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Cover: Coromandal Sacred Langur *Semnopithecus priam* - made with acrylic paint. © P. Kritika.



Avifaunal diversity of Tsirang District with a new country record for Bhutan

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Abstract: Birds play a vital role in ecosystems. Studying avifaunal diversity therefore has a noteworthy role in indicating nature's ecological balance in the environment. A total of 749 bird species have so far been recorded in Bhutan. We present a comprehensive checklist of birds of Tsirang, District which largely lies outside Bhutan's protected area system. The data was collected through opportunistic encounters and with regular field visits to a range of locations in different seasons. One-fourth of the country's total avifauna and a new species recorded for Bhutan, The Plum-headed Parakeet *Psittacula cyanocephala* was recorded as part of this study. In all, 285 avian species belonging to 18 orders and 65 families including one globally 'Critically Endangered', three 'Vulnerable', and a 'Near Threatened' species were recorded during the survey. The high species richness of birds in the study area reveals that it includes good habitats for birds in Bhutan. Similar studies are suggested in other areas contiguous to the protected areas in Bhutan including the current study area. This should aid in understanding of the factors driving the differences in bird diversity within and outside the protected areas so as to facilitate informed conservation actions in future.

Keywords: Birds, broadleaved forests, checklist, conservation, IUCN Red List status, vegetation.

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Author contributions: Mr. Gyeltsen assumed the principal role in originating this manuscript, encompassing responsibilities such as photography, data compilation, and revision of the reviewed draft. Mr. Sangay Chhophel substantially contributed by supplying data and assuming a pivotal role in revising the manuscript. Likewise, Mr. Karma Wangda and Mr. Kinley contributed essential data and enhanced the manuscript's composition. Mr. Tshering Penjor and Mr. Karma Dorji provided references to distinct sections of the manuscript and actively participated in its revision. Collectively, each author made substantive and noteworthy contributions to the conception and maturation of this paper.

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INTRODUCTION

Described as ‘feathered bipeds’, birds are a very visible and integral part of the ecosystem (Ali 1941). Their roles include ecological health indicators, plant pollinators, and seed dispersers as well as pest regulators (Ali 1941; Bilgrami 1995; Harisha & Hosetti 2009).

It is said that the bird exploration in Bhutan began as early as 1937 by a team of foreigners from Britain (Ludlow & Kinnear 1937; Clements 1992; Gyeltshen et al. 2020). Since then, a number of studies on birds have been carried out in Bhutan which have contributed to developing baseline data. For example, Inskipp & Inskipp (1993) recorded 319 bird species, including 21 previously unpublished records for Bhutan.

The first detailed and comprehensive field guide titled ‘Birds of Bhutan’ recorded 616 species (Inskipp et al 1999). After two decades, the same team with an additional author from Bhutan published a new book titled ‘Birds of Bhutan and the Eastern Himalayas’, which is one of the latest comprehensive works on avifauna for Bhutan. According to Grimmett et al. (2019), Bhutan hosts 736 bird species. Since then, the Bhutan Birdlife Society (BBS) which is one of the latest civil society organizations (CSO) has shown through its Facebook group that 748 species have been recorded in Bhutan. The increase in the number of new records is attributed to a citizen science initiative as confirmed by ornithologists Tim Inskipp & Sherab (as cited in Dendup et al. 2020; Gyeltshen et al. 2020). With the recent sighting of Short-tailed Shearwater *Adenna tenuirostris* from Phibsoo Wildlife Sanctuary on 20 January 2021, a total of 749 species has been recorded in Bhutan (BBS 2021).

Bhutan is one of the Endemic Bird Areas (EBA) in the eastern Himalaya (Stattersfield et al. 1998; Bishop 1999). This is attributed to suitable climatic conditions, and the availability of natural resources in the region (Mohammad & Krishna 2016).

Bhutan has made a great effort to protect birds and their habitat. For example, the Biodiversity Conservation Act 2003 and Forest and Nature Conservation Rules and Regulations 2017 cover bird conservation, and 36 species (National Biodiversity Centre 2019) are listed as totally protected under schedule I.

MATERIAL AND METHODS

Study Area

Tsirang Forest Division jurisdiction is located in the south-central part of Bhutan (Figure 1). The total area of Tsirang is 638.8 km² and it is located between 27°11’58.6” N - 27°48’59.9” N and 90°20’ 57.7” E-90°20’23.3” E in central Bhutan. Tsirang shares boundaries with three other districts: Wangdue Phodrang, Dagana, and Sarpang in central Bhutan. Tsirang has 12 blocks and 101 villages with a population density of 35.9 per km² (Tsirang 2021).

The vegetation in the district is predominantly broadleaved forest covering 77.64% of the land area. In addition, there are other forest types such as Chir Pine *Pinus roxburghii* forest covering 6.51%, fir *Abies* forest covering 0.40%, and mixed conifer forests covering about 2.95% at the outer reaches of the district (FRMD 2017). The other significant vegetation is shrubs at 3.30%, which make up the higher altitude mountain slopes to the north of the district.

A portion of Tsirang District in the north lies in Jigme Singye Wangchuck National Park (JSWNP) covering about 34 km² in Sergithang block and Phuntenchu block. Part of southeastern Tsirang lies in the biological corridor network which connects JSWNP, Royal Manas National Park (RMNP), and Phibsoo Wildlife Sanctuary (PWS). With a warm and temperate climate, the elevation of Tsirang ranges 200–4,500 m (FRMD 2017). It is inhabited by rural settlements distributed sparsely on the hills and gentle slopes.

Methods

The data was gathered through intentional and opportunistic records in most parts of the district to document avifaunal diversity with most of the records captured during our field visits. The areas covered are located at altitudes ranging 250–2,500 m. Bird watching was normally done in the early hours (0600–0900 h) and occasionally in the evening at around 1530–1800 h. This survey explored a wide range of habitats including forests, streams, artificial ponds, and cultivation to study bird diversity. Canon 1300D, Canon Rebel T5, Nikon D5100 DSLR cameras with a zoom lens of max 300 mm, and 8x42 binoculars were used for bird watching and to capture bird images.

Birds were identified to the species level with the help of various available field guides (Grimmett et al. 1999, 2019) and experts’ identification through the Birds of Bhutan (Bhutan Birdlife Society) Facebook forum. The terminology is based on Manakadan & Pittie (2001).

The birds were categorized as A—Abundant (sighted

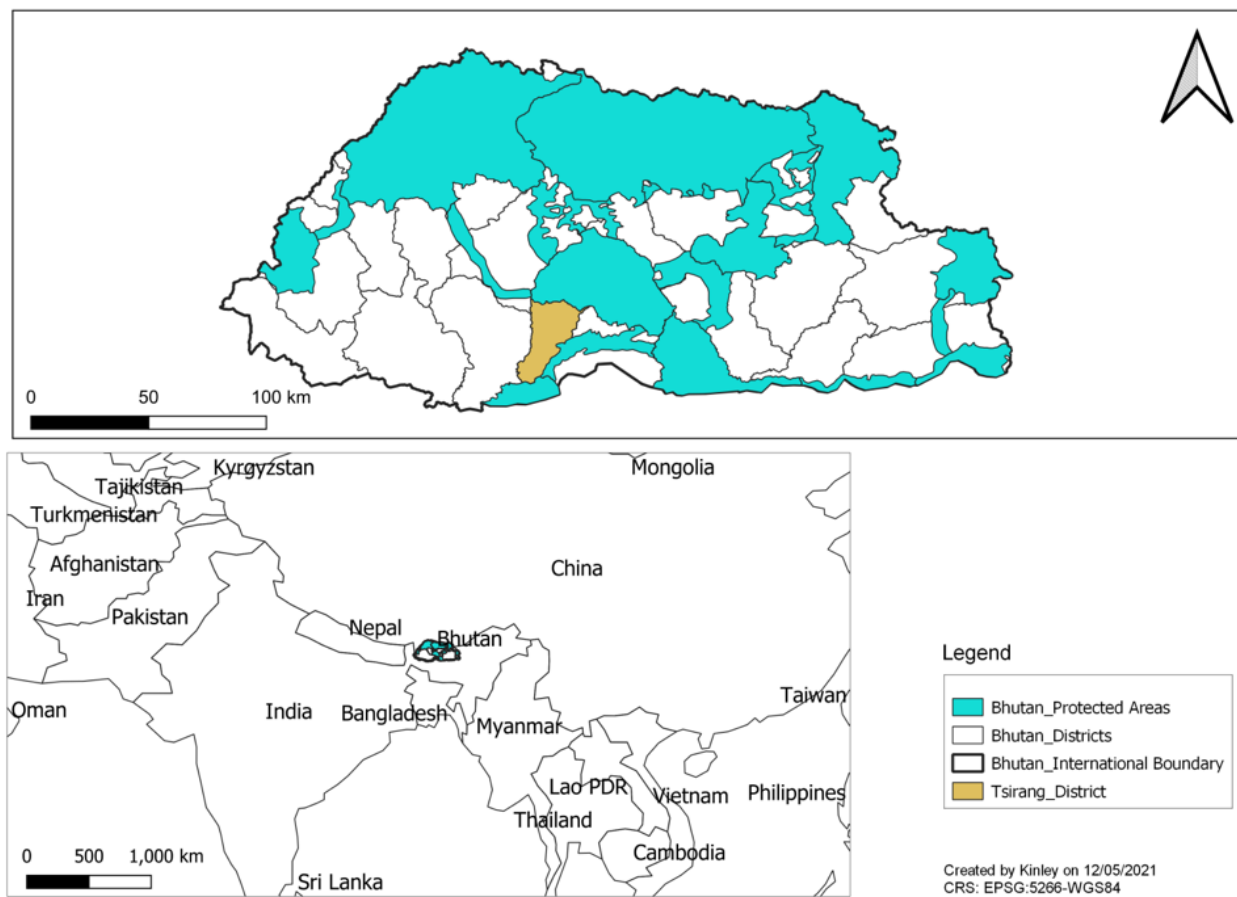


Figure 1. Study area where bird species were observed.



Image 1. A sparsely occupied and cultivated agricultural land of Mendrelgang Block. © Gyeltshen.

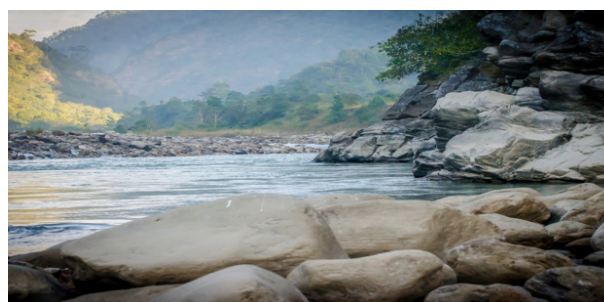


Image 2. At the lowest elevation of Sankosh River under Tsirang District. © Sangay Chhophel.

almost every time we go for bird watching in different sites); C—Common (sighted 10 times in the region); O—Occasional (sighted occasionally up to 5 times); and R—Rare (once or twice) based on the presence or absence during our visit to the areas.

RESULTS AND DISCUSSION

A total of 258 avian species belonging to 18 orders and 65 families was recorded (Table 1). The bird species were categorized by their order, abundance, and conservation status.

Among the total of 18 orders, Passeriformes was the dominant order comprising 71.3% (184 species in 45 families) of the total species recorded, followed by

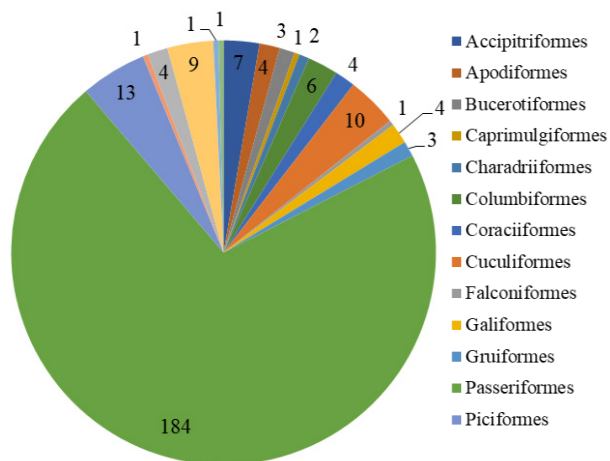


Figure 2. Number of bird species by order.

Piciformes (13 species in 2 families) with 5.03% of the total species count. Trogoniformes, Caprimulgiformes, Suliformes, and Psittaciformes were the least represented orders with a single species each (Figure 2).

The majority of bird species fall in the occasional group (O) with 51.5% ($n = 133$) of the total species recorded, followed by Common bird species (C) with 25.5% ($n = 66$) of the total, abundant species with 7.36% ($n = 19$) of the total and rarely sighted species with 7.4% ($n = 19$) of the total species recorded.

The results reported by Gyeltshen et al. (2020) in Trongsa District in central Bhutan also indicated that passerines were the most dominant order in which our result was consistent with Gyeltshen et al. (2020). The majority of bird recorded (253 species, 98% of the total) have been assessed as Least Concern (LC). Four globally threatened species were also sighted during the survey (Figure 4). Amongst the rarely sighted species is the globally 'Critically Endangered' White-bellied Heron *Ardea insignis* which occurs at 250 m along the Sankosh River, one of the longest rivers in the country, and its tributaries. The globally 'Vulnerable' Rufous-necked Hornbill *Aceros nipalensis* and Great Hornbill *Buceros bicornis* were recorded from different localities including Barshong, Sergithang, Patshaling, Phuentschu, and Mendrelgang during the survey. The Beautiful Nuthatch (VU) *Sitta formosa* was recorded from the Daratsho area adjoining Sarpang district which lies in the biological corridor that connects JSWNP, RMNP, and PWS. The globally 'Near Threatened' species River Lapwing *Vanellus duvaucelii* was also recorded from the lowest altitude of Sunkosh River and Malbasay under Patshaling block.

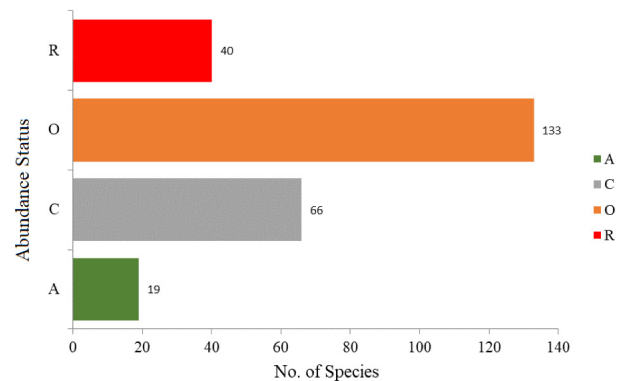


Figure 3. Abundance status: A—Abundant | C—Common | O—Occasional | R—Rare.

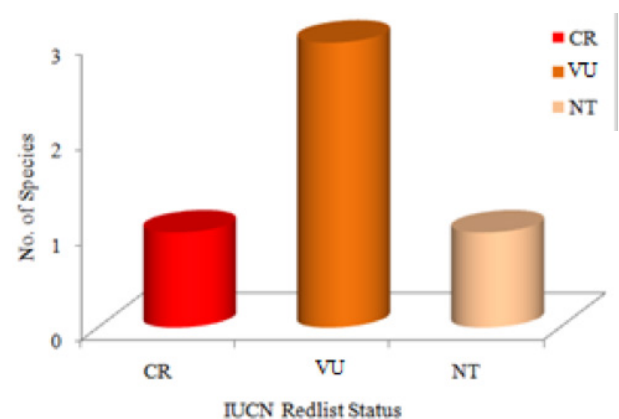


Figure 4. Classification by the IUCN Red List status

A single male Tibetan Serin *Serinus thibetanus* was observed once at Patshaling Block in February 2017 by the roadside and the Sapphire Flycatcher *Ficedula sapphira* the following day at Mendrelgang block. Neither species was sighted subsequently despite consistent efforts to find them. Common Myna *Acridotheres tristis*, Rock Pigeon *Columba livia*, Eurasian Tree Sparrow *Passer montanus*, and White-crested Laughing thrush *Garrulax leucolophus* are abundant in the locality. The Plum-headed Parakeet *Psittacula cyanocephala* (Image 65) is a new record contributed to the list of Birds of Bhutan sighted first on 28 October 2018 at Mendrelgang block under Tsirang District at 2,100 m by the first author. The record was later verified and confirmed by Tim Inskipp & Sherab.

Most of the birds were observed and photographed at the edges of cultivation, along highways, on farms, and on roadsides. Many of these birds were recorded during the spring and autumn seasons.

Table 1. Checklist of bird diversity in Tsirang, Bhutan.

	Common name	Scientific name	Family	Categorization	IUCN Red List status
1	Rufous-throated Partridge	<i>Arborophila rufogularis</i>	Phasianidae	C	LC
2	Red Junglefowl	<i>Gallus gallus</i>	Phasianidae	C	LC
3	Indian Peafowl	<i>Pavo cristatus</i>	Phasianidae	R	LC
4	Kalij Pheasant	<i>Lophura leucomelanos</i>	Phasianidae	C	LC
5	Great Cormorant	<i>Phalacrocorax carbo</i>	Phalacrocoracidae	O	LC
6	Little Cormorant	<i>Microcarbo niger</i>	Phalacrocoracidae	R	LC
7	Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Ardeidae	R	LC
8	White-bellied Heron	<i>Ardea insignis</i>	Ardeidae	R	CR
9	Little Egret	<i>Egretta garzetta</i>	Ardeidae	R	LC
10	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Accipitridae	O	LC
11	Jerdon's Baza	<i>Aviceda jerdoni</i>	Accipitridae	O	LC
12	Crested Serpent-Eagle	<i>Spilornis cheela</i>	Accipitridae	O	LC
13	Black Eagle	<i>Ictinaetus malaiensis</i>	Accipitridae	O	LC
14	Besra	<i>Accipiter virgatus</i>	Accipitridae	O	LC
15	Eurasian Sparrowhawk	<i>Accipiter nisus</i>	Accipitridae	O	LC
16	Common Buzzard	<i>Buteo buteo</i>	Accipitridae	O	LC
17	Slaty-breasted Rail	<i>Gallirallus striatus</i>	Rallidae	R	LC
18	Black-tailed Crake	<i>Zapornia bicolor</i>	Rallidae	C	LC
19	Barred Buttonquail	<i>Turnix suscitator</i>	Turnicidae	O	LC
20	River Lapwing	<i>Vanellus duvaucelii</i>	Charadriidae	C	NT
21	Red-wattled Lapwing	<i>Vanellus indicus</i>	Charadriidae	R	LC
22	Rock Pigeon	<i>Columba livia</i>	Columbidae	A	LC
23	Oriental Turtle-Dove	<i>Streptopelia orientalis</i>	Columbidae	A	LC
24	Spotted Dove	<i>Streptopelia chinensis</i>	Columbidae	A	LC
25	Barred Cuckoo-Dove	<i>Macropygia unchall</i>	Columbidae	A	LC
26	Wedge-tailed Green Pigeon	<i>Treron sphenurus</i>	Columbidae	A	LC
27	Mountain Imperial Pigeon	<i>Ducula badia</i>	Columbidae	O	LC
28	Asian Koel	<i>Eudynamis scolopaceus</i>	Cuculidae	R	LC
29	Green-billed Malkoha	<i>Phaenicophaeus tristis</i>	Cuculidae	O	LC
30	Chestnut-winged Cuckoo	<i>Clamator coromandus</i>	Cuculidae	O	LC
31	Plaintive Cuckoo	<i>Cacomantis merulinus</i>	Cuculidae	O	LC
32	Large HawkCuckoo	<i>Hierococcyx sparveroides</i>	Cuculidae	O	LC
33	Lesser Cuckoo	<i>Cuculus poliocephalus</i>	Cuculidae	O	LC
34	Indian Cuckoo	<i>Cuculus micropterus</i>	Cuculidae	R	LC
35	Himalayan Cuckoo	<i>Cuculus saturates</i>	Cuculidae	R	LC
36	Common Cuckoo	<i>Cuculus canorus</i>	Cuculidae	R	LC
37	Lesser Coucal	<i>Centropus bengalensis</i>	Cuculidae	O	LC
38	Mountain Scops-Owl	<i>Otus spilocephalus</i>	Strigidae	O	LC
39	Collared Scops-Owl	<i>Otus lettia</i>	Strigidae	O	LC
40	Brown Wood Owl	<i>Strix leptogrammica</i>	Strigidae	R	LC
41	Collared Owlet	<i>Glaucidium brodiei</i>	Strigidae	O	LC
42	Asian Barred Owlet	<i>Glaucidium cuculoides</i>	Strigidae	O	LC
43	Jungle Owlet	<i>Glaucidium radiatum</i>	Strigidae	R	LC
44	Spotted Owlet	<i>Athene brama</i>	Strigidae	R	LC

	Common name	Scientific name	Family	Categorization	IUCN Red List status
45	Tawny Fish Owl	<i>Ketupa flavipes</i>	Strigidae	R	LC
46	Grey Nightjar	<i>Caprimulgus indicus</i>	Caprimulgidae	O	LC
47	White-throated Needletail	<i>Hirundapus caudacutus</i>	Apodidae	O	LC
48	House Swift	<i>Apus nipalensis</i>	Apodidae	O	LC
49	Himalayan Swiftlet	<i>Aerodramus brevirostris</i>	Apodidae	O	LC
50	Blyth's Swift	<i>Apus leuconyx</i>	Apodidae	O	NE
51	Red-headed Trogon	<i>Harpactes erythrocephalus</i>	Trogonidae	O	LC
52	Eurasian Hoopoe	<i>Upupa epops</i>	Upupidae	O	LC
53	Great Hornbill	<i>Buceros bicornis</i>	Bucerotidae	C	VU
54	Rufous-necked Hornbill	<i>Aceros nipalensis</i>	Bucerotidae	R	VU
55	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Alcedinidae	O	LC
56	Crested Kingfisher	<i>Megaceryle lugubris</i>	Alcedinidae	O	LC
57	Pied Kingfisher	<i>Ceryle rudis</i>	Alcedinidae	R	LC
58	Blue-bearded Bee-eater	<i>Nyctornis athertoni</i>	Meropidae	O	LC
59	Great Barbet	<i>Psilopogon virens</i>	Megalaimidae	C	LC
60	Golden-throated Barbet	<i>Psilopogon franklinii</i>	Megalaimidae	O	LC
61	Blue-throated Barbet	<i>Psilopogon asiaticus</i>	Megalaimidae	C	LC
62	Speckled Piculet	<i>Picumnus innominatus</i>	Picidae	O	LC
63	White-browed Piculet	<i>Sasia ochracea</i>	Picidae	O	LC
64	Grey-capped Pygmy Woodpecker	<i>Dendrocopos canicapillus</i>	Picidae	O	LC
65	Fulvous-breasted Woodpecker	<i>Dendrocopos macei</i>	Picidae	O	LC
66	Lesser Yellownape	<i>Picus chlorolophus</i>	Picidae	O	LC
67	Greater Yellownape	<i>Picus flavinucha</i>	Picidae	O	LC
68	Grey-headed Woodpecker	<i>Picus canus</i>	Picidae	C	LC
69	Rufous Woodpecker	<i>Micropternus brachyurus</i>	Picidae	O	LC
70	Greater Flameback	<i>Chrysocolaptes guttacristatus</i>	Picidae	O	LC
71	Bay Woodpecker	<i>Blythipicus pyrrhotis</i>	Picidae	O	LC
72	Eurasian Kestrel	<i>Falco tinnunculus</i>	Falconidae	O	LC
73	Long-tailed Broadbill	<i>Psarisomus dalhousiae</i>	Eurylaimidae	O	LC
74	Blue-naped Pitta	<i>Hydrornis nipalensis</i>	Pittidae	O	LC
75	Large Woodshrike	<i>Tephrodornis virgatus</i>	Tephrodornithidae	O	LC
76	Bar-winged Flycatcher-shrike	<i>Hemipus picatus</i>	Tephrodornithidae	O	LC
77	Ashy Woodswallow	<i>Artamus fuscus</i>	Artamidae	O	LC
78	Common Iora	<i>Aegithina tiphia</i>	Aegithinidae	O	LC
79	Gray-chinned Minivet	<i>Pericrocotus solaris</i>	Campephagidae	O	LC
80	Long-tailed Minivet	<i>Pericrocotus ethologus</i>	Campephagidae	O	LC
81	Scarlet Minivet	<i>Pericrocotus speciosus</i>	Campephagidae	C	LC
82	Short-billed Minivet	<i>Pericrocotus brevirostris</i>	Campephagidae	O	LC
83	Large Cuckooshrike	<i>Coracina macei</i>	Campephagidae	O	LC
84	Black-winged Cuckooshrike	<i>Lalage melaschistos</i>	Campephagidae	O	LC
85	Brown Shrike	<i>Lanius cristatus</i>	Laniidae	R	LC
86	Long-tailed Shrike	<i>Lanius schach</i>	Laniidae	C	LC
87	Gray-backed Shrike	<i>Lanius tephronotus</i>	Laniidae	O	LC
88	Blyth's Shrike-Babbler	<i>Pteruthius aeralatus</i>	Vireonidae	O	LC
89	White-bellied Erpornis	<i>Erpornis zantholeuca</i>	Vireonidae	O	LC

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90	Slender-billed Oriole	<i>Oriolus tenuirostris</i>	Oriolidae	R	LC
91	Maroon Oriole	<i>Oriolus traillii</i>	Oriolidae	O	LC
92	Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	R	LC
93	Ashy Drongo	<i>Dicrurus leucophaeus</i>	Dicruridae	A	LC
94	Bronzed Drongo	<i>Dicrurus aeneus</i>	Dicruridae	O	LC
95	Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	Dicruridae	O	LC
96	Lesser Racket-tailed Drongo	<i>Dicrurus remifer</i>	Dicruridae	O	LC
97	Hair-crested Drongo	<i>Dicrurus hottentottus</i>	Dicruridae	O	LC
98	White-throated Fantail	<i>Rhipidura albicollis</i>	Rhipiduridae	O	LC
99	Common Green-Magpie	<i>Cissa chinensis</i>	Corvidae	O	LC
100	Grey Treepie	<i>Dendrocitta formosae</i>	Corvidae	C	LC
101	Barn Swallow	<i>Hirundo rustica</i>	Hirundinidae	C	LC
102	Nepal House Martin	<i>Delichon nepalensis</i>	Hirundinidae	O	LC
103	Red-rumped Swallow	<i>Cecropis daurica</i>	Hirundinidae	C	LC
104	Yellow-bellied Fairy-Fantail	<i>Chelidorhynch hypoxantha</i>	Stenostiridae	C	LC
105	Grey-headed Canary-Flycatcher	<i>Culicicapa ceylonensis</i>	Stenostiridae	C	LC
106	Sultan Tit	<i>Melanochlora sultanea</i>	Paridae	O	LC
107	Green-backed Tit	<i>Parus monticolus</i>	Paridae	C	LC
108	Yellow-cheeked Tit	<i>Macholophus spilonotus</i>	Paridae	O	LC
109	Black-throated Tit	<i>Aegithalos concinnus</i>	Aegithalidae	O	LC
110	Beautiful Nuthatch	<i>Sitta formosa</i>	Sittidae	R	VU
111	Chestnut-bellied Nuthatch	<i>Sitta cinnamoventris</i>	Sittidae	O	LC
112	Velvet-fronted Nuthatch	<i>Sitta frontalis</i>	Sittidae	R	LC
113	White-tailed Nuthatch	<i>Sitta himalayensis</i>	Sittidae	O	LC
114	Wall Creeper	<i>Tichodroma muraria</i>	Tichodromidae	R	LC
115	Hodgson's Treecreeper	<i>Certhia hodgsoni</i>	Certhiidae	O	LC
116	Brown Dipper	<i>Cinclus pallasii</i>	Cinclididae	O	LC
117	Striated Bulbul	<i>Pycnonotus striatus</i>	Pycnonotidae	O	LC
118	Black-crested Bulbul	<i>Pycnonotus flaviventris</i>	Pycnonotidae	O	LC
119	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	A	LC
120	White-throated Bulbul	<i>Alophix flaveolus</i>	Pycnonotidae	O	LC
121	Black Bulbul	<i>Hypsipetes leucocephalus</i>	Pycnonotidae	C	LC
122	Ashy Bulbul	<i>Hemixos flava</i>	Pycnonotidae	C	LC
123	Mountain Bulbul	<i>Ixos maclellandii</i>	Pycnonotidae	O	LC
124	Chestnut-headed Tesia	<i>Cettia castaneocoronata</i>	Cettiidae	C	LC
125	Black-faced Warbler	<i>Abroscopus schisticeps</i>	Cettiidae	O	LC
126	Brownish-flanked Bush Warbler	<i>Horornis fortipes</i>	Cettiidae	O	LC
127	Aberrant Bush Warbler	<i>Horornis flavivaceus</i>	Cettiidae	O	LC
128	Dusky Warbler	<i>Phylloscopus fuscatus</i>	Cettiidae	O	LC
129	Hume's Bush warbler	<i>Cettia brunneescens</i>	Cettiidae	O	LC
130	Tickell's Leaf Warbler	<i>Phylloscopus affinis</i>	Cettiidae	C	LC
131	Ashy-throated Warbler	<i>Phylloscopus maculipennis</i>	Cettiidae	O	LC
132	Yellow-browed Warbler	<i>Phylloscopus inornatus</i>	Cettiidae	O	LC
133	Smoky Warbler	<i>Phylloscopus fulviter</i>	Phylloscopidae	O	LC
134	Greenish Warbler	<i>Phylloscopus trochiloides</i>	Phylloscopidae	O	LC

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135	Western Crowned Warbler	<i>Phylloscopus occipital</i>	Phylloscopidae	O	LC
136	Yellow-vented Warbler	<i>Phylloscopus cantator</i>	Phylloscopidae	O	LC
137	Gray-hooded Warbler	<i>Phylloscopus xanthoschistos</i>	Phylloscopidae	C	LC
138	Golden-spectacled Warbler	<i>Seicercus burkii</i>	Phylloscopidae	O	LC
139	Whistler's Warbler	<i>Seicercus whistleri</i>	Phylloscopidae	O	LC
140	White-spectacled Warbler	<i>Seicercus affinis</i>	Phylloscopidae	O	LC
141	Chestnut-crowned Warbler	<i>Seicercus castaniceps</i>	Phylloscopidae	O	LC
142	Pale-rumped warbler	<i>Phylloscopus chloronotus</i>	Phylloscopidae	O	LC
143	Brown Bush Warbler	<i>Locustella luteoventris</i>	Locustellidae	O	LC
144	Common Tailorbird	<i>Orthotomus sutorius</i>	Cisticolidae	C	LC
145	Striated Prinia	<i>Prinia crinigera</i>	Cisticolidae	O	LC
146	Rufescent Prinia	<i>Prinia rufescens</i>	Cisticolidae	O	LC
147	Grey-breasted Prinia	<i>Prinia hodgsonii</i>	Cisticolidae	O	LC
148	Jungle Prinia	<i>Prinia sylvatica</i>	Cisticolidae	O	LC
149	White-browed Fulvetta	<i>Fulvetta vinipectus</i>	Sylviidae	O	LC
150	Greater Rufous-headed Parrotbill	<i>Psittiparus bakeri</i>	Sylviidae	O	LC
151	Lesser Rufous-headed Parrotbill	<i>Chleuasicus atrosuperciliaris</i>	Sylviidae	O	LC
152	Striated Yuhina	<i>Yuhina castaniceps</i>	Zosteropidae	O	LC
153	Stripe-throated Yuhina	<i>Yuhina gularis</i>	Zosteropidae	O	LC
154	Whiskered Yuhina	<i>Yuhina flavirostris</i>	Zosteropidae	C	LC
155	Rufous-vented Yuhina	<i>Yuhina occipitalis</i>	Zosteropidae	O	LC
156	Black-chinned Yuhina	<i>Yuhina nigrimenta</i>	Zosteropidae	O	LC
157	Oriental (Indian) White-eye	<i>Zosterops palpebrosus</i>	Zosteropidae	C	LC
158	Rufous-vented Yuhina	<i>Yuhina occipitalis</i>	Zosteropidae	O	LC
159	Puff-throated Babbler	<i>Pellorneum ruficeps</i>	Pellorneidae	O	LC
160	Golden Babbler	<i>Cyanoderma chrysaeum</i>	Timaliidae	R	LC
161	Rufous-capped Babbler	<i>Cyanoderma ruficeps</i>	Timaliidae	O	LC
162	White-browed Scimitar-babbler	<i>Pomatorhinus schisticeps</i>	Timaliidae	O	LC
163	Rusty-cheeked Scimitar-babbler	<i>Megapomatorhinus erythrogastrus</i>	Timaliidae	C	LC
164	Coral-billed Scimitar-babbler	<i>Pomatorhinus ferruginosus</i>	Timaliidae	R	LC
165	Streak-breasted Scimitar-babbler	<i>Pomatorhinus ruficollis</i>	Timaliidae	R	LC
166	Gray-throated Babbler	<i>Stachyris nigriceps</i>	Timaliidae	O	LC
167	Scaly-breasted Wren-babbler	<i>Pnoepyga albiventer</i>	Pnoepygidae	R	LC
168	Long-billed Wren-babbler	<i>Rimator malacoptilus</i>	Pellorneidae	R	LC
169	Yellow-throated Fulvetta	<i>Schoeniparus cinereus</i>	Pellorneidae	O	LC
170	Rufous-winged Fulvetta	<i>Schoeniparus castaneiceps</i>	Pellorneidae	O	LC
171	Nepal Fulvetta	<i>Alcippe nipalensis</i>	Pellorneidae	O	LC
172	Striated Laughingthrush	<i>Grammatoptila striata</i>	Leiothrichidae	C	LC
173	White-crested Laughingthrush	<i>Garrulax leucolophus</i>	Leiothrichidae	A	LC
174	Lesser Necklaced Laughingthrush	<i>Garrulax monileger</i>	Leiothrichidae	O	LC
175	White-throated Laughingthrush	<i>Pterorhinus albogularis</i>	Leiothrichidae	O	LC
176	Grey-sided Laughingthrush	<i>Pterorhinus caeruleus</i>	Leiothrichidae	R	LC
177	Bhutan Laughingthrush	<i>Trochalopteron imbricatum</i>	Leiothrichidae	O	LC
178	Blue-winged Laughingthrush	<i>Trochalopteron squamatum</i>	Leiothrichidae	O	LC
179	Chestnut-crowned Laughingthrush	<i>Trochalopteron erythrocephalum</i>	Leiothrichidae	O	LC

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180	Rufous-chinned Laughing Thrush	<i>Ianthocincla rufogularis</i>	Leiothrichidae	O	LC
181	Rufous Sibia	<i>Heterophasia capistrata</i>	Leiothrichidae	C	LC
182	Silver-eared Mesia	<i>Leiothrix argentauris</i>	Leiothrichidae	C	LC
183	Red-billed Leiothrix	<i>Leiothrix lutea</i>	Leiothrichidae	C	LC
184	Red-tailed Minla	<i>Minla ignotincta</i>	Leiothrichidae	C	LC
185	Rusty-fronted Barwing	<i>Actinodura egerstoni</i>	Leiothrichidae	C	LC
186	Blue-winged Minla	<i>Actinodura cyanouroptera</i>	Leiothrichidae	C	LC
187	Chestnut-tailed Minla	<i>Actinodura strigula</i>	Leiothrichidae	O	LC
188	Long-tailed Sibia	<i>Heterophasia caoides</i>	Leiothrichidae	R	LC
189	Red-faced Liocichla	<i>Liocichla phoenicea</i>	Leiothrichidae	O	LC
190	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	Muscicapidae	O	LC
191	Dark-sided Flycatcher	<i>Muscicapa sibirica</i>	Muscicapidae	O	LC
192	Slaty-backed Flycatcher	<i>Ficedula erithacus</i>	Muscicapidae	O	LC
193	Ferruginous Flycatcher	<i>Muscicapa ferruginea</i>	Muscicapidae	R	LC
194	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Muscicapidae	A	LC
195	Blue-throated Flycatcher	<i>Cyornis rubeculoides</i>	Muscicapidae	O	LC
196	Large Niltava	<i>Niltava grandis</i>	Muscicapidae	O	LC
197	Small Niltava	<i>Niltava macgrigoriae</i>	Muscicapidae	O	LC
198	Rufous-bellied Niltava	<i>Niltava sundara</i>	Muscicapidae	O	LC
199	Verditer Flycatcher	<i>Eumyias thalassinus</i>	Muscicapidae	C	LC
200	Pale Blue Flycatcher	<i>Cyornis unicolor</i>	Muscicapidae	R	LC
201	Blue Whistling-Thrush	<i>Myophonus caeruleus</i>	Muscicapidae	A	LC
202	Spotted Forktail	<i>Enicurus maculatus</i>	Muscicapidae	O	LC
203	Slaty-backed Forktail	<i>Enicurus schistaceus</i>	Muscicapidae	C	LC
204	Siberian Rubythroat	<i>Calliope calliope</i>	Muscicapidae	R	LC
205	Himalayan Bluetail	<i>Tarsiger rufilatus</i>	Muscicapidae	O	LC
206	Indian Bush Robin	<i>Larvivora brunnea</i>	Muscicapidae	R	LC
207	Rufous-breasted Bush-Robin	<i>Tarsiger hyperythrus</i>	Muscicapidae	R	LC
208	Slaty-blue Flycatcher	<i>Ficedula tricolor</i>	Muscicapidae	O	LC
209	Rufous-gorgeted Flycatcher	<i>Ficedula strophilata</i>	Muscicapidae	O	LC
210	Sapphire Flycatcher	<i>Ficedula sapphira</i>	Muscicapidae	R	LC
211	Little Pied Flycatcher	<i>Ficedula westermanni</i>	Muscicapidae	O	LC
212	Ultramarine Flycatcher	<i>Ficedula supercilialis</i>	Muscicapidae	O	LC
213	Taiga Flycatcher	<i>Ficedula albicilla</i>	Muscicapidae	O	LC
214	Red-breasted Flycatcher	<i>Ficedula parva</i>	Muscicapidae	R	LC
215	Blue-fronted Redstart	<i>Phoenicurus frontalis</i>	Muscicapidae	O	LC
216	Plumbeous Redstart	<i>Phoenicurus fuliginosus</i>	Muscicapidae	C	LC
217	White-capped Redstart	<i>Phoenicurus leucocephalus</i>	Muscicapidae	C	LC
218	Hodgson's Redstart	<i>Phoenicurus hodgsoni</i>	Muscicapidae	O	LC
219	Black Redstart	<i>Phoenicurus ochruros</i>	Muscicapidae	R	LC
220	White-winged Redstart	<i>Phoenicurus erythrogastrus</i>	Muscicapidae	R	LC
221	Chestnut-bellied Rock-Thrush	<i>Monticola rufiventris</i>	Muscicapidae	O	LC
222	Blue-capped Rock-Thrush	<i>Monticola cinclorhynchus</i>	Muscicapidae	O	LC
223	Blue Rock-Thrush	<i>Monticola solitaries</i>	Muscicapidae	O	LC
224	Siberian Stonechat	<i>Saxicola maurus</i>	Muscicapidae	O	LC

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225	Grey Bushchat	<i>Saxicola ferreus</i>	Muscicapidae	C	LC
226	Lesser Shortwing	<i>Brachypteryx leucophris</i>	Muscicapidae	R	LC
227	Eye-browed Thrush	<i>Turdus obscurus</i>	Turdidae	R	LC
228	Orange-headed Thrush	<i>Geokichla citrina</i>	Turdidae	O	LC
229	Tickell's Thrush	<i>Turdus unicolor</i>	Turdidae	C	LC
230	Gray-winged Blackbird	<i>Turdus boulboul</i>	Turdidae	O	LC
231	Black-throated Thrush	<i>Turdus atrogularis</i>	Turdidae	O	LC
232	Scaly Thrush	<i>Zoothera dauma</i>	Turdidae	O	LC
233	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	Sturnidae	C	LC
234	Common Myna	<i>Acridotheres tristis</i>	Sturnidae	A	LC
235	Great Myna	<i>Acridotheres grandis</i>	Sturnidae	O	LC
236	Golden-fronted Leafbird	<i>Chloropsis aurifrons</i>	Chloropseidae	O	LC
237	Orange-bellied Leafbird	<i>Chloropsis hardwickii</i>	Chloropseidae	O	LC
238	Fire-breasted Flowerpecker	<i>Dicaeum ignipectus</i>	Dicaeidae	C	LC
239	Black-throated Sunbird	<i>Aethopyga saturate</i>	Nectariniidae	O	LC
240	Green-tailed Sunbird	<i>Aethopyga nipalensis</i>	Nectariniidae	C	LC
241	Crimson Sunbird	<i>Aethopyga siparaja</i>	Nectariniidae	C	LC
242	Streaked Spiderhunter	<i>Arachnothera magna</i>	Nectariniidae	C	LC
243	Rufous-breasted Accentor	<i>Prunella strophlata</i>	Prunellidae	O	LC
244	Grey Wagtail	<i>Motacilla cinerea</i>	Motacillidae	C	LC
245	White Wagtail	<i>Motacilla alba</i>	Motacillidae	C	LC
246	White browed Wagtail	<i>Motacilla madraspatensis</i>	Motacillidae	O	LC
247	Olive-backed Pipit	<i>Anthus hodgsoni</i>	Motacillidae	A	LC
248	Crested Bunting	<i>Melophus lathami</i>	Emberizidae	O	LC
249	Yellow-breasted Greenfinch	<i>Chloris spinoides</i>	Fringillidae	O	LC
250	Tibetan Serin	<i>Spinus thibetanus</i>	Fringillidae	R	LC
251	Common Rosefinch	<i>Carpodacus erythrinus</i>	Fringillidae	O	LC
252	House Sparrow	<i>Passer domesticus</i>	Passeridae	O	LC
253	Russet Sparrow	<i>Passer rutilans</i>	Passeridae	C	LC
254	Eurasian Tree Sparrow	<i>Passer montanus</i>	Passeridae	A	LC
255	White-rumped Munia	<i>Lonchura striata</i>	Estrildidae	O	LC
256	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Estrildidae	C	LC
257	Plum-headed Parakeet	<i>Psittaculacyanocephala</i>	Psittaculidae	R	LC
258	Slaty-headed Parakeet	<i>Psittacula Himalayana</i>	Psittaculidae	R	LC

LC—Least Concern | VU—Vulnerable | A—Abundant | C—Common | O—Occasional | R—Rare | NE—Not Evaluated.

CONCLUSION AND RECOMMENDATIONS

This study represents one of the few documented references of bird inventory in the region and can be used as baseline data for future monitoring and survey. The comprehensive bird checklist indicates, that some areas lying outside protected areas in Bhutan provide good habitats for birds. However, the current trend of anthropogenic activities such as timber felling, new farm

road construction, and increased resource collections due to fewer restrictions as opposed to within protected areas pose a significant threat to birds.

Since this study was limited to a checklist, there are opportunities for in-depth studies on birds' interaction with ecosystems and associated threats in order to encourage bird conservation in the area. Further, a systematic study is recommended covering the whole of the Tsirang Forest area jurisdiction as we could only

cover the areas below 2,500 m.

Similar studies are suggested in other areas contiguous to protected areas in Bhutan as well as in the region. This should aid an understanding of the factors driving the differences in bird diversity within and outside the protected areas in Bhutan and should help in initiating conservation actions in future.

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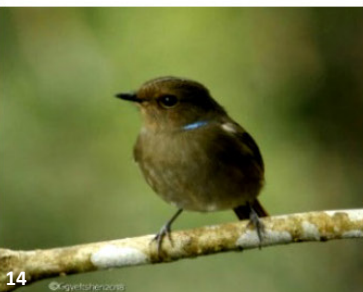
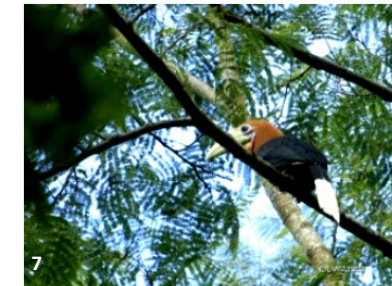


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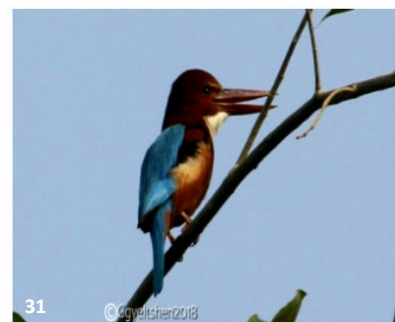
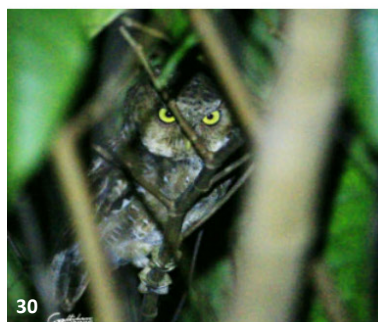
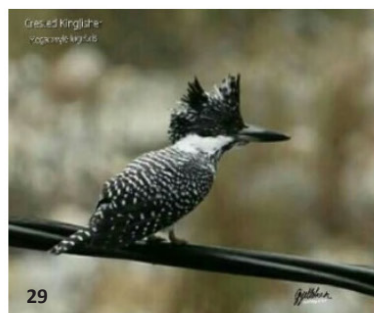
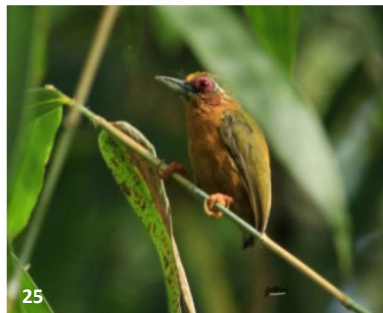
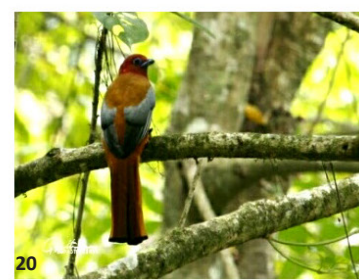


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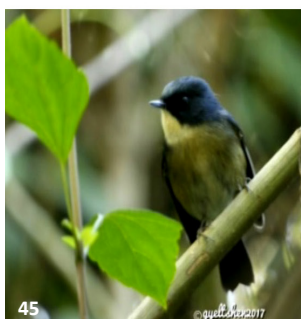
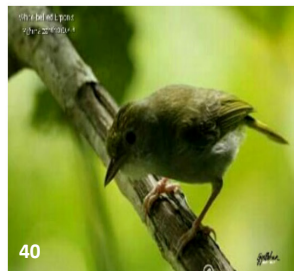
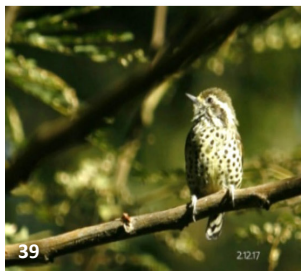
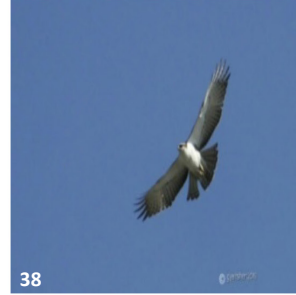
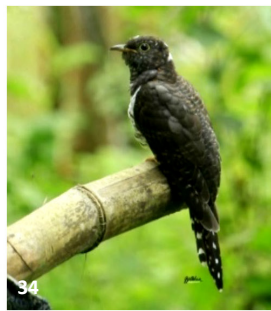


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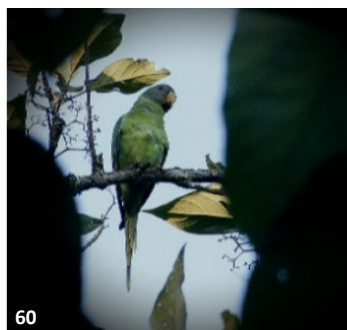
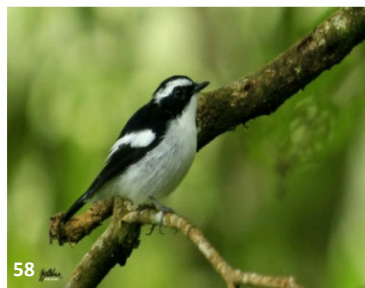
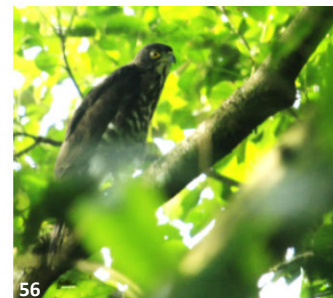
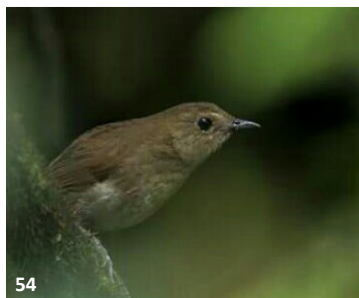
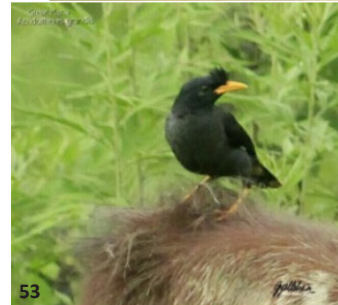
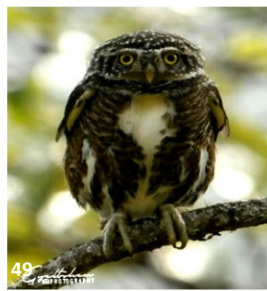


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