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A Checklist of Avifauna in Mukuruthi National Park, The Nilgiris, Southern Western Ghats, Tamil Nadu, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The present study was carried out from January to June of each year 2022 to 2023 checklist of avifauna in Mukuruthi National Park in the Nilgiris. We have documented 75 bird species across 13 orders and 34 families. Passerine birds(n=45) were more diverse than non-passerine birds (n=30).

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In the study, several bird species are categorized under various IUCN threat categories only one species is near threatened (*Zoothera neilgherriensis*) while each of the three species is considered endangered, and vulnerable, and the remaining 68 species are classified as least concern. The present study anticipates that montane grassland and shola forest habitats will serve as critical areas for flora and fauna species, supporting future studies on various aspects of avian ecology.

Keywords: Avifauna; Grassland; Mukuruthi National Park; Nilgiris.

1. INTRODUCTION

Birds serve as ideal bioindicators and effective models for studying various environmental issues (Francis, 2017). Thus, evaluating the condition of local landscapes is essential to identifying key determinants of bird community structure, crucial for avian conservation (Kattan & Franco, 2004). The Indian checklist acknowledges a total of 1358 species of birds constituting about 12% of the world's avifauna (Alstrom et al., 2016). This diversity is supported by a wide range of climatic conditions, unique habitats, and extensive inland, forest, and coastal regions, which attract and sustain a variety of bird species year-round (Grimmett et al., 1999). The Western Ghats Mountain range in southwestern India forms a significant part of the Western Ghats-Sri Lanka biodiversity hotspot, and it is renowned for its high levels of biodiversity and endemism (Myers et al., 2000). This region alone supports 26 endemic bird species, each with different levels of extinction risk according to the IUCN Red List (Ramesh et al., 2017). In India, bird monitoring efforts have primarily focused on endangered species, wetland birds, heronries, and birds within protected areas, such as national parks, sanctuaries, and Important Bird Areas (IBAs) (Urfi, 2005). Bird community assessments have become essential for biodiversity conservation, underscoring the need to document the current status of bird species to enable effective future monitoring and conservation efforts (Islam & Rahmani, 2004). The study represents the first attempt to explore the distribution and diversity of avifauna, focusing on identification and documentation within Mukuruthi National Park in the Upper Nilgiris.

Mukurthi National Park (MNP) is situated in the Nilgiris district of Tamil Nadu, India, and forms part of the larger Nilgiri Biosphere Reserve. The Mukurthi National Park faces the west between 11°10′ to 11°22′ N and 76°26′ to 76°34′ E the central location being 11° 16′ N and 76° 32′ E. is area approximately 78. 46 sq.km ofthe Western Ghats and lies at an elevation ranging between 1,500 and 2,629 meters above sea level. This high-altitude park is characterized by unique montane grasslands interspersed with shola forests, creating a distinct ecosystem that supports a variety of endemic species. The entire terrain is undulating grassland with patches of montane evergreen forest confined to the folds of hills and depressions. Mukurthi was declared a wildlife sanctuary in 1980 (MoEF & CC, 2021). under the Wildlife Protection Act of 1972 and a national park in 1990 mainly for the protection of the endangered Nilgiri tahr as well as numerous endemic bird species and other flora and fauna unique to the Western Ghats. It is part of the Nilgiri Biosphere Reserve the first one to be notified in 1986 among the 18 biosphere reserves of India (MoEF & CC, 2019).

2. METHODS AND METHODOLOGY

The study was carried out in the Nilgiris' Mukuruthi National Park from January to June of each year (2022–2023). The bird survey was conducted in the morning and evening periods within the MNP. The bird was identified and recorded during the fieldwork by direct count observation. The bird species were observed with a field binocular Nikon Prostaff 7S 8x42 6.8. Photographs were taken with the help of Nikon COOLPIX P600 Digital Camera 60x wide optical zoom 4.3-258mm. Bird identification is done by Ali and Ripley (1996), and Grimmett et al. (1999). The checklist refers to the taxonomic order and limit of species defined by Praveen and Jayapal (2024). Residential status was determined by presence and absence classifying birds as resident, migratory, vagrant, or local migratory, the relative abundance was categorized as acommon (C), uncommon (UC), orrare (Ra) sighting. As stated earlier depending on their feeding habits birds were categorized into carnivores, frugivores, insectivores, graminivores, omnivores, and nectarines (Ali, 1996). The relative diversity of families was calculated using the formula from Torre- Cuadros et al., (2007).

$$RDi = \frac{Number\ of\ bird\ species\ in\ a\ family}{Total\ number\ of\ species} \times 100$$

3. RESULTS

During the study period, we identified 75 bird species across 13 orders and 34 families in the recorded MNP (Table 1). Passerine birds were more diverse than non-passerine birds with Passeriformes (60%) and Accipitriformes (12%) respectively (Fig. 1). As shown in Fig. 2,

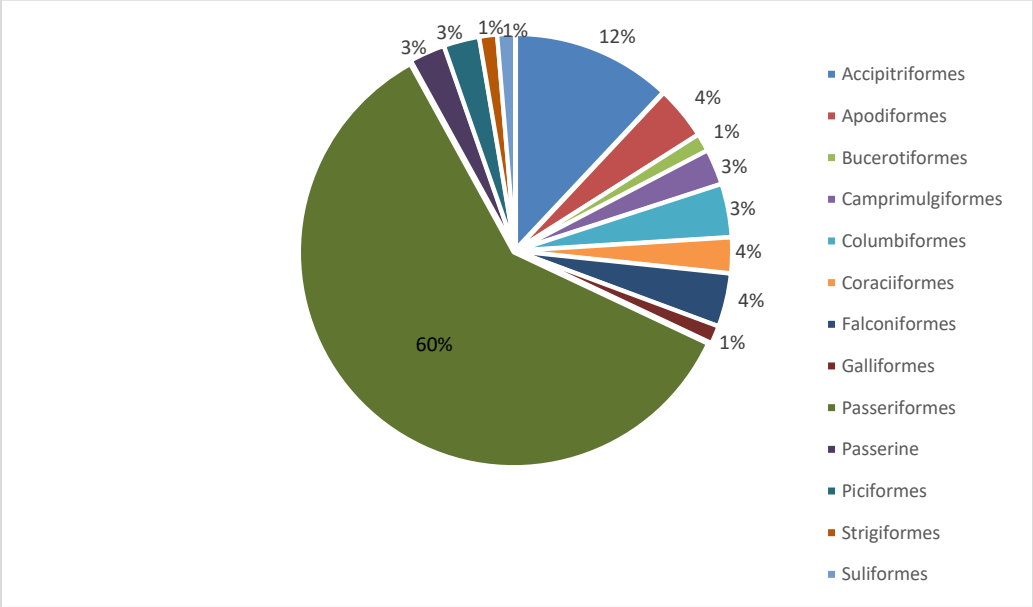

Fig. 1. Order-wise bird species abundance in Mukuruthi National Park, The Nilgiris

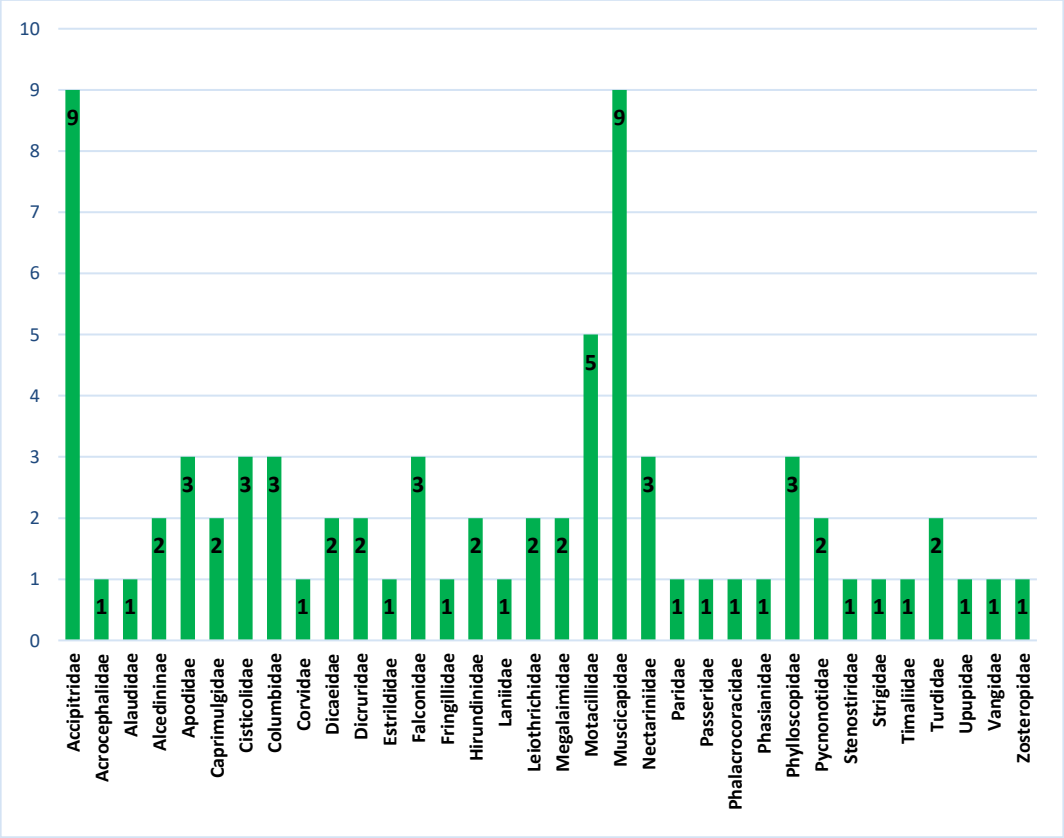

Fig. 2. Family-wise bird abundance in Mukuruthi National Park, The Nilgiris

Table 1. Checklist of avian species in Mukuruthi National Park in the Nilgiris

S. No.	Name of the species	Scientific Name	family	order	IUCN	Habitat	Residential status	Relative abundance	Feeding guild
1	Shikra	*Accipiter badius*	Accipitridae	Accipitriformes	LC	O	R	CO	C
2	Black Eagle	*Ictinaetus malaiensis*	Accipitridae	Accipitriformes	LC	O	R	CO	C
3	Changeable Hawk-Eagle	*Nisaetus cirrhatus*	Accipitridae	Accipitriformes	LC	O	V	Ra	C
4	Oriental Honey-buzzard	*Pernis ptilorhynchus*	Accipitridae	Accipitriformes	LC	O	R	CO	C
5	Besra	*Accipiter virgatus*	Accipitridae	Accipitriformes	LC	O	R	CO	C
6	Black-winged Kite	*Elanus caeruleus*	Accipitridae	Accipitriformes	LC	O	R	UC	C
7	White-eyed Buzzard	*Butastur teesa*	Accipitridae	Accipitriformes	LC	O	R	CO	C
8	Indian spotted Eagle	*Clanga hastata*	Accipitridae	Accipitriformes	VU	O	R	Ra	C
9	Pied Harrier	*Circus melanoleucos*	Accipitridae	Accipitriformes	LC	O	M	Ra	C
10	Blyth's Reed Warbler	*Acrocephalus dumetorum*	Acrocephalidae	Passeriformes	LC	S	R	CO	I
11	Malabar Lark	*Galerida malabarica*	Alaudidae	Passeriformes	LC	GL	R	Ra	I, G
12	Common Kingfisher	*Alcedo atthis*	Alcedininae	Coraciiformes	LC	W	R	UC	C
13	White-throated Kingfisher	*Halcyon smyrnensis*	Alcedininae	Coraciiformes	LC	W	V	UC	C
14	Little Swift	*Apus affinis*	Apodidae	Apodiformes	LC	O, W	R	CO	I
15	Asian Palm Swift	*Cypsiurus balasiensis*	Apodidae	Apodiformes	LC	O, W	R	CO	I
16	Indian Swiftlet	*Aerodramus unicolor*	Apodidae	Apodiformes	LC	O	R	CO	I
17	Indian Nightjar	*Caprimulgus asiaticus*	Caprimulgidae	Camprimulgiformes	LC	O	R	CO	I
18	Jungle Nightjar	*Caprimulgus indicus*	Caprimulgidae	Camprimulgiformes	LC	O	R	CO	I
19	Ashy Prinia	*Prinia socialis*	Cisticolidae	Passerine	LC	S, PL	R	CO	I
20	Grey-breasted Prinia	*Prinia hodgsonii*	Cisticolidae	Passerine	LC	S, PL	R	CO	I
21	Common Tailorbird	*Orthotomus sutorius*	Cisticolidae	Passeriformes	LC	S	R	UC	I, N
22	Nilgiri Wood-Pigeon	*Columba elphinstonii*	Columbidae	Columbiformes	VU	S, PL	R	VC	F, G
23	Spotted Dove	*Spilopelia chinensis*	Columbidae	Columbiformes	LC	S, PL	R	CO	F, G
24	Asian Emerald Dove	Chalcophaps indica	Columbidae	Columbiformes	LC	S	V	UC	F, G
25	Large-billed Crow	*Corvus macrorhynchos*	Corvidae	Passeriformes	LC	O	R	VC	O
26	Nilgiri Flowerpecker	*Dicaeum concolor*	Dicaeidae	Passeriformes	LC	S	R	CO	F, N
27	Pale-billed Flowerpecker	*Dicaeum erythrorhynchos*	Dicaeidae	Passeriformes	LC	S	R	CO	F, N
28	Ashy Drongo	*Dicrurus leucophaeus*	Dicruridae	Passeriformes	LC	S	R	UC	I
29	Bronzed Drongo	*Dicrurus aeneus*	Dicruridae	Passeriformes	LC	S	R	UC	I
30	Red Munia	*Amandava amandava*	Estrildidae	Passeriformes	LC	S	R	UC	G
31	Common Kestrel	Falco tinnunculus	Falconidae	Falconiformes	LC	O	R	VC	C
32	Lesser Kestrel	*Falco naumanni*	Falconidae	Falconiformes	LC	O	R	VC	C
33	Red-necked Falcon	*Falco chicquera*	Falconidae	Falconiformes	LC	O	R	CO	C
34	Common Rosefinch	*Carpodacus erythrinus*	Fringillidae	Passeriformes	LC	S, O	R	CO	G
35	Barn Swallow	*Hirundo rustica*	Hirundinidae	Passeriformes	LC	O, W	R	CO	I

S. No.	Name of the species	Scientific Name	family	order	IUCN	Habitat	Residential status	Relative abundance	Feeding guild
36	Hill Swallow	*Hirundo domicola*	Hirundinidae	Passeriformes	LC	O	R	VC	I
37	Long-tailed Shrike	*Lanius schach*	Laniidae	Passeriformes	LC	S, PL	R	UC	C
38	Nilgiri Laughingthrush	*Montecincla cachinnans*	Leiothrichidae	Passeriformes	EN	S	R	VC	F, I
39	Rufous Babbler	*Argya subrufa*	Leiothrichidae	Passeriformes	LC	S	V	Ra	I, N
40	Malabar Barbet	*Psilopogon malabaricus*	Megalaimidae	Piciformes	EN	PL	M	UC	F
41	White-cheeked Barbet	*Psilopogon viridis*	Megalaimidae	Piciformes	LC	S	R	CO	F
42	Nilgiri Pipit	*Anthus nilghiriensis*	Motacillidae	Passeriformes	VU	GL	R	VC	I
43	Paddyfield Pipit	*Anthus rufulus*	Motacillidae	Passeriformes	LC	O	R	VC	I
44	White-browed Wagtail	*Motacilla maderaspatensis*	Motacillidae	Passeriformes	LC	W	R	CO	I
45	Grey Wagtail	*Motacilla cinerea*	Motacillidae	Passeriformes	LC	W	R	CO	I
46	Citrine Wagtail	*Motacilla citreola*	Motacillidae	Passeriformes	LC	W	R	CO	I
47	Nilgiri Sholakili	*Sholicola major*	Muscicapidae	Passeriformes	EN	S	R	VC	F, I
48	Nilgiri Flycatcher	*Eumyias albicaudatus*	Muscicapidae	Passeriformes	LC	S, PL	R	VC	I
49	Black-and-orange Flycatcher	*Ficedula nigrorufa*	Muscicapidae	Passeriformes	LC	S	R	VC	I
50	Oriental Magpie-Robin	*Copsychus saularis*	Muscicapidae	Passeriformes	LC	S	R	VC	I, N
51	Tickell's Blue Flycatcher	*Cyornis tickelliae*	Muscicapidae	Passeriformes	LC	S	V	Ra	I
52	Pied Bushchat	*Saxicola caprata*	Muscicapidae	Passeriformes	LC	GL	R	VC	I
53	Hill Blue Flycatcher	*Cyornis whitei*	Muscicapidae	Passeriformes	LC	S	V	UC	I
54	Indian Blue Robin	*Larvivora brunnea*	Muscicapidae	Passeriformes	LC	S	R	UC	I
55	White-bellied Blue Flycatcher	*Cyornis pallidipes*	Muscicapidae	Passeriformes	LC	S	V	UC	I
56	Crimson-backed Sunbird	*Leptocoma minima*	Nectariniidae	Passeriformes	LC	PL	R	UC	I, N
57	Purple-rumped Sunbird	*Leptocoma zeylonica*	Nectariniidae	Passeriformes	LC	S	R	CO	I, N
58	Purple Sunbird	*Cinnyris asiaticus*	Nectariniidae	Passeriformes	LC	S	R	CO	I, N
59	Cinereous Tit	*Parus cinereus*	Paridae	Passeriformes	LC	O, PL	R	VC	I, N
60	House Sparrow	*Passer domesticus*	Passeridae	Passeriformes	LC	O	R	CO	O
61	Indian Cormorant	*Phalacrocorax fuscicollis*	Phalacrocoracidae	Suliformes	LC	W	V	UC	C
62	Grey Junglefowl	*Gallus sonneratii*	Phasianidae	Galliformes	LC	S	R	UC	I, G
63	Greenish Warbler	*Phylloscopus trochiloides*	Phylloscopidae	Passeriformes	LC	S	R	CO	I
64	Large-billed Leaf Warbler	*Phylloscopus magnirostris*	Phylloscopidae	Passeriformes	LC	S	R	CO	I
65	Green Warbler	*Phylloscopus nitidus*	Phylloscopidae	Passeriformes	LC	S	R	CO	I
66	Red-whiskered Bulbul	*Pycnonotus jocosus*	Pycnonotidae	Passeriformes	LC	S, O	R	VC	F, I
67	Square-tailed Bulbul	*Hypsipetes ganeesa*	Pycnonotidae	Passeriformes	LC	S, PL	R	VC	F, I
68	Grey-headed Canary-Flycatcher	*Culicicapa ceylonensis*	Stenostiridae	Passeriformes	LC	S, W	R	VC	I
69	Brown Fish-Owl	*Ketupa zeylonensis*	Strigidae	Strigiformes	LC	O	R	Ra	C

S. No.	Name of the species	Scientific Name	family	order	IUCN	Habitat	Residential status	Relative abundance	Feeding guild
70	Indian Scimitar-Babbler	*Pomatorhinus horsfieldii*	Timaliidae	Passeriformes	LC	S	R	VC	I, N
71	Nilgiri Thrush	*Zoothera neilgherriensis*	Turdidae	Passeriformes	NT	S	V	Ra	I
72	Indian Blackbird	*Turdus simillimus*	Turdidae	Passeriformes	LC	S, GL	R	VC	F, I
73	Eurasian Hoopoe	*Upupa epops*	Upupidae	Bucerotiformes	LC	O, PL	R	CO	I
74	Bar-winged Flycatcher-shrike	*Hemipus picatus*	Vangidae	Passeriformes	LC	S	V	UC	I
75	Indian White-eye	*Zosterops palpebrosus*	Zosteropidae	Passeriformes	LC	S, O	R	VC	I, N

IUCN Status: LC- Least Concern, EN- Endangered, VU- Vulnerable, NT- Near threatened. Residential Status: R – Resident, M- Migratory, Vagrant. Relative abundance: VC- Very common, C- Common, UN- Uncommon, Ra- Rare. Feeding guild: C- Carnivores, F- Frugivores, FG- Frugivores Granivores, FI- Frugivores Insectivores, FN- Frugivores Nectarivores, G- Granivores, I- Insectivores, IG- Insectivores Granivores,IN- Insectivores Nectarivores, O- Omnivores. Habitat: GL- Grassland, O- Open area, OPL- Open area Plantation, OW- Open area Wetland, PL- Plantation, S – Shola, SGL- Shola Grassland, SO- Shola Open area, SPL – Shola Plantation, SW – Shola Wetland, W- Wetland.

Table 2. Relative diversity of avian species at Mukuruthi National Park in the Nilgiris

S. no	Family	No. of species	Rdi %
1.	Accipitridae	9	12
2.	Acrocephalidae	1	1.33
3.	Alaudidae	1	1.33
4.	Alcedininae	2	2.67
5.	Apodidae	3	4
6.	Caprimulgidae	2	2.67
7.	Cisticolidae	3	4
8.	Columbidae	3	4
9.	Corvidae	1	1.33
10.	Dicaeidae	2	2.67
11.	Dicruridae	2	2.67
12.	Estrildidae	1	1.33
13.	Falconidae	3	4
14.	Fringillidae	1	1.33
15.	Hirundinidae	2	2.67
16.	Laniidae	1	1.33
17.	Leiothrichidae	2	2.67
18.	Megalaimidae	2	2.67
19.	Motacillidae	5	6.67
20.	Muscicapidae	9	12
21.	Nectariniidae	3	4
22.	Paridae	1	1.33
23.	Passeridae	1	1.33
24.	Phalacrocoracidae	1	1.33
25.	Phasianidae	1	1.33
26.	Phylloscopidae	3	4
27.	Pycnonotidae	2	2.67
28.	Stenostiridae	1	1.33
29.	Strigidae	1	1.33
30.	Timaliidae	1	1.33
31.	Turdidae	2	2.67
32.	Upupidae	1	1.33
33.	Vangidae	1	1.33
34.	Zosteropidae	1	1.33

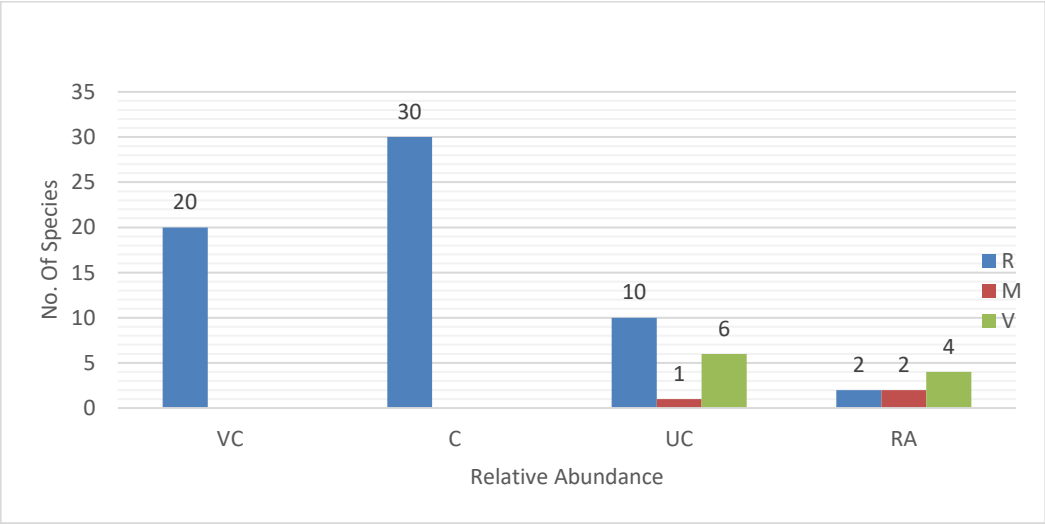

Fig. 3. Relative abundance of birds with residential status in the Mukuruthi National Park in the Nilgiris

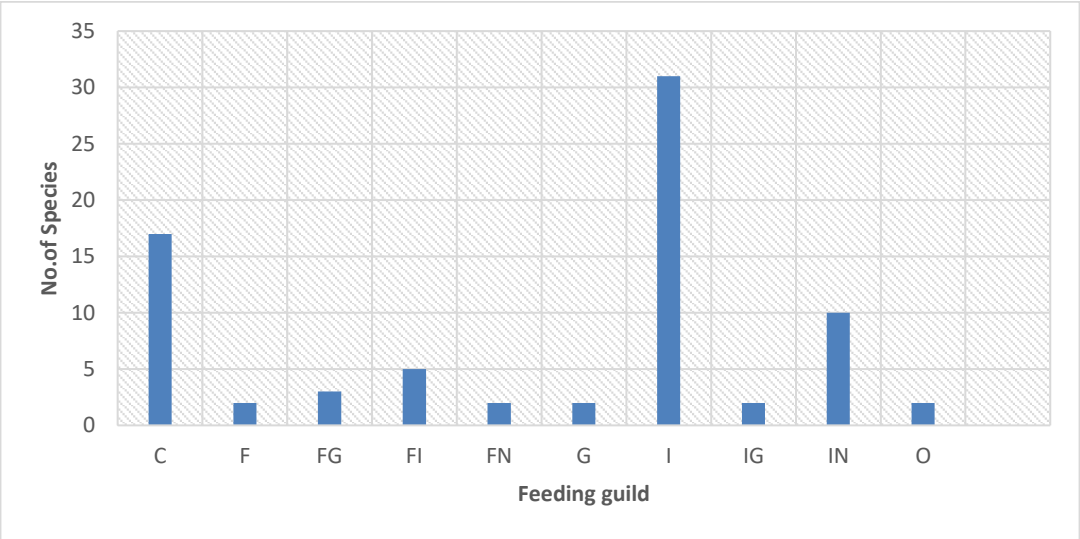

Fig. 4. Feeding guild status recorded in the Mukuruthi National Park in the Nilgiris

Muscicapidae and Accipitridae were the most dominant, with 9 species each, followed by Motacillidae with 5 species. Families Apodidae, Columbidae, Falconidae, Nectariniidae, and Phylloscopidae each had 3 species, while Caprimulgidae, Alcedininae, Dicaeidae, Dicruridae, Hirundinidae, Leiothrichidae, Pycnonotidae, Turdidae, Cisticolidae, and Megalaimidae each included 2 species. Additionally, 17 families were represented by only a single species in the study area. The highest RDi analysis value was recorded for the Muscicapidae and Accipitridae families at 12% each, followed by the Motacillidae family at 6.67%. (Table 2). The relative abundance results show that of the 30 species are common(C), 20 species are very common (VC), 17 species are uncommon (UC), and8 species are rare (Ra). (Fig. 3). The feeding guild results show that (n=30) were Insectivores followed by (n=17) were Carnivores, and (n=10) were Insectivores and nectarivores (Fig. 4). In the study, several bird species are categorized under various IUCN threat classifications: three are considered endangered (*Montecincla cachinnans, Psilopogon malabaricus, Sholicola major*), three are vulnerable (*Columba elphinstonii, Anthus nilghiriensis, Clanga hastata*), one is near threatened (*Zoothera neilgherriensis*), and the remaining sixty-eight species are classified as least concern.

4. DISCUSSION

The present study underscores the ecological importance of Mukurthi National Park (MNP) in the Nilgiris as a key protected area within the Western Ghats Mountain range. Islam and Rahmani (2004) highlighted MNP as a vital habitat, particularly for globally threatened and shola-dependent species. Shola forests, unique mosaics of grasslands interspersed with forest patches, serve as essential habitats for several endemic and endangered species. Among these are the Nilgiri Laughingthrush, Nilgiri Flycatcher, Black-and-Orange Flycatcher, Nilgiri Sholakili, and Nilgiri Pipit, among other commonly found bird species. Birds are an extensively studied group within shola ecosystems, with numerous individual species-focused studies. In the present study, the family Muscicapidae emerged as the most represented, a finding consistent with previous research by Sankar et al. (2006) and Yaseen et al. (2011), who also identified Muscicapidae as the largest bird family across different protected areas in India. Studies on avifaunal diversity across different regions in the Nilgiris have documented varying numbers of bird species. Gokula (1998) recorded 265 bird species in the Mudumalai Wildlife Sanctuary at the lower elevations of the Nilgiri Hills, while Zarri (2008) observed 192 species in the upper Nilgiris. Peter et al. (2015) identified 87 species across 31 families and 13 orders in the Nilgiri foothills. In the Kethi Valley area, Kalaiyarasi et al. (2017) recorded 41 bird species, and in Doddabetta Hills, Samson et al. (2018) reported 123 species from 36 families and 16 orders. Kalaiyarasi et al. (2019) documented 46 species across 8 orders and 25 families in the Kodanadu region. Recently, Sivaraj et al. (2024) reported 108 bird species from 47 families within the

Nilgiris Forest Division. In contrast, studies specifically focusing on the upper Nilgiri plateau are limited. Early investigations in this area include those by Davison (1883); Cardew (1885), Baker, and Inglis (1930); with more recent work by Manikandan and Balasubramanian (2016). Studies on avian species in the upper Nilgiris are limited. Earlier work by Khan (1978) examined the biology of the Black-and-Orange Flycatcher, while later studies have investigated the biology and ecology of other threatened, endemic birds within this habitat, such as the Nilgiri Wood Pigeon, Nilgiri Pipit, and Nilgiri Laughingthrush (Robin, 2005, Robin and Sukumar, 2002, Robin et al., 2006, Zarri et al., 2008, Somasundaram and Vijayan, 2010). Vinod and Vijayan (2005) conducted one of the few studies on the Nilgiri Pipit, documenting its preference for marshy grasslands for nesting. Praveen and Kuriakose (2006) reviewed the distribution of the Black-and-Orange Flycatcher, an endemic species of shola forests.

The Shola grasslands, spanning an elevation gradient of approximately 500 to 2500 meters above sea level, support a unique and diverse assemblage of species, each adapted to specific elevational ranges (Srinivasan et al., 2007). Individual Shola Forest patches within these “sky islands” exhibit high species richness despite lower overall species abundance compared to neighboring lowland forests (Das, 2009). These grasslands also serve as critical habitats for several endangered flora and fauna species (Bunyan et al., 2012). However, this unique bird diversity and ecological balance are under significant threat from the conversion of grasslands to plantations and the spread of invasive alien species like *Acacia mearnsii*, which disrupt the native ecosystem and put additional pressure on these endangered species. Mukurthi National Park is notably less impacted by anthropogenic pressures such as grazing, logging, and settlement than other protected areas, providing a relatively undisturbed environment essential for conservation. Enhancing knowledge resources and offering legal support to local site management groups is crucial to protecting this unique ecosystem.

5. CONCLUSIONS

The study highlights that Mukuruthi National Park is a region with a lot of diversity, which is crucial for conserving the unique and endangered Shola grassland ecosystem and its endemic flora and fauna. In hosting bird species from various families and orders, there is a notable dominance of passerine species. The presence of species in the IUCN threat categories, which include Near Threatened and others classified as Endangered, Vulnerable, or Least Concern, highlights the importance of conservation in the park. We identify the montane grassland and shola forest habitats as essential ecosystems for sustaining avifaunal diversity. This underscores the importance of these habitats for future research on avian ecology and conservation in the Nilgiris region.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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