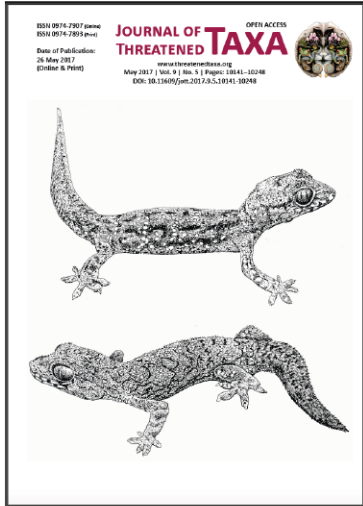


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## COMMUNICATION

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## A COMPARATIVE STUDY OF AVIAN DIVERSITY IN TEKNAF WILDLIFE SANCTUARY, INANI RESERVE FOREST AND CHITTAGONG UNIVERSITY CAMPUS IN BANGLADESH

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### OPEN ACCESS



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**Abstract:** We performed a comparative study of birds in Teknaf Wildlife Sanctuary (TWS), Inani Reserve Forest (IRF) and the Chittagong University Campus (CUC) in 2015. A total of 249 species belonging to 50 families were recorded: 210 species from 46 families in TWS, 187 species from 45 families in IRF, and 182 species from 45 families in CUC. Of these, 181 species (73%) were resident, 57 (23%) winter visitors, three (1.20%) summer visitors, two (0.80%) passage migrants and five (2%) vagrants. According to their frequency of occurrence, 73 species (29.32%) were very common, 66 (26.5%) common, 62 (25%) uncommon and 48 (19%) rare. 120 species (48%) were passerines (97 in TWS, 95 in IRF and 97 in CUC) and 129 (52%) non-passerines (113 in TWS, 92 in IRF and 85 in CUC). Among the three areas, TWS had the greatest diversity in terms of total species, (210>187>182), residents (161>148>134), non-residents (49>48>39), forest indicator birds (47>44>31) and wading birds (48>34>24).

**Keywords:** Bangladesh, Birds, Chittagong University Campus, comparative study, diversity, Inani Reserve Forest, Teknaf Wildlife Sanctuary.

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**Competing interests:** The authors declare no competing interests.

**Author detail:** DR. MD. FARID AHSAN is currently working as Professor in the Department of Zoology, University of Chittagong, Chittagong, and pronounced Wildlife Biologist in Bangladesh. IBRAHIM KHALIL AL HAIDAR is student, Department of Zoology, University of Chittagong.

**Author contribution:** The first author designed the study and all study has done under his supervision and improved the manuscript, while the second author conducted the field surveys of this study, compiled the data and wrote this manuscript.

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## INTRODUCTION

Diversity of avifauna is one of the most important ecological indicators for evaluating the quality of habitats (Johnston & Odum 1956; Morrison 1986; Welsh 1987; Koskimies 1989; Temple & Weins 1989; Browder et al. 2002), since flying birds react rapidly to habitat changes (Hilden 1965; Morrison 1986; Fuller et al. 1995; Louette et al. 1995). Bangladesh is home to about 700 species of birds (Khan 2015), representing 50% of total species on the Indian subcontinent and 7% of global species (Harvey 1990; Khan 2008). Previous studies of avian diversity reported 286 species of birds in Teknaf Wildlife Sanctuary (TWS; Khan et al. 1994), from which Khan (2013) later annotated a list of 243 species, and Ahsan & Khanom (2005) recorded 92 bird species in the Chittagong University campus. Though comparative study is very important to justify the habitat quality of birds, but in Bangladesh only one comparative study on the birds of five protected areas (Lawachara, Satchori, Rema-Kalenga, Chunati and Teknaf) was done by Khan & Aziz (2014).

Three different types of area were selected to study the diversity of birds and to compare populations associated with specific types of habitat. TWS is a peninsular landmass protected as a sanctuary since 2010 by an amendment under the provision of Bangladesh Wildlife (Preservation) (Amendment) Act, 1974 (now the act is called Wildlife [Conservation and Security] Act, 2012), it was previously classed as a Game Reserve. It is also an Ecologically Critical Area declared by the Department of the Environment in 1999. Inani Reserve Forest (IRF) is not officially a protected area but is conserved by legal means. Chittagong University Campus (CUC) is a semi-urbanized area that is neither included in the list of protected areas nor conserved by the government as a wildlife habitat. Thus, Teknaf Wildlife Sanctuary, Inani Reserve Forest and Chittagong University Campus are quite different habitats for birds.

## STUDY AREAS

### Teknaf Wildlife Sanctuary

is located in Teknaf sub-district of Cox's Bazar District at the southeast corner of Bangladesh (20°52'–21°09'N & 92°08'–92°18'E). TWS is bounded by the Naf River in the east, the plains of Teknaf peninsula in the south, the Bay of Bengal in the west, and Inani Reserve Forest in the north (Figs. 1,2). It is about 50km south of Cox's Bazar and runs along the longest beach in the world (Cox's

Bazar Beach). The sanctuary is comprised of 10 forest beats under three forest ranges of Cox's Bazar (south) Forest Division. It is a hilly mixed-evergreen sub-tropical forest with secondary plantations and covers an area of 11,615ha with a length of 32km (north-south) and width of 5km at the north end and 3km at the south end. The highest elevation in TWS is 284m at Toingya of Shilkhali Forest Range, although Bari & Dutta (2004) and Feeroz (2013) mentioned that it is 700m. The area consists of intervals of steep hills and valleys. The moist sub-tropical maritime climate of the sanctuary has three seasons: spring (March to April), monsoon (May to October) and winter (November to February; Bari & Dutta 2004). The sanctuary is rich in flora and contains several different ecosystems including hill forest, mangrove formation and sand-dune (Uddin et al. 2013). Feeroz (2013) recorded a total of 538 plant species under 102 families and 370 genera from TWS: 143 trees, 113 shrubs, 184 herbs, 87 climbers, 10 epiphytes and 1 parasite.

### Inani Reserve Forest

(Figs. 1,3) is located in Ukhiya subdistrict of Cox's Bazar (21°09'–21°17'N & 92°02'–92°11'E) is surrounded by Himchari National Park in the north, TWS in the south, a suburban area in the east and the Bay of Bengal in the west. It is about 22km south of Cox's Bazar and runs along Cox's Bazar beach. It comprises four Forest Beats under Inani Range of Cox's Bazar (south) Forest Division. IRF is a hilly area with mixed-evergreen forest and secondary plantations (Jashimuddin 2010) covering an area of 8,200ha with about 22km length and maximum 5km width. IRF has the same climate, seasons and vegetation as TWS. Kabir (2012) mentioned that forests which support rich biodiversity remain in the IRF, although according to DeCosse (2007) and M.F. Ahsan (pers. obs. since 1981) some areas that were natural low or high dense forest in the past have become scattered grasslands, agricultural lands and scattered trees.

### Chittagong University Campus

(Figs. 1,4) is situated at Zubra Village under Fatehpur union parishad of Hathazari sub-district in Chittagong District (22°27'30"–22°29'0"N & 91°46'30"–91°47'45"E). It is about 22km north of Chittagong, 3km southwest of Hathazari headquarter and about 6km east of the Bay of Bengal. The CUC is 709.82ha in area, surrounded by the Chittagong hill region and bounded by two hill streams from the south and the north. The highest altitude is about 61m on the northwestern side (Faculty of Biological Sciences), and the CUC contains an assortment of hills, lakes, ponds, flat land and valleys (Islam et al.



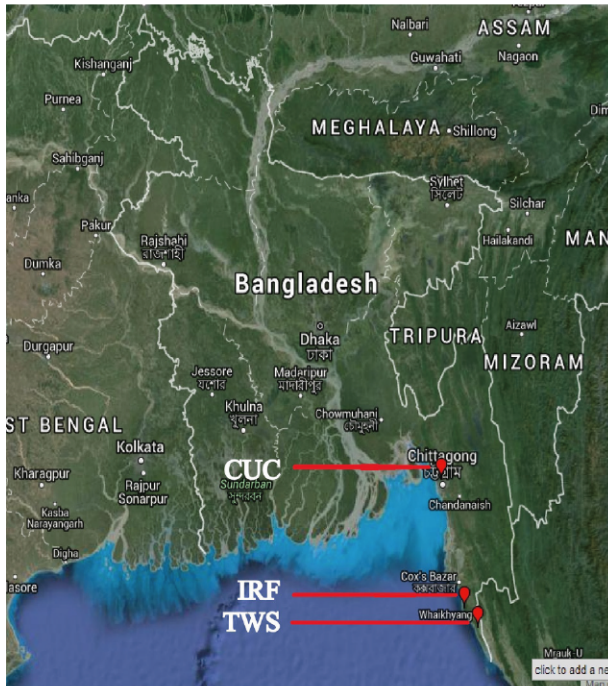


Figure 1. Positions of three study areas (TWS - Teknaf Wildlife Sanctuary; IRF - Inani Reserve Forest; CUC - Chittagong University Campus) in Bangladesh



Figure 2. Map of the Teknaf Wildlife Sanctuary showing transects

1979). The CUC shares the same climate and seasons as the other study areas and the vegetation is semi-evergreen (Ahsan & Khanom 2005) with a total of 665 plant species under 126 families and 404 genera, of which 550 are dicotyledons and 115 are monocotyledons (Alam & Pasha 1999).

**MATERIALS AND METHODS**

**Field Observations**

The study was carried out from January to December 2015. A total of 72 days were spent in the field (24 days in each study area; two days in a month (randomly)). Field observations were done throughout the day, with emphasis on the morning (06:00–10:00 hr) and evening (16:00–19:00 hr) when birds are most active, in order to find them in their natural habitats. The data were collected through Strip transect sampling (Buckland et al. 2001) and opportunistic findings along roads, trails, streams and bridle paths. A total of 23 transects were established to record data: 9 in TWS (Table 1), 7 in IRF (Table 2) and 7 in CUC (Table 3).

**Data Collection from Secondary Sources**

The source of national status of birds was IUCN Ban-



Figure 3. Map of the Inani Reserve Forest showing transects





Figure 4. Map of the Chittagong University Campus showing transects

gladesh (2015). Birds were categorized according to their status as resident or migratory based on Siddiqui et al. (2008). The checklist of the birds of the Oriental region by Inskipp et al. (1996) was followed for English and scientific names.

**Species Identification**

Observations were carried out with field binoculars (Vixen: 8x32 magnification) during the day. Photographs were taken (Canon 600D with 75–300 mm lens) whenever necessary to identify birds accurately. Identification was done with the help of standard field guides of Ali & Ripley (1995), Kazmierczak & van Perlo (2006) and Grimmett et al. (2013).

**Data Analysis**

Birds were grouped into four categories based on the frequency of their occurrence: Very Common (VC: observed on >75% of total observation days), Common (C: seen on 51–75 % of observation days), Uncommon (UC: recorded on 26–50 % of observation days) and Rare (R: seen on <25% of observation days). Birds considered as forest indicators were those that were not seen outside of forests. Birds were also classed as residents (R), rare or local migrants, seasonal migrants (winter or summer), passage migrants or vagrants.

Table 1. Transects in Teknaf Wildlife Sanctuary

	Name of transect	GPS coordination	Length (km)
1	Netong Hill	20°52'52.68"–20°53'9.6"N & 92°17'49.344"–92°17'39.408"E	0.70
2	Keruntoli Hill	20°53'52.044"–20°53'49.056"N & 92°16'54.12"–92°16'45.048"E	0.55
3	Keruntoli stream	20°54'1.44"–20°53'55.5"N & 92°16'48.324"–92°16'19.92"E	1.167
4	West of Teknaf Port	20°54'34.74"–20°54'38.268"N & 92°16'28.56"–92°16'4.008"E	0.941
5	Nature park	20°56'6.18"–20°55'46.308"N & 92°15'33.84"–92°15'36.036"E	0.902
6	Hnila I	20°1'7.824"–20°1'19.236"N & 92°13'22.836"–92°12'54.648"E	1.00
7	Hnila II	20°1'6.024"–20°1'34.032"N & 92°13'24.384"–92°13'16.032"E	0.782
8	Whykeong	20°5'24.108"–20°5'3.408"N & 92°9'29.016"–92°10'2.568"E	1.806
9	Shilkhali	21°1'22.872"–21°1'22.728"N & 92°11'13.848"–92°11'36.42"E	0.667

Table 2. Transects in Inani Reserve Forest

	Name of transect	GPS coordination	Length (km)
1	Holar Chara	21°14'6.108"–21°13'45.264"N & 92°3'21.42"–92°3'52.776"E	1.418
2	Narkella Jhira	21°13'48.936"–21°14'19.464"N & 92°4'6.024"–92°3'44.1"E	2.839
3	Boro Khal	21°13'29.208"–21°13'33.384"N & 92°3'22.14"–92°4'4.188"E	1.642
4	Patar Ghona	21°13'28.416"–21°13'6.78"N & 92°3'17.424"–92°3'46.224"E	1.465
5	Choto Khal	21°12'28.944"–21°12'13.356"N & 92°3'16.74"–92°3'41.688"E	1.385
6	Dakchara	21°12'3.564"–21°12'1.836"N & 92°3'9.252"–92°3'34.992"E	1.078
7	Swankhali	21°10'50.34"–21°10'51.528"N & 92°3'7.236"–92°3'44.388"E	1.486

Table 3. Transects in Chittagong University campus

	Name of transect	GPS coordination	Length (km)
1	Rail Line	22°28'14.736"–22°28'10.56"N & 91°47'40.164"–91°47'50.208"E	1.344
2	South Campus: Forestry	22°28'4.008"–22°27'38.268"N & 91°47'38.292"–91°47'34.692"E	1.034
3	South Campus: Botanical Garden	22°28'15.636"–22°27'33.156"N & 91°47'12.3"–91°47'16.944"E	1.505
4	South Campus: Hill Bottom Colony	22°28'11.316"–22°27'38.736"N & 91°46'59.016"–91°47'8.88"E	1.14
5	South Campus: Biological Faculty	22°28'11.028"–22°27'37.296"N & 91°46'59.016"–91°46'48.684"E	1.217
6	North Campus: North of Shaheed Abdur Rab Hall	22°28'25.572"–22°28'56.244"N & 91°47'8.268"–91°47'5.532"E	2.00
7	North Campus: Central Field and Sluice Gate	22°28'27.588"–22°29'7.44"N & 91°47'30.012"–91°47'32.496"E	1.445

**RESULTS**

A total of 249 species of birds under 50 families were recorded from the three study areas (Appendix 1). One-hundred-and-twenty species (48%) were passerines, and 129 (52%) non-passerines. One-hundred-and-eighty-one species (72.7%) were resident, 57 (22.9%) winter visitors, three (1.2%) summer visitors, two (0.8%) passage migrants and five (2%) vagrants. According to their occurrence, 73 species (29.3%) were very common, 66 (26.5%) common, 62 (25%) uncommon and 48 (19.3%) were rare.

While the three study areas have different degrees of official protection, they showed similar levels of species diversity with 210 species belonging to 46 families in TWS, 187 species in 45 families from IRF, and 182 species from 45 families in CUC. A majority of 145 species (58%) were recorded from all three study areas, while 40 (16%) were observed in only two areas and 64 species (25.8%) were restricted to a single area (Fig. 5).

Of the 210 species recorded on TWS, 97 (46%) were passerines and 113 (54%) non-passerines. In TWS, 161 species of birds were resident, 46 winter visitors, one summer visitor and two vagrants. Occurrence of birds of TWS revealed that 73 (35%) species were very common, 59 (28%) common, 52 (25%) uncommon and 26 (12%) were rare (Fig. 6).

Of the 187 species recorded in IRF, 95 (51%) were passerines and 92 (49%) non-passerines. One-hundred-and-forty-eight species were resident, 37 winter visitors and two vagrants. According to relative abundance, 71 (38%) species were very common, 61 (33%) common, 42 (22.5%) uncommon and 13 (7%) were rare (Fig. 7).

Of 182 species of birds observed at CUC, 97 (46%) were passerines and 85 (54%) non-passerines. One-hundred-and-thirty-four species were resident, 39 winter visitors, three summer visitors, four vagrants and two passage migrants. Seventy-three (40%) species of CUC were very common, 56 (31%) common, 32 (17.6%) uncommon and 21 (11.5%) were rare (Fig. 8).

Of the species recorded from the three study areas, 61 (24.5%) could be taken as forest indicators, of which TWS was home for 47 species, IRF for 44 and CUC for 31. Twenty-three of 61 species were common in all three areas. Most species (54 i.e., 88.5%) of forest indicator birds are resident of Bangladesh, except for Black Baza *Aviceda leuphotes*, Lesser Racket-tailed Drongo *Dicrurus remifer*, Blue Whistling Thrush *Myiophonus caeruleus* and Blyth's Leaf Warbler *Phylloscopus reguloides* as winter visitors, Chestnut-winged Cuckoo *Clamator coromandus* as a summer visitor, Pale Blue Flycatcher

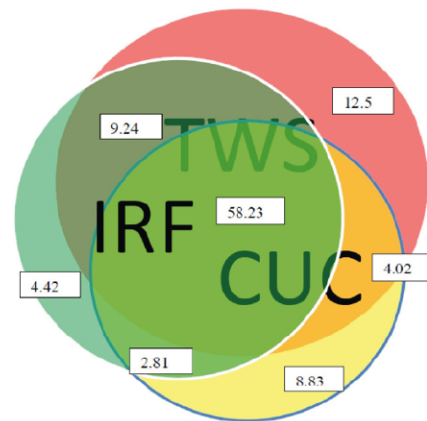


Figure 5. Species composition (%) in the three study areas

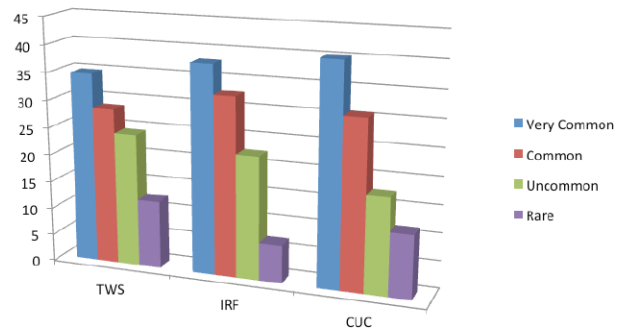


Figure 6. Composition of status of birds in the three study areas (%)

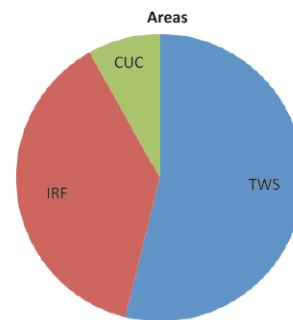


Figure 7. Proportion of size of the three study areas (%)

*Cyornis unicolor* as a vagrant, and Forest Wagtail *Dendronanthus indicus* as a passage migrant.

Fifty-two of 249 species observed from three study areas were wading birds: 48 at TWS, 34 at IRF and 25 at CUC, with almost half (23 species) of these being winter visitors to Bangladesh. Species diversity of wading birds was the highest in TWS, consistent with the higher local abundance of wetlands compared to the other study areas.

According to IUCN Bangladesh (2015), three species

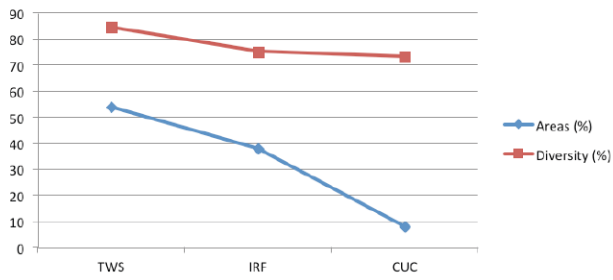


Figure 8. Comparison of diversity of birds with sizes of the study areas

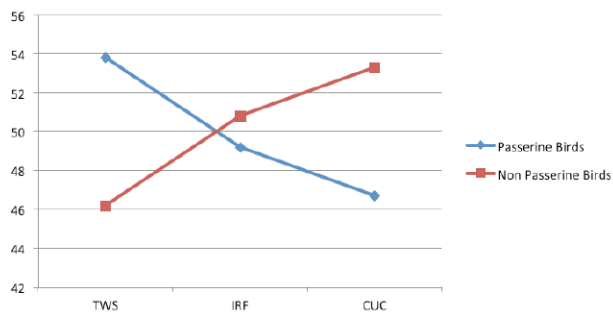


Figure 9. Passerine vs non-passerine birds in three study areas (%)

observed in the study areas are classed as Vulnerable in Bangladesh: Kalij Pheasant *Lophura leucomelanos* and Black-headed Ibis *Threskiornis melanocephalus* in TWS and CUC, and Yellow-eyed Babbler *Chrysomma sinense* from TWS only. Three species are also considered as Near Threatened (NT) in Bangladesh: Grey-headed Fish Eagle *Ichthyophaga ichthyaetus* observed in all three areas, Great Slaty Woodpecker *Mulleripicus pulverulentus* in TWS, and White-browed Scimitar Babbler *Pomatorhinus schisticeps*. The Crow-billed Drongo observed in IRF and CUC is considered as Data Deficient (DD) in Bangladesh. Twenty-one species were also recorded during the study period that were previously considered as Data Deficient (DD) in Bangladesh (IUCN Bangladesh 2000). Among them, nine were recorded as Rare species during this study: Great Slaty Woodpecker *Mulleripicus pulverulentus*, Eurasian Golden Oriole *Oriolus oriolus* and White-crested Laughing thrush *Garrulax leucolophus* from TWS; Barred Buttonquail *Turnix suscitator* and Blue-bearded Bee-eater *Nyctornis athertoni* from IRF; Blue-naped Pitta *Pitta nipalensis* from CUC; Thick-billed Green Pigeon *Treron curvirostra* and Rufescent Prinia *Prinia rufescens* from TWS and IRF; and Black-headed Ibis *Threskiornis melanocephalus* from TWS and CUC. Besides these, 8 were observed as Uncommon (Asian Glossy Starling *Aplonis panayensis* from TWS; Large Scimitar Babbler *Pomatorhinus hypoleucos*

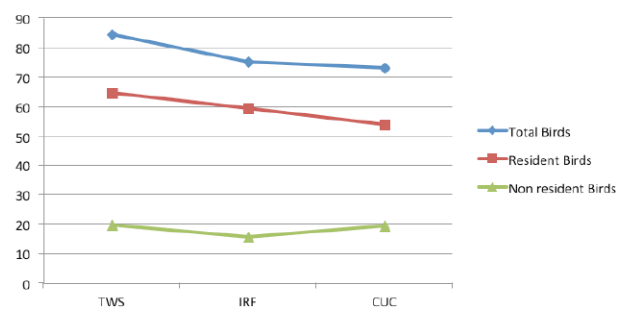


Figure 10. Total number bird species vs. resident and non-resident status in three study areas (%)

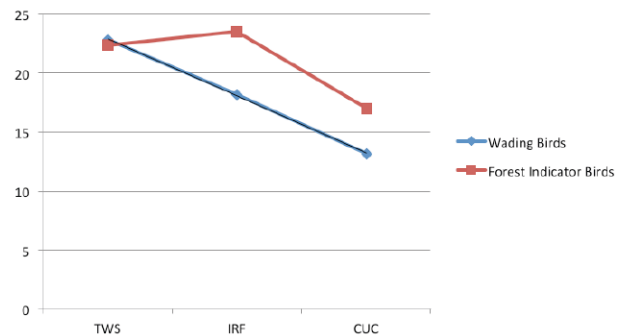


Figure 11. Number of wading bird species vs. forest indicator birds in three study areas (%)

from IRF; Olive Bulbul *Pycnonotus virescens* from TWS and IRF; and Asian Barred Owlet *Glaucidium cuculoides*, Jerdon's Baza *Aviceda jerdoni*, Oriental Honey-Buzzard *Pernis ptilorhynchus*, Lesser Racket-tailed Drongo and Thick-billed Flowerpecker *Dicaeum agile* from all three areas). Moreover, four species of birds were considered as Common during this study (Orange-bellied Flowerpecker *Dicaeum trigonistigma*, Grey-headed Fish Eagle *Ichthyophaga ichthyaetus*, Common Green Magpie *Cissa chinensis* and Black-headed Cuckooshrike *Coracina melanoptera*), the first one was seen at IRF and the rest in the all three areas.

## DISCUSSION

The total species of birds (249) recorded from our three study areas represent >30% of species occurring in Bangladesh (711; Khan 2015) and about 18% of Indian subcontinental species (1375; Grimmett et al. 2013). The study areas differ considerably in size: TWS (11,615ha), IRF (8,200ha) and CUC (709.82ha), and in availability of habitats. Yet the total species numbers recorded were similar: CUC (182), TWS (210) and IRF (187; Figs. 9,10),



as were numbers of very common species: 73 in TWS, 71 in IRF and 73 in CUC, and Common species: 60 in TWS, 61 in IRF and 56 in CUC. Most of the Uncommon birds were recorded from TWS (51 of 62 species), with 42 in IRF and 32 in CUC. A similar pattern was observed for Rare birds, with 26 of 47 species observed in TWS, 21 in CUC and 13 in IRF, and for forest indicator birds, with 47 species recorded in TWS, 44 in IRF and 31 in CUC (Fig. 11). Wading birds were most abundant in TWS with 48 species, 34 in IRF and 24 in CUC (Fig. 11).

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**Appendix 1. List of birds and their status in three study areas with special reference to forest indicator species (1–129 = Non-passerine and 130–249 = Passerine)**

	Scientific name	Common name	Distribution			Status		Forest Indicator
			TWS	IRF	CUC	Abundance	Residential	
01	<i>Gallus gallus</i>	Red Jungle Fowl	√	√	√	C	CR	√
02	<i>Lophura leucomelanos</i>	Kalij Pheasant	√		√	UC	UR	√
03	<i>Dendrocygna javanica</i>	Lesser Whistling-Duck	√		√	UC	CR	
04	<i>Anser indicus</i>	Bar-headed Goose			√	R	UW	
05	<i>Turnix suscitator</i>	Barred Buttonquail		√		R	RR	
06	<i>Jynx torquilla</i>	Eurasian Wryneck	√	√	√	UC	UW	
07	<i>Dendrocopos macei</i>	Fulvous-breasted Woodpecker	√	√	√	VC	CR	
08	<i>Celeus brachyurus</i>	Rufous Woodpecker	√		√	UC	CR	
09	<i>Picus canus</i>	Grey-headed Woodpecker		√	√	R	CR	√
10	<i>Picus chlorolophus</i>	Lesser Yellownape	√	√		R	CR	√
11	<i>Picus flavinucha</i>	Greater Yellownape	√			R	CR	√
12	<i>Picus xanthopygus</i>	Streak-throated Woodpecker	√	√	√	C	CR	√
13	<i>Dinopium benghalense</i>	Black-rumped Flameback	√	√	√	VC	CR	
14	<i>Dinopium javanense</i>	Common Flameback			√	R	UR	√
15	<i>Chrysocolaptes lucidus</i>	Greater Flameback	√	√		UC	CR	√
16	<i>Mulleripicus pulverulentus</i>	Great Slaty Woodpecker	√			R	RR	√
17	<i>Megalaima asiatica</i>	Blue-throated Barbet	√	√		UC	CR	
18	<i>Megalaima haemacephala</i>	Coppersmith Barbet	√	√	√	C	CR	
19	<i>Megalaima lineata</i>	Lineated Barbet	√	√	√	VC	CR	
20	<i>Anthraceroceros albirostris</i>	Oriental Pied Hornbill	√	√	√	UC	UR	√
21	<i>Upupa epops</i>	Common Hoopoe	√	√	√	VC	UR	
22	<i>Harpactes erythrocephalus</i>	Red-headed Trogon	√			R	UR	√
23	<i>Coracias benghalensis</i>	Indian Roller	√	√	√	VC	CR	
24	<i>Eurystomus orientalis</i>	Dollarbird	√			UC	UR	√
25	<i>Alcedo atthis</i>	Common Kingfisher	√	√	√	VC	CR	
26	<i>Halcyon capensis</i>	Stork-billed Kingfisher	√	√	√	VC	UR	
27	<i>Halcyon pileata</i>	Black-capped Kingfisher	√			UC	CW	
28	<i>Halcyon smyrnensis</i>	White-throated Kingfisher			√	VC	CR	
29	<i>Todiramphus chloris</i>	Collared Kingfisher	√			R	CR	
30	<i>Ceryle rudis</i>	Pied Kingfisher	√	√	√	VC	CR	
31	<i>Nyctornis athertoni</i>	Blue-bearded Bee-eater		√		R	UR	√
32	<i>Merops leschenaulti</i>	Chestnut-headed Bee-eater	√	√	√	VC	UR	
33	<i>Merops orientalis</i>	Green Bee-eater	√	√	√	VC	CR	
34	<i>Merops philippinus</i>	Blue-tailed Bee-eater	√	√	√	VC	CR	
35	<i>Clamator coromandus</i>	Chestnut-winged Cuckoo			√	R	US	√
36	<i>Clamator jacobinus</i>	Pied Cuckoo	√		√	UC	US	
37	<i>Hierococcyx sparverioides</i>	Large Hawk Cuckoo			√	R	RW	
38	<i>Hierococcyx varius</i>	Common Hawk Cuckoo			√	UC	CR	
39	<i>Cuculus micropterus</i>	Indian Cuckoo	√	√	√	C	CR	
40	<i>Cacomantis merulinus</i>	Plaintive Cuckoo	√	√	√	C	CR	
41	<i>Surniculus lugubris</i>	Drongo Cuckoo	√	√	√	UC	CR	√
42	<i>Eudynamis scolopacea</i>	Asian Koel	√	√	√	VC	CR	

	Scientific name	Common name	Distribution			Status		Forest Indicator
			TWS	IRF	CUC	Abundance	Residential	
43	<i>Phaenicophaeus tristis</i>	Green-billed Malkoha	√	√	√	C	CR	√
44	<i>Centropus bengalensis</i>	Lesser Coucal	√	√	√	C	CR	
45	<i>Centropus sinensis</i>	Greater Coucal	√	√	√	VC	CR	
46	<i>Loriculus vernalis</i>	Vernal Hanging Parrot		√		UC	UR	
47	<i>Psittacula alexandri</i>	Red-breasted Parakeet	√	√	√	VC	CR	
48	<i>Psittacula krameri</i>	Rose-ringed Parakeet	√	√	√	VC	CR	
49	<i>Cypsiurus balasiensis</i>	Asian Palm Swift	√	√	√	C	CR	
50	<i>Apus affinis</i>	Little Swift			√	C	CR	
51	<i>Apus nipalensis</i>	House Swift	√	√	√	VC	CR	
52	<i>Tyto alba</i>	Barn Owl	√	√	√	C	UR	
53	<i>Otus bakkamoena</i>	Collared Scops Owl	√	√	√	C	CR	
54	<i>Otus sunia</i>	Oriental Scops Owl	√	√	√	C	CR	
55	<i>Ketupa zeylonensis</i>	Brown Fish Owl	√	√	√	C	UR	
56	<i>Glaucoedon cuculoides</i>	Asian Barred Owlet	√	√	√	UC	CR	
57	<i>Athene brama</i>	Spotted Owlet	√	√	√	VC	CR	
58	<i>Ninox scutulata</i>	Brown Hawk Owl	√	√	√	UC	CR	
59	<i>Caprimulgus macrurus</i>	Large-tailed Nightjar	√	√	√	C	CR	
60	<i>Columba livia</i>	Rock Pigeon	√	√	√	VC	CR	
61	<i>Streptopelia chinensis</i>	Spotted Dove	√	√	√	VC	CR	
62	<i>Streptopelia suratensis</i>	Western Spotted Dove		√		UC	CR	
63	<i>Streptopelia decaocto</i>	Eurasian Collared Dove	√	√	√	C	CR	
64	<i>Streptopelia orientalis</i>	Oriental Turtle Dove	√	√	√	C	UR	
65	<i>Streptopelia tranquebarica</i>	Red Collared Dove	√	√	√	C	CR	
66	<i>Chalcophaps indica</i>	Emerald Dove	√			UC	CR	√
67	<i>Treron bicincta</i>	Orange-breasted Green Pigeon		√		UC	UR	√
68	<i>Treron curvirostra</i>	Thick-billed Green Pigeon	√	√		R	RR	√
69	<i>Treron phaeopectera</i>	Yellow-footed Green Pigeon	√	√	√	C	CR	√
70	<i>Treron pompadora</i>	Pompadour Green Pigeon		√		UC	RR	√
71	<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	√	√	√	VC	UR	
72	<i>Gallixrex cinerea</i>	Watercock			√	R	UR	
73	<i>Gallinula chloropus</i>	Common Moorhen			√	UC	CR	
74	<i>Gallinago gallinago</i>	Common Snipe	√	√	√	C	CW	
75	<i>Gallinago stenura</i>	Pintail Snipe	√	√	√	UC	CW	
76	<i>Tringa glareola</i>	Wood Sandpiper	√	√	√	C	CW	
77	<i>Tringa nebularia</i>	Common Greenshank	√			UC	CW	
78	<i>Tringa ochropus</i>	Green Sandpiper	√	√	√	C	UW	
79	<i>Tringa totanus</i>	Common Redshank	√			UC	CW	
80	<i>Xenus cinereus</i>	Terek Sandpiper	√			R	CW	
81	<i>Actitis hypoleucos</i>	Common Sandpiper	√	√	√	VC	CW	
82	<i>Arenaria interpres</i>	Ruddy Turnstone	√			UC	UW	
83	<i>Calidris alba</i>	Sanderling	√			R	UW	
84	<i>Calidris minuta</i>	Little Stint	√			R	CW	
85	<i>Calidris temminckii</i>	Temminck's Stint	√			R	CW	
86	<i>Rostratula benghalensis</i>	Greater Painted-Snipe	√	√	√	C	RR	



	Scientific name	Common name	Distribution			Status		Forest Indicator
			TWS	IRF	CUC	Abundance	Residential	
87	<i>Metopidius indicus</i>	Bronze-winged Jacana	√	√	√	VC	UR	
88	<i>Pluvialis fulva</i>	Pacific Golden Plover	√	√	√	C	CW	
89	<i>Charadrius alexandrinus</i>	Kentish Plover	√	√		C	CW	
90	<i>Charadrius dubius</i>	Little-ringed Plover	√	√		C	CR	
91	<i>Charadrius leschenaultii</i>	Greater Sand Plover	√	√		UC	CW	
92	<i>Charadrius mongolus</i>	Lesser Sand Plover	√	√		UC	CW	
93	<i>Vanellus cinereus</i>	Grey-headed Lapwing	√			UC	CW	
94	<i>Vanellus indicus</i>	Red-wattled Lapwing	√	√	√	VC	CR	
95	<i>Glareola maldivarum</i>	Oriental Pratincole		√		R	RR	
96	<i>Larus brunnicephalus</i>	Brown-headed Gull	√	√		C	CW	
97	<i>Larus ichthyaetus</i>	Pallas's Gull	√	√		C	CW	
98	<i>Larus ridibundus</i>	Black-headed Gull	√	√		C	CW	
99	<i>Sterna albifrons</i>	Little Tern	√	√		UC	UR	
100	<i>Chlidonias hybridus</i>	Whiskered Tern	√	√		C	CR	
101	<i>Aviceda jerdoni</i>	Jerdon's Baza	√	√	√	UC	RR	√
102	<i>Aviceda leuphotes</i>	Black Baza	√			R	RW	√
103	<i>Elanus caeruleus</i>	Black-shouldered Kite	√			R	CR	
104	<i>Milvus migrans</i>	Black Kite	√	√	√	VC	CR	
105	<i>Haliastur indus</i>	Brahminy Kite	√	√	√	VC	CR	
106	<i>Ichthyophaga ichthyaetus</i>	Grey-headed Fish Eagle	√	√	√	C	RR	
107	<i>Gyps fulvus</i>	Eurasian Griffon	√			R	V	
108	<i>Spilornis cheela</i>	Crested Serpent Eagle	√	√	√	VC	CR	
109	<i>Accipiter badius</i>	Shikra	√	√	√	VC	CR	
110	<i>Accipiter virgatus</i>	Besra	√	√	√	UC	RR	
111	<i>Buteo buteo</i>	Common Buzzard			√	R	RW	
112	<i>Pernis ptilorhynchus</i>	Oriental Honey-Buzzard	√	√	√	UC	RR	
113	<i>Falco amurensis</i>	Amur Falcon			√	R	RS	
114	<i>Falco peregrinus</i>	Peregrine Falcon	√			R	RW	
115	<i>Falco tinnunculus</i>	Common Kestrel	√	√	√	C	UW	
116	<i>Tachybaptus ruficollis</i>	Little Grebe	√	√	√	UC	UR	
117	<i>Phalacrocorax niger</i>	Little Cormorant	√	√	√	VC	CR	
118	<i>Egretta garzetta</i>	Little Egret	√	√	√	VC	CR	
119	<i>Ardea cinerea</i>	Grey Heron	√			R	CR	
120	<i>Casmerodius albus</i>	Great Egret	√	√	√	C	CR	
121	<i>Mesophoyx intermedia</i>	Intermediate Egret	√	√		UC	CR	
122	<i>Bubulcus ibis</i>	Cattle Egret	√	√	√	VC	CR	
123	<i>Ardeola grayii</i>	Indian Pond Heron	√	√	√	VC	CR	
124	<i>Butorides striatus</i>	Little Heron	√			UC	CR	
125	<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	√		√	R	CR	
126	<i>Ixobrychus cinnamomeus</i>	Cinnamon Bittern	√	√	√	C	UR	
127	<i>Ixobrychus sinensis</i>	Yellow Bittern	√	√		UC	RR	
128	<i>Threskiornis melanocephalus</i>	Black-headed Ibis	√		√	R	UW	
129	<i>Anastomus oscitans</i>	Asian Openbill	√	√	√	C	CR	
130	<i>Pitta nivalensis</i>	Blue-naped Pitta			√	R	RR	√

	Scientific name	Common name	Distribution			Status		Forest Indicator
			TWS	IRF	CUC	Abundance	Residential	
131	<i>Irena puella</i>	Asian Fairy Bluebird	√	√		C	UR	√
132	<i>Chloropsis aurifrons</i>	Golden-fronted Leafbird	√	√	√	C	CR	
133	<i>Chloropsis cochinchinensis</i>	Blue-winged Leafbird	√			UC	UR	√
134	<i>Lanius cristatus</i>	Brown Shrike	√	√	√	VC	CW	
135	<i>Lanius schach</i>	Long-tailed Shrike	√	√	√	VC	CR	
136	<i>Lanius tephronotus</i>	Grey-backed Shrike	√	√	√	UC	UW	
137	<i>Cissa chinensis</i>	Common Green Magpie	√	√	√	C	UR	√
138	<i>Dendrocitta formosae</i>	Grey Treepie	√			UC	UR	
139	<i>Dendrocitta vagabunda</i>	Rufous Treepie	√	√	√	VC	CR	
140	<i>Corvus macrorhynchos</i>	Large-billed Crow	√	√	√	VC	CR	
141	<i>Corvus splendens</i>	House Crow	√	√	√	VC	CR	
142	<i>Artamus fuscus</i>	Ashy Woodswallow	√	√	√	VC	CR	
143	<i>Oriolus chinensis</i>	Black-naped Oriole	√	√	√	C	RW	
144	<i>Oriolus oriolus</i>	Eurasian Golden Oriole	√			R	RR	
145	<i>Oriolus xanthornus</i>	Black-hooded Oriole	√	√	√	VC	CR	
146	<i>Coracina macei</i>	Large Cuckooshrike	√	√	√	VC	CR	
147	<i>Coracina melanoptera</i>	Black-headed Cuckooshrike	√	√	√	C	UR	
148	<i>Coracina melaschistos</i>	Black-winged Cuckooshrike	√	√	√	C	UW	
149	<i>Pericrocotus cantonensis</i>	Swinhoe's Minivet			√	C	WV	
150	<i>Pericrocotus cinnamomeus</i>	Small Minivet	√	√	√	UC	CR	
151	<i>Pericrocotus divaricatus</i>	Ashy Minivet	√		√	C	WV	
152	<i>Pericrocotus flammeus</i>	Scarlet Minivet	√		√	UC	CR	
153	<i>Pericrocotus roseus</i>	Rosy Minivet			√	R	UW	
154	<i>Rhipidura albicollis</i>	White-throated Fantail	√	√	√	VC	CR	
155	<i>Dicrurus aeneus</i>	Bronzed Drongo	√	√	√	VC	CR	
156	<i>Dicrurus annectans</i>	Crow-billed Drongo		√	√	R	V	√
157	<i>Dicrurus hottentottus</i>	Spangled Drongo	√	√	√	C	CR	√
158	<i>Dicrurus leucophaeus</i>	Ashy Drongo	√	√	√	UC	UW	
159	<i>Dicrurus macrocercus</i>	Black Drongo	√	√	√	VC	CR	
160	<i>Dicrurus paradiseus</i>	Greater Racket-tailed Drongo	√	√	√	VC	CR	√
161	<i>Dicrurus remifer</i>	Lesser Racket-tailed Drongo	√	√	√	UC	CW	√
162	<i>Hypothymis azurea</i>	Black-naped Monarch	√	√	√	VC	CR	
163	<i>Terpsiphone paradisi</i>	Asian Paradise Flycatcher			√	R	UR	
164	<i>Aegithina tiphia</i>	Common Iora	√	√	√	VC	CR	
165	<i>Tephrodornis gularis</i>	Large Woodshrike	√			UC	CR	√
166	<i>Tephrodornis pondicerianus</i>	Common Woodshrike		√		UC	CR	√
167	<i>Monticola solitarius</i>	Blue Rock Thrush		√	√	C	UW	
168	<i>Myophonus caeruleus</i>	Blue Whistling Thrush	√	√	√	C	RW	√
169	<i>Zoothera citrina</i>	Orange-headed Thrush			√	R	UR	
170	<i>Turdus unicolor</i>	Tickell's Thrush	√			R	RW	
171	<i>Muscicapa muttui</i>	Brown-breasted Flycatcher			√	UC	PM	
172	<i>Ficedula parva</i>	Red-throated Flycatcher	√	√	√	VC	CW	
173	<i>Ficedula westermanni</i>	Little Pied Flycatcher			√	R	RW	
174	<i>Eumyias thalassina</i>	Verditer Flycatcher	√	√	√	C	CW	

	Scientific name	Common name	Distribution			Status		Forest Indicator
			TWS	IRF	CUC	Abundance	Residential	
175	<i>Cyornis poliogenys</i>	Pale-chinned Flycatcher	√		√	R	RR	√
176	<i>Cyornis rubeculoides</i>	Blue-throated Flycatcher	√	√	√	UC	RW	
177	<i>Cyornis unicolor</i>	Pale Blue Flycatcher			√	R	V	√
178	<i>Culicicapa ceylonensis</i>	Grey-headed Canary Flycatcher	√	√	√	C	CW	
179	<i>Copsychus malabaricus</i>	White-rumped Shama	√	√	√	VC	CR	√
180	<i>Copsychus saularis</i>	Oriental Magpie Robin	√	√	√	VC	CR	
181	<i>Phoenicurus ochruros</i>	Black Redstart		√	√	UC	RW	
182	<i>Enicurus immaculatus</i>	Black-backed Forktail	√	√	√	C	UR	√
183	<i>Saxicola caprata</i>	Pied Bush Chat	√			UC	UR	
184	<i>Saxicola torquata</i>	Common Stone Chat	√	√	√	C	CW	
185	<i>Aplonis panayensis</i>	Asian Glossy Starling	√			UC	RR	
186	<i>Sturnus contra</i>	Asian Pied Starling	√	√	√	VC	CR	
187	<i>Sturnus malabaricus</i>	Chestnut-tailed Starling	√	√	√	VC	CR	
188	<i>Acridotheres fuscus</i>	Jungle Myna	√	√	√	VC	CR	
189	<i>Acridotheres tristis</i>	Common Myna	√	√	√	VC	CR	
190	<i>Gracula religiosa</i>	Hill Myna	√	√		UC	UR	√
191	<i>Parus major</i>	Great Tit	√	√	√	VC	CR	
192	<i>Riparia riparia</i>	Sand Martin		√	√	R	RW	
193	<i>Hirundo daurica</i>	Red-rumped Swallow			√	UC	UW	
194	<i>Hirundo rustica</i>	Barn Swallow	√	√	√	VC	RR	
195	<i>Pycnonotus atriceps</i>	Black-headed Bulbul	√	√		UC	UR	√
196	<i>Pycnonotus cafer</i>	Red-vented Bulbul	√	√	√	VC	CR	
197	<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	√	√	√	VC	CR	
198	<i>Pycnonotus melanicterus</i>	Black-crested Bulbul	√	√	√	C	CR	√
199	<i>Alophoixus flaveolus</i>	White-throated Bulbul	√	√	√	C	CR	√
200	<i>Iole virescens</i>	Olive Bulbul	√	√		UC	UR	√
201	<i>Prinia inornata</i>	Plain Prinia	√	√	√	VC	CR	
202	<i>Prinia rufescens</i>	Rufescent Prinia	√	√		R	UR	√
203	<i>Zosterops alpebrosus</i>	Oriental White-Eye	√	√	√	VC	CR	
204	<i>Acrocephalus dumetorum</i>	Blyth's Reed Warbler		√	√	UC	CW	
205	<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler			√	UC	CW	
206	<i>Orthotomus atrogularis</i>	Dark-necked Tailorbird	√	√	√	UC	RR	√
207	<i>Orthotomus sutorius</i>	Common Tailorbird	√	√	√	VC	CR	
208	<i>Phylloscopus cantator</i>	Yellow-vented Warbler			√	R	UW	√
209	<i>Phylloscopus fuscatus</i>	Dusky Warbler	√	√	√	VC	CW	
210	<i>Phylloscopus reguloides</i>	Blyth's Leaf Warbler		√		UC	CW	√
211	<i>Phylloscopus trochiloides</i>	Greenish Warbler	√	√	√	C	CW	
212	<i>Megalurus palustris</i>	Striated Grassbird	√	√	√	VC	CR	
213	<i>Garrulax leucolophus</i>	White-crested Laughingthrush	√			R	UR	√
214	<i>Garrulax monileger</i>	Lesser Necklaced Laughingthrush	√		√	UC	UR	√
215	<i>Garrulax pectoralis</i>	Greater Necklaced Laughingthrush	√	√	√	C	CR	√
216	<i>Garrulax ruficollis</i>	Rufous-necked Laughingthrush	√	√	√	C	CR	



	Scientific name	Common name	Distribution			Status		Forest Indicator
			TWS	IRF	CUC	Abundance	Residential	
217	<i>Malacocincla abbotti</i>	Abbott's Babbler	√	√	√	VC	CR	
218	<i>Pellorneum ruficeps</i>	Puff-throated Babbler	√	√	√	VC	CR	√
219	<i>Pomatorhinus hypoleucos</i>	Large Scimitar Babbler		√		UC	RR	√
220	<i>Pomatorhinus schisticeps</i>	White-browed Scimitar Babbler		√		R	UR	√
221	<i>Macronous gularis</i>	Striped Tit Babbler	√	√	√	VC	CR	√
222	<i>Timalia pileata</i>	Chestnut-capped Babbler	√	√		UC	UR	
223	<i>Chrysomma sinense</i>	Yellow-eyed Babbler	√			R	RR	
224	<i>Turdoides earlei</i>	Striated Babbler		√	√	UC	UR	
225	<i>Turdoides striatus</i>	Jungle Babbler			√	R	CR	
226	<i>Dicaeum agile</i>	Thick-billed Flowerpecker	√	√	√	UC	RR	√
227	<i>Dicaeum cruentatum</i>	Scarlet-backed Flowerpecker	√	√	√	C	CR	√
228	<i>Dicaeum erythrorhynchus</i>	Pale-billed Flowerpecker	√	√	√	VC	CR	
229	<i>Dicaeum trigonostigma</i>	Orange-bellied Flowerpecker		√		R	UR	√
230	<i>Chalcopariasingalensis</i>	Ruby-cheeked Sunbird	√	√		UC	CR	√
231	<i>Nectarinia sperata</i>	Purple-throated Sunbird	√	√	√	C	CR	√
232	<i>Nectarinia zeylonica</i>	Purple-rumped Sunbird	√	√	√	VC	CR	
233	<i>Nectarinia asiaticus</i>	Purple Sunbird	√	√	√	VC	CR	
234	<i>Aethopyga siparaja</i>	Crimson Sunbird	√	√		UC	CR	√
235	<i>Arachnothera longirostra</i>	Little Spiderhunter	√	√	√	C	CR	√
236	<i>Passer domesticus</i>	House Sparrow	√	√	√	VC	CR	
237	<i>Dendronanthus indicus</i>	Forest Wagtail			√	UC	PM	√
238	<i>Motacilla alba</i>	White Wagtail	√	√	√	VC	CW	
239	<i>Motacilla cinerea</i>	Grey Wagtail	√	√	√	VC	UW	
240	<i>Motacilla citreola</i>	Citrine Wagtail	√	√	√	C	CW	
241	<i>Motacilla maderaspatensis</i>	White-browed Wagtail	√			R	RR	
242	<i>Anthus hodgsoni</i>	Olive-backed Pipit	√	√	√	C	CW	
243	<i>Anthus rufulus</i>	Paddyfield Pipit	√	√	√	C	CR	
244	<i>Ploceus philippinus</i>	Baya weaver	√	√	√	VC	CR	
245	<i>Lonchura malabarica</i>	Indian Silverbill	√	√	√	C	UR	
246	<i>Lonchura malacca</i>	Tri-colored Munia	√	√	√	C	UR	
247	<i>Lonchura atricapilla</i>	Black-headed Munia	√	√	√	C	UR	
248	<i>Lonchura punctulata</i>	Scaly-breasted Munia	√	√	√	VC	CR	
249	<i>Lonchura striata</i>	White-rumped Munia	√	√	√	UC	UR	

TWS - Teknaf Wildlife Sanctuary; IRF - Inani Reserve Forest; CUC - Chittagong University Campus

VC - Very Common; C - Common; UC - Uncommon; R - Rare

CR - Common Resident; UR - Uncommon Resident; RR - Rare Resident; WV - Winter Visitor; S - Summer Visitor; CW - Common Winter Visitor, UW - Uncommon Winter Visitor; RW - Rare Winter Visitor; V - Vagrant; PM - Passage Migrant.







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