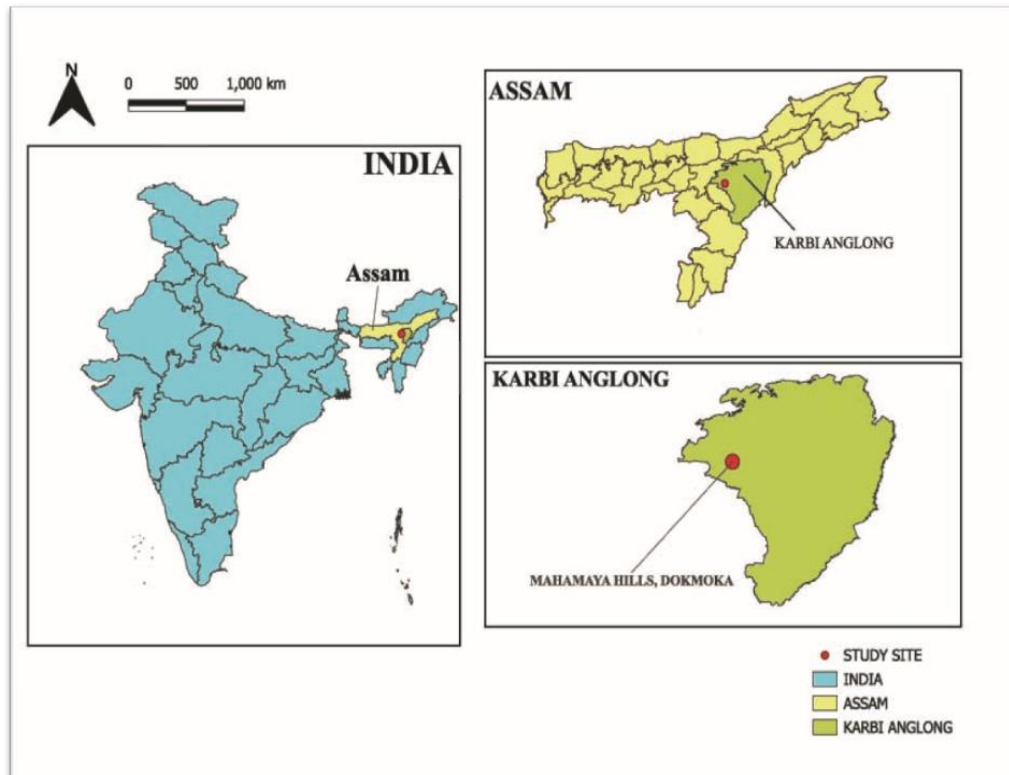
Birds are among the most well-studied classes of living organisms and play a vital role in maintaining the functioning of the ecosystems they inhabit. They serve as excellent bio indicators and are valuable models for studying various environmental issues. Consequently, there has been a growing awareness in recent times about the importance of birds, especially in the remote regions of India (Chaturvedi and Singh 2017), where the condition of the local landscape requires thorough investigation. Identifying the crucial determinants of bird communities is essential in this context. Noticeably the availability of checklist of birds in that structure for avian conservation areas is highly helpful to get the complete picture (Kattan and Franco 2004). They are cosmopolitan and uneven in their distributions. Their distribution, diversity and densities depend on various factors such as climate, altitude, vegetation, water availability and anthropogenic activities. Describing and explaining spatial patterns in species diversity are crucial steps in conserving global biodiversity (Xu *et al.*, 2023) as the number of bird as the number of bird (Ali, 1979) depend on climatic changes accompanied by corresponding changes in vegetation.

Despite birds being well-known organisms, there are still substantial gaps in our knowledge regarding their distributions, abundances and densities (Voon *et al.*, 2014). Studies on bird diversity are important as it raises an awareness of the need for global conservation of the avian community (Sondhi, 2002) and to

understand the wellbeing of an ecosystem as a whole and help to delineate the importance of a regional or local landscape for avian conservation. Despite Karbi Anglong being part of the Indo-Myanmar biodiversity hotspot (Choudhury, 2000) research on its avian community remains limited. While some studies focus on pheasants or specific bird groups in certain areas, comprehensive research is lacking (Rahmani *et al.*, 2016).

MATERIAL AND METHODS

1. Study site. Mahamaya is a small hill plateau at 26°20'17.63" N latitude and 93°06'81.09 E longitude, Dokmoka Karbi Anglong, Assam. It is situated at the Indo Myanmar biodiversity hotspot for which it also become essentially important to study this place. It rests at 222m above sea level. The Mahamaya hill is situated at a distance of 65 km from district headquarter. The hill is surrounded by paddy from three sides and NH 29 in one side; interestingly it appears to be same from every side when seen from distant view. The Mahamaya hill is also an important archaeological site because of the presence of stone temple of circa of 11th century AD. Historical evidence shows (Xu *et al.*, 2023) that this area was included in the kingdom of the Kachari king Krishna Chandra (1790-1813 AD). Above the hill there is a big pond present along with the historical temple. The pond harbours different types of birds and also plays an important role in the ecosystem.



Map 1. Site of sample collection.

2. Sampling method. The line transect method was utilized to count and assess the abundance and diversity of birds in the study area (Ali, 1969). The research was conducted over a three-month period, spanning from post-winter to pre-monsoon (February to April 2023). Data collection occurred every six days during this timeframe. Birds were observed and recorded directly in the field during morning hours (07:30 to 11:00) and afternoon hours (15:00 to 17:30). Bird counts were performed by walking through the forest area. Two parallel transects, each 500 meters long and separated by a distance of 300 meters, were established. The maximum visibility on either side of a transect extended to 100 meters, covering an effective area of 500 × 200 meters. To prevent overlap in vegetation coverage, a 100-meter gap was maintained between the two transects. Birds were identified using Nikon binoculars with a magnification of 10 × 50 and field guides of Ali (1996). For each transect, we recorded the bird species and numbers encountered in the area. The calls of birds

were used for observations, recording and identification and addition to line transect method, simple bird watching (opportunistic sampling) within the study was also adopted.

3. Data analysis. The relative abundance of a species was calculated by dividing the abundance of a species by the total abundance of all species combined.

$$RA = \frac{\text{specific species number/total species number}}{\text{total species number}}$$

Bird diversity was calculated using both Shannon's diversity which estimates the diversity of community by considering both species richness and evenness. Shannon Wiener diversity Index was calculated using the formula:

$$H' = - \sum_{i=1}^R p_i \ln p_i$$

Where p_i = proportion of individual species and R = total number of species of the community (numbers seen and heard)

RESULT AND DISCUSSION

Table 1: Showing species composition of Mahamaya hill.

Order	Family	Common name	Scientific name	IUCN status	Total observation
Columbiformes	Colimidae	Barred cuckoo dove	<i>Macropygia unchall</i>	LC	12
Columbiformes	Columbidae	Spotted dove	<i>Streptopelia chinensis</i>	LC	54
Coraciiformes	Alcedinidae	Common kingfisher	<i>Alcedo atthis</i>	LC	5
Coraciiformes	Alcedinidae	Blue eared kingfisher	<i>Alcedo meninting</i>	LC	1
Coraciiformes	Coraciidae	Indo chinese roller	<i>Coracias affinis</i>	LC	12
Passeriformes	Campephagidae	Small minivet	<i>Pericrocotus cinnamomeus</i>	LC	2
Passeriformes	Campephagidae	Black-winged cuckooshrike	<i>Coracina melaschistos</i>	LC	7
Passeriformes	Cettiidae	Grey bellied tesia	<i>Tesia cyaniventer</i>	LC	12
Passeriformes	Cettiidae	Grey breasted pirinia	<i>Prinia hodgsonii</i>	LC	36
Passeriformes	Cettiidae	Mountain tailorbird	<i>Orthotomus cuculatus</i>	LC	11

Passeriformes	Chloropseidae	Gold-fronted leafbird	<i>Chloropsis aurifrons</i>	LC	5
Passeriformes	Cisticolidae	Common tailorbird	<i>Orthotomus sutorius</i>	LC	27
Passeriformes	Cisticolidae	Black-throated prinia	<i>Prinia atrogularis</i>	LC	1
Passeriformes	Cisticolidae	Grey-throated prinia	<i>Prinia hodgsonii</i>	LC	2
Passeriformes	Cisticolidae	Plain prinia	<i>Prinia inornata</i>	LC	2
Passeriformes	Corvidae	Grey treepie	<i>Dendrocitta formosa</i>	LC	12
Passeriformes	Corvidae	Jungle crow	<i>Corvus macrorhynchos</i>	LC	7
Passeriformes	Corvidae	Grey treepie	<i>Dendrocitta formosae</i>	LC	11
Passeriformes	Corvidae	Rufoustreepie	<i>Dendrocitta vagabunda</i>	LC	19
Passeriformes	Dicruridae	Black drongo	<i>Dicrurus macrocercus</i>	LC	165
Passeriformes	Dicruridae	Ashy drongo	<i>Dicrurus leucophaeus</i>	LC	65
Passeriformes	Dicruridae	Bronzed drongo	<i>Dicrurus aeneus</i>	LC	15
Passeriformes	Dicruridae	Greater racket tailed drongo	<i>Dicrurus paradiseus</i>	LC	21
Passeriformes	Emberizidae	Chestnut eared bunting	<i>Emberiza pusilla</i>	LC	4
Passeriformes	Leiothrichidae	Grey sibia	<i>Heterophasia gracilis</i>	LC	7
Passeriformes	Muscicapidae	Oriental magpie robin	<i>Copsychus saularis</i>	LC	2
Passeriformes	Muscicapidae	White capped restart	<i>Phoenicurus leucocephalus</i>	LC	3
Passeriformes	Muscicapidae	Blue-whistling thrush	<i>Myophonus caeruleus</i>	LC	4
Passeriformes	Nectariniidae	Purple sun bird	<i>Cinnyris asiaticus</i>	LC	1
Passeriformes	Oriolidae	Black hooded oriole	<i>Oriolus xanthornus</i>	LC	2
Passeriformes	Passeridae	Eurasian tree sparrow	<i>Passer montanus</i>	LC	157
Passeriformes	Passeridae	House sparrow	<i>passer domesticus</i>	LC	45
Passeriformes	Phylloscopidae	Grey-hooded warbler	<i>Phylloscopus xanthoschistos</i>	LC	22
Passeriformes	Phylloscopidae	Blyth's leaf warbler	<i>Phylloscopus reguloides</i>	LC	11
Passeriformes	Phylloscopidae	Pale footed bush warbler	<i>Urosphena pallidipes</i>	LC	9
Passeriformes	Phylloscopidae	Broad billed warbler	<i>Tickillia hodgsoni</i>	LC	11
Passeriformes	Phylloscopidae	Thick billed warbler	<i>Arundinax aedon</i>	LC	13
Passeriformes	Phylloscopidae	Paddy field warbler	<i>Acrocephalus agricola</i>	LC	18
Passeriformes	Phylloscopidae	Blunt winged warbler	<i>Acrocephalus concinwns</i>	LC	12
Passeriformes	Phylloscopidae	Yellow browed warbler	<i>Phylloscopus inornatus</i>	LC	19
Passeriformes	Phylloscopidae	Dusky warbler	<i>Phylloscopus fuscatus</i>	LC	14
Passeriformes	Phylloscopidae	White spectacles warbler	<i>Phylloscopus intermedius</i>	LC	7
Passeriformes	Phylloscopidae	Whistler's warbler	<i>Phylloscopus whistleris</i>	LC	8
Passeriformes	Phylloscopidae	Blyth's leaf warbler	<i>Phylloscopus reguloides</i>	LC	1
Passeriformes	Sturnidae	Common myna	<i>Acridotheres tristis</i>	LC	97
Passeriformes	Sturnidae	Jungle myna	<i>Acridotheres fuscus</i>	LC	88
Passeriformes	Sittidae	Velvet-fronted nuthatch	<i>Sitta frontalis</i>	LC	2
Passeriformes	Vangidae	Large wood shrike	<i>Tephrodornis virgatus</i>	LC	2
Passeriformes	Vangidae	Common wood shrike	<i>Tephrodornis pondicerianus</i>	LC	5
Piciformes	Megalaimidae	Blue-throated barbet	<i>Megalaima asiatica</i>	LC	16
Piciformes	Megalaimidae	Great barbet	<i>Megalaima virens</i>	LC	5

Table 2: Showing relative abundance of each species.

Common name	Total observation	Relative abundance
Barred cuckoo dove	12	1.101928
Spotted dove	54	4.958678
Common kingfisher	5	0.459137
Blue eared kingfisher	1	0.091827
Indo chinese roller	12	1.101928
Small minivet	2	0.183655
Black-winged cuckooshrike	7	0.642792
Grey bellied tesia	12	1.101928
Grey breasted pirinia	36	3.305785
Mountain tailorbird	11	1.010101
Gold-fronted leafbird	5	0.459137
Common tailorbird	27	2.479339
Black-throated prinia	1	0.091827
Grey-throated prinia	2	0.183655
Plain prinia	2	0.183655
Grey treepie	12	1.101928

Jungle crow	7	0.642792
Grey treepie	11	1.010101
Rufoustreepie	19	1.74472
Black drongo	165	15.15152
Ashy drongo	65	5.968779
Bronzed drongo	15	1.37741
Greater racket tailed drongo	21	1.928375
Chestnut eared bunting	4	0.367309
Grey sibia	7	0.642792
Oriental magpie robin	2	0.183655
White capped restart	3	0.275482
Blue-whistling thrush	4	0.367309
Purple sun bird	1	0.091827
Black hooded oriole	2	0.183655
Eurasian tree sparrow	157	14.4169
House sparrow	45	4.132231
Grey-hooded warbler	22	2.020202
Blyth's leaf warbler	11	1.010101
Pale footed bush warbler	9	0.826446
Broad billed warbler	11	1.010101
Thick billed warbler	13	1.193756
Paddy field warbler	18	1.652893
Blunt winged warbler	12	1.101928
Yellow browed warbler	19	1.74472
Dusky warbler	14	1.285583
White spectacles warbler	7	0.642792
Whistler's warbler	8	0.734619
Blythi's leaf warbler	1	0.091827
Common myna	97	8.907254
Jungle myna	88	8.080808
Velvet-fronted nuthatch	2	0.183655
Large woodshrike	2	0.183655
Common wood shrike	5	0.459137
Blue-throated barbet	16	1.469238
Great barbet	5	0.459137

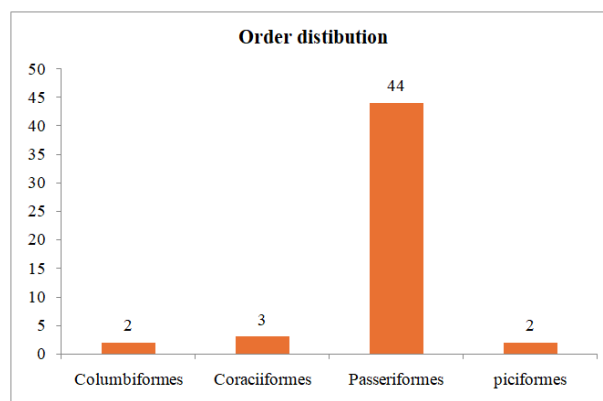


Fig. 1. Showing the order distribution of bird.

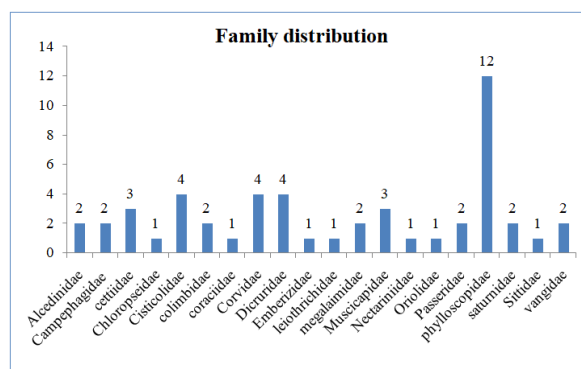


Fig. 2. Showing the family of distribution of birds.

During the study conducted at Mahamaya Hill, a total of 51 bird species were identified, representing 20 families and 4 orders (as detailed in Table 1). Of these, 1053 individuals were observed within the transect areas, while an additional 36 species were documented outside the transects through opportunistic sampling methods. This finding highlights that the area is significantly rich in avian diversity. However, it is important to acknowledge certain contextual factors influencing the site (Chaturvedi and Singh 2017). The region is predominantly inhabited by ethnic communities who have been residing there for generations, and some are known to engage in various hunting practices. Additionally, the site does not fall under any category of protected areas recognized or notified by the state or local government. The relatively high abundance and diversity of bird species can largely be attributed to the availability of a heterogeneous habitat, which includes primary and secondary forests, grasslands, bamboo forests, and areas of shifting cultivation (jhum land). Furthermore, the conservation efforts led by the local community play a crucial role, as their communal forest management practices ensure the protection and preservation of habitats, thereby supporting a large variety of avifauna and other wildlife.

Family-wise species composition indicate that pyloscopidae has the largest family comprising of 12 species, followed by followed by Cisticolidae, Corvidae and Dicruridae with 4 species in each group, cettiidae and Muscicapidae comprises 3species each, Alcedinidae, Campephagidae, colimbidae, megalaimidae, Passeridae, saturnidae and vangidae contain 2 species each. Chloropseidae, coraciidae, Emberizidae, leiothrichidae, Nectariniidae, Oriolidae and Sittidae each group contain 1 species (Fig. 2).

Relative abundance of each species shows that black drongo has the highest dominance of 15.15% (Table 2) is may be due to the favourable food for the species and surrounded by open field and also could be attributed to their feeding habit, preference of habitat and behaviour breeding pattern.

The species composition by order revealed that Passeriformes had the highest representation, with 44 species recorded, followed by Coraciiformes with 3 species, and Piciformes and Columbiformes with 2 species each (Fig. 1). Passeriformes also had the highest family diversity, represented by 12 families. The study showed that most of the species belong to aerial bird group such as black drongo.

All bird species recorded during the study were classified under the Least Concern (LC) category of the IUCN Red List of Threatened Species. The predominance of LC species at Mahamaya Hill is likely due to constant human interaction in the area. Species categorized as Threatened, Near Threatened, Vulnerable, or other special categories are typically specialist species requiring specific conditions to thrive and are more likely to avoid human-dominated landscapes.

The Shannon-Wiener diversity index for Mahamaya Hill was calculated to be $H' = 3.133509$, indicating a high level of species diversity and significant potential

as a site for avian conservation. However, due to time and financial constraints, the study did not examine the distribution of birds across the landscape or their habitat associations. Future research in these areas is highly recommended to better understand the dynamics of bird populations in the region.

To ensure effective conservation, improved management of the community-protected site, along with the adjacent secondary forest and cultivation areas, is advised. Additionally, raising conservation awareness within local communities, particularly among hunters, is essential to minimize threats to the avian population. These measures can help preserve the area's rich biodiversity and strengthen its role as a critical site for bird conservation.

CONCLUSIONS

A total of 51 bird species, belonging to 20 families and 4 orders, were recorded from Mahamaya Hill, with the Shannon-Wiener Diversity Index calculated at $H' = 3.133509$. Family-wise species composition revealed that Phylloscopidae dominated the area with 12 species, followed by Cisticolidae, Corvidae, and Dicruridae, each represented by 4 species. Among all the recorded species, *Dicrurus macrocercus* common name black drongo showed the highest abundance (15.15%), followed by *Passer montanus* (Eurasian Tree Sparrow) and *Acridotherestrictis* (Common Myna) with 14.42% and 8.91% respectively. Family-wise relative abundance indicated that Dicruridae had the highest relative abundance (24.43%), followed by Passeridae (18.55%) and Sturnidae (16.98%). All recorded species fall under the Least Concern category of the IUCN Red List for Threatened Species. This indicates that the area supports a rich and diverse bird community, despite not being designated as a protected site by the state government or local authorities. The region has significant potential for avian conservation and bird watching tourism. This high diversity can be attributed to the heterogeneous habitat and the conservation efforts of local communities. The study also found that secondary forests and cultivation sites sustain a good diversity of birds. However, due to time and financial constraints, the distribution of birds across the landscape and their habitat associations were not investigated, highlighting the need for further studies. Improved management of the community-protected site, along with the adjacent secondary forest and cultivation areas, is recommended. Efforts to raise conservation awareness, particularly among hunters in the community, should be enhanced.

FUTURE SCOPE

Since this hill is located near to human settlements and national highway so there is high chance of disturbance in this area. The hill is home to diverse birds groups so need to be protected with utmost importance. Since the sampling period was for short duration, further studies are required to understand the behaviour and breeding pattern etc.

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Conflict of Interest. None.

REFERENCES

- Ali, S. (1979). *Bird Study in India: Its History and Its Importance*. Indian Council for Cultural Relations.
- Ali, S. (1969). *Birds of kerala*. cornell university.
- Chaturvedi, R. K., & Singh, J. S. (2017). Restoration of mine spoil in a dry tropical region: a review. *Proceedings of Indian National Science Academy*, 83(4), 789-844.
- Choudhury, A. (2020). *The Birds of Assam*. assam: Gibbon Books & World Wide Fund for Nature-India, North-East Regional Office, 2000.
- Kattan, G. H. & Franco, P. (2004). Bird diversity along elevational gradients in the Andes of Colombia: area and mass effects. *Global Ecology and Biogeography*, 13(5), 451-458.
- Rahmani, A. R., Islam, M. U. & Kasambe, R. M. (2016). Important bird and biodiversity areas in India: Priority sites for conservation (Revised and updated). *Bombay Natural History Society, Indian Bird Conservation Network, Royal Society for the Protection of Birds and Bird Life International (UK)*, 1992.
- Sondhi, N. (2002). A comparison of birdscommunity of two fragmented and two continuous South East Asia forest. *Biodiversity and conservation*, 1105–1119.
- Voon, A. M. F., Nasradhi, K. N. A. K., Rahman, M. A., & Mohd-Azlan, J. (2014). Bird diversity, density and foraging activities in a university campus landscape in Sarawak. *Borneo Journal of Resource Science and Technology*, 4(2), 9-20.
- Xu, S., Yuan, Y., Song, P., Cui, M., Zhao, R., Song, X. & Yang, J. (2023). The spatial patterns of diversity and their relationships with environments in rhizosphere microorganisms and host plants differ along elevational gradients. *Frontiers in Microbiology*, 14, 1079113.

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