

Full Length Research Paper

Birds of Seshachalam biosphere reserve, South-eastern Ghats of Andhra Pradesh, India

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The Seshachalam hill is the first declared biosphere reserve in Andhra Pradesh and is located in the southern Eastern Ghats of Chittoor and Kadapa districts. The vegetation comprises of a unique mix of the tropical southern dry mixed deciduous type. The study was carried out from August 2011 to February 2014. The study recorded 215 species of birds, which belong to 45 families. Among which 172 species (80%) were resident, 30 (14%) winter migrant, 8 (4%) seasonal local migrant and 5 (2%) and local migrant. 88 species were found common (C); followed by 91 species uncommon (UC); 15 species rare (R); 14 species occasional (O) and 7 species were found very rare (VR). Passeriform birds are the dominating order of birds, more than 14 families and 79 species of birds were recorded. During the bird survey IUCN status was also gathered, out of 215 species, (n = 208), 97% species were Least Concern (LR-lc), (n = 4), 2% species were Near Threatened (LR-nt) and (n = 3), 1% species were Vulnerable (VU) status. The findings of the present study underline the importance of Seshachalam Hills and also provide baseline data about birds in and around the reserve.

Key words: Birds diversity, abundance, status, seshachalam hills.

INTRODUCTION

Biodiversity is the total variety of life on earth (Rajendran et al., 2014) and also bird form an important component of the ecosystem (Rahul et al., 2014) as a part of food web, as potential pollinators and bio-indicators (Rudra, 2013). India has rich diversity of plants and animals both domesticated and wild in variety of habitats and ecosystem (Wanjari, 2013). The forests play a key role in maintaining a wide range of delicate relationship with

nature and its ecosystem (Khaleel et al., 2014). The Indian subcontinent, a part of the vast Oriental biogeographic region, is very rich in biodiversity. Out of the more than 9,990 birds of the world, the Indian subcontinent contains about, 1,340 species of birds which contribute more than 15% of the world's bird species (Anula, 2015). In Andhra Pradesh more than 500 species of birds were recorded (Taher and Pittie, 1989).

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Sri Venkateswara Wildlife Sanctuary has a record of 178 species of birds (Anand, 2000) before it was declared as biosphere reserve. After 22 years, a study was conducted on birds in this region and 75 birds species were added to the previous list. Very little information is available on the avifauna of Andhra Pradesh through the work done by and Kinner (1930-37) on the vernay scientific survey of the Eastern Ghats and the Hyderabad state ornithology Survey (Ali, 1933-34). Later work was done by Hussain (1976), Shahid Ali (1976-83), Beehler (1985) and Anand Mohan (2000). These were mostly restricted to the northern part of Eastern Ghats in Andhra Pradesh and a few other patches in the state, so far there is no scientific study in this reserve (Anand Mohan, 2000). In the present study, attempt was made to prepare a comprehensive checklist of the birds of Seshachalam Hills and adjoining areas.

Study area

The Seshachalam biosphere reserve has been designated recently in 2011; these hill ranges are a part of the eastern Ghats and lie between 13°38' E and 13°55'N latitudes and 79°07' and 79°24'E longitudes spread over 4755.997 Km² in Chittoor and Kadapa districts of Andhra Pradesh (Map 1). The elevation ranges from 150 to 1,130 m, the terrain is undulating, with deep forest-covered valleys. The maximum temperature ranges from 16 to 46°C and minimum from 9.7 to 25°C depending upon the season. Average rainfall in this region is between 800 to 900 mm. Most of the rainfall is received from the northeast monsoon and a little from the South-west monsoon. The vegetation is a unique mix of the tropical southern dry mixed deciduous type (Champion and Seth, 1968). It is the richest floristic hot spot harbouring many endemic and rare plants. The entire sanctuary is an uninhabited large chunk of dry deciduous, especially Red Sanders (*Pterocarpus santalinus*) bearing forest, forming catchments to Swarnamukhi and Pennar rivers, both in Chittoor and Kadapa districts. Seshachalam biosphere reserve includes, Sri Venkateswara Wildlife Sanctuary and Sri Venkateswara National Park (Map 1).

METHODOLOGY

The study was conducted for the two and half years from August 2011 to February 2014 using direct visual count. Existing forest trails were used to conduct the study on foot (Lankar et al., 2010). The surveys were usually made in the early morning (07:00 to 10:30 h) and evening (16: 00 to 18:00 h), and also sometime night for nocturnal species like, owls and nightjars. Observation was carried out with the help of (8X40) binocular and photography was done with Nikon SLR camera with 150 to 500 mm zoom lens. The identification of birds in the field was based on Ali (2002) and Grimmett et al. (2011), and nomenclature and classification is

followed according to Manakadan and Pittie (2001). The following field stations were monitored for avifauna. Water birds, this includes, Mamandur village tank, Settikunta village tank, Karakambadi tank, Kalyani dam, K.P.dam, Sidhala kanti tank. Terrestrial birds survey were monitored areas like, Jungle book (2 Km radius), Mamandur (8 Km radius), Balapalli (6 Km radius), Kangimadugu (3 Km radius), Tirumala (8 Km radius), Chamala (8 km radius) and Talakona (7 Km radius). Status of abundance and status of bird's classification was followed on (Anil Mahajan et al., 2012).

Status and abundance

C- Common- (50 to 100) times; UC- Uncommon- (25 to 50 times); O- Occasional – (15 to 20 times) and seen occasionally in the study area; R- Rare- Seen only five times or maximum seven times; VR- Very Rare- Seen only once or twice.

Status of birds was classified as

- i) R- Resident- which are found in the study area throughout the year.
- ii) WM- Winter Migrant- which are found in the study area only during winter.
- iii) LM- Local Migrant- which are found in the study area irregularly, but is resident of India.
- iv) SLM- Seasonal Migrant- which are found in particular season only, but is resident of India.

RESULTS AND DISCUSSION

A total of 215 species belonging to 17 orders and 45 families were recorded from Seshachalam Hills and its surrounding wetlands (Table 1). Of the total birds, 141 (66%) species of non-breeding and 74 (34%) species of breeding were recorded during our survey. According to the IUCN red list 97% (n = 208) species were listed as least concern (LR-lc), (n = 4) 2% species were Near Threatened (LR-nt), (n = 3) 1% species were Vulnerable (VU) (Figure 1). Accipitridae was the most dominant family with 19 species (9%), followed by Muscicapidae 18 species (8%), Scolopacidae 13 species (6%) and Corvidae 13 species (6%) were recorded. The birds were categorized as Common (C) 41% (n = 88 species), Uncommon (UC) 42% (n = 91 species), Occasional (O) 7 % (n = 14 species), Rare (R) 7% (n = 15 species) and Very Rare (VR) 3% (n = 7 species) (Figure 2). Among the total species observed, 172 (80%) species are Resident (R), 30 (14 %) Winter Migrant (WM), 8 (4%) Seasonal Local Migrant (SLM) and 5 (2%) Local Migrant (LM) (Figure 3). The present study recorded 215 species of birds belonging to 45 families. Nearly 85 species of wetland birds and migratory winter visitors. The main season for winter visitors is from September to February. In present survey reports four Near Threatened bird species namely Painted Stork (*Mycteria leucocephala*), Darter (*Anhinga rufa*), Pallid Harrier (*Circus macrourus*), Alexandrine Parakeet (*Psittacula eupatria*) and three species like Greater

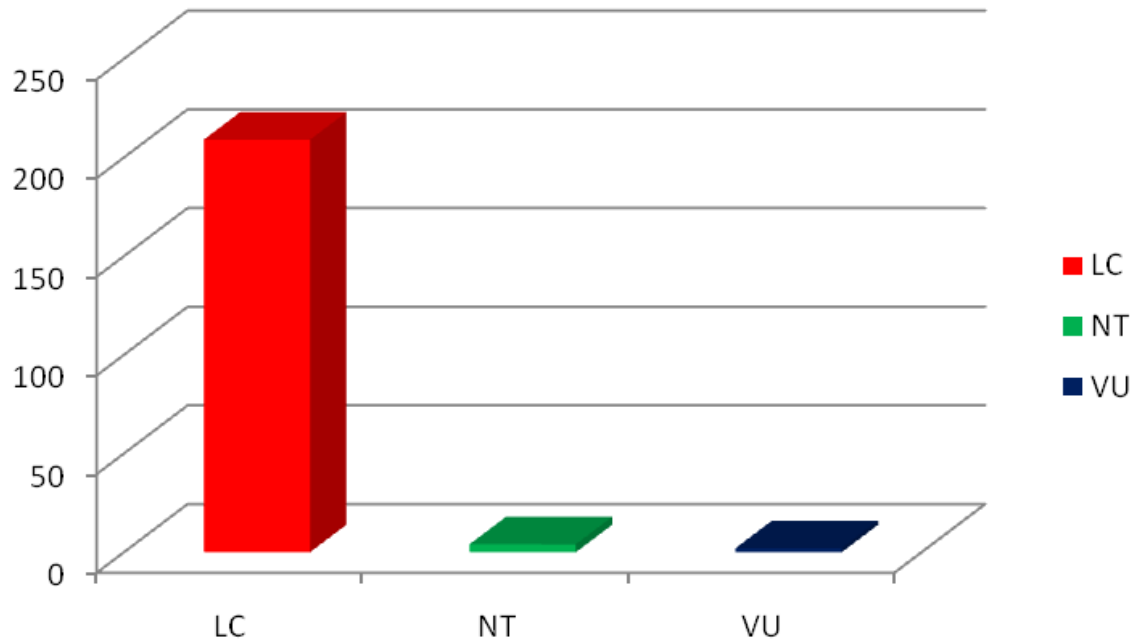


Figure 1. IUCN Status were observed in the study areas. LC- Least Concern; VU- Vulnerable; NT- Near Threatened.

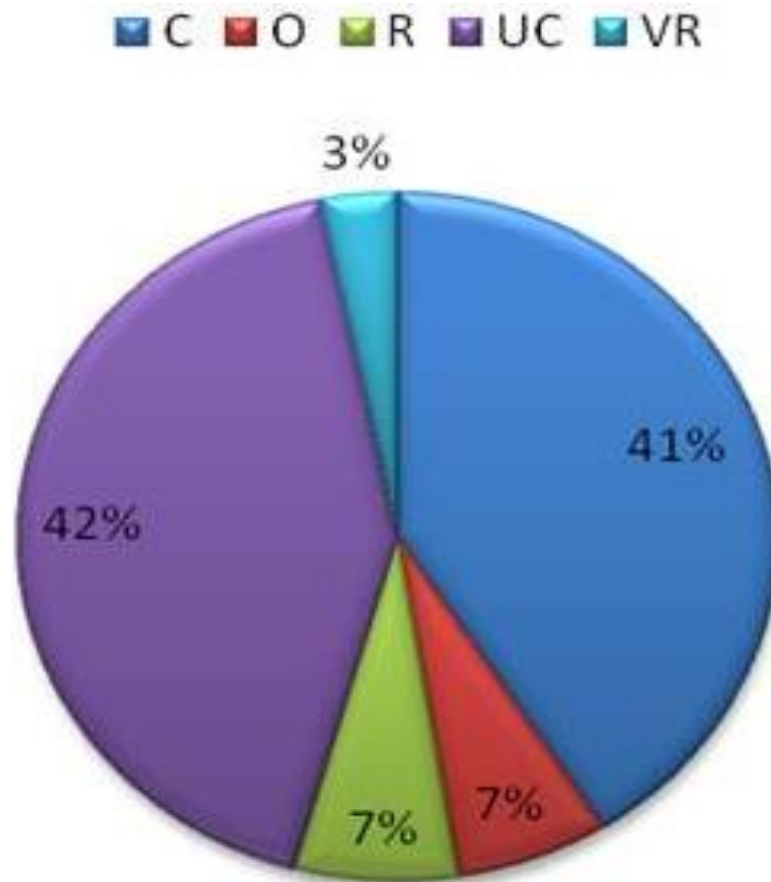


Figure 2. Abundance were analysed in the study areas. C – Common; O- Occasional; R- Rare; uncommon (UC); very rare (VR).

Table 1. Checklist of birds of Seshachalam hills, southern eastern Ghats of Andhra Pradesh, India.

Sl. No	Common name	Scientific name	Family	Order	Abn	Status	Breeding/ Non-Breeding	IUCN Status
1	Little Grebe	<i>Tachybaptus ruficollis</i>	Podicipedidae	Podicipedidae	UC	Res	Breeding	LC
2	Great Cormorant	<i>Phalacrocorax carbo</i>	Phalacrocoracidae	Pelecaniformes	R	SLM		LC
3	Little Cormorant	<i>Phalacrocorax niger</i>	Phalacrocoracidae		UC	SLM		LC
4	Darter	<i>Anhinga rufa</i>	Phalacrocoracidae		R	SLM		NT
5	Grey Heron	<i>Ardea cinerea</i>	Ardeidae	Ciconiiformes	C	LM		LC
6	Purple Heron	<i>Ardea Purpurea</i>	Ardeidae		UC	LM		LC
7	Indian Pond- Heron	<i>Ardeola grayii</i>	Ardeidae		C	Res	Breeding	LC
8	Black- crowned Night-Heron	<i>Nycticorax nycticorax</i>	Ardeidae		UC	LM		LC
9	Little Green Heron	<i>Ardeola striatus</i>	Ardeidae		O	LM		LC
10	Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae		C	Res	Breeding	LC
11	Great Egret	<i>Casmerodius albus</i>	Ardeidae		UC	Res		LC
12	Intermediate Egret	<i>Mesophoyx intermedia</i>	Ardeidae		UC	Res		LC
13	Little Egret	<i>Egretta garzetta</i>	Ardeidae		C	Res		LC
14	Yellow Bittern	<i>Ixobrychus sinensis</i>	Ardeidae		UC	Res		LC
15	Asian Open- billed Stork	<i>Anastomus oscitrans</i>	Ciconiidae		UC	Res		LC
16	White Stork	<i>Ciconia ciconia</i>	Ciconiidae		O	SLM		LC
17	Painted Stork	<i>Mycteria leucocephala</i>	Ciconiidae		O	SLM		NT
18	Asian White Ibis	<i>Threskiomis melanocephalus</i>	Threskiomithidae		UC	LM		LC
19	Black Ibis	<i>Pseudibis papillosa</i>	Threskiomithidae		R	WM		LC
20	Ruddy Shelduck	<i>Tadoma ferruginea</i>	Anatidae	Anseriformes	UC	WM		LC
21	Nothern Pintail	<i>Anas acuta</i>	Anatidae		UC	WM		LC
22	Common Teal	<i>Anas crecca</i>	Anatidae		UC	WM		LC
23	Spot-billed Duck	<i>Anas poecilorthyncha</i>	Anatidae		UC	WM		LC
24	Gadwall	<i>Anas strepera</i>	Anatidae		UC	WM		LC
25	Eurasian Wigeon	<i>Anas penelope</i>	Anatidae		UC	WM		LC
26	Garganey	<i>Anas querquedula</i>	Anatidae		UC	WM		LC
27	Northern Shoveller	<i>Anas clypeata</i>	Anatidae		UC	WM		LC
28	Red- crested Pochard	<i>Rhodonessa rufina</i>	Anatidae		R	WM		LC
29	Common Pochard	<i>Aythya ferina</i>	Anatidae		UC	WM		LC
30	Tufted Pochard	<i>Aythya fuligula</i>	Anatidae		UC	Res		LC
31	Lesser Whistling Duck	<i>Dendrocygna javanica</i>	Anatidae		UC	Res		LC
32	Black- shouldered Kite	<i>Elanus caerules</i>	Accipitridae	Falconiformes	C	Res	Breeding	LC
33	Black Kite	<i>Milvus migrans</i>	Accipitridae		C	Res	Breeding	LC
34	Brahminy Kite	<i>Haliastur indus</i>	Accipitridae		C	Res	Breeding	LC
35	Shikra	<i>Accipiter badius</i>	Accipitridae		C	Res	Breeding	LC
36	Crested Goshawk	<i>Accipiter trivirgatus</i>	Accipitridae		UC	Res		LC
37	Oriental Honey Buzzard	<i>Permis ptilorhynchus</i>	Accipitridae		R	Res		LC
38	Long-legged Buzzard	<i>Buteo rufinus</i>	Accipitridae		O	Res		LC
39	White-eyed Buzzard	<i>Butastur Teesa</i>	Accipitridae		UC	Res		LC
40	Changeable Hawk- Eagle	<i>Spizaetus cirrhatus</i>	Accipitridae		C	Res		LC
41	Tawny Eagle	<i>Aquila rapax</i>	Accipitridae		C	Res		LC
42	Grater Spotted Eagle	<i>Aquila clanga</i>	Accipitridae		R	Res		VU
43	Booted Eagle	<i>Aquila pennala</i>	Accipitridae		VR	Res		LC
44	Bonelli's Eagle	<i>Aquila fasciata</i>	Accipitridae		VR	Res		LC
44	Crested Serpent- Eagle	<i>Spilornis cheela</i>	Accipitridae		R	Res		LC
45	Black Eagle	<i>Ictinaetus malayensis</i>	Accipitridae		R	Res		LC
46	Pallid Harrier	<i>Circus macrourus</i>	Accipitridae		UC	Res		NT
47	Pied Harrier	<i>Circus melanoleucos</i>	Accipitridae		UC	WM		LC
48	Eurasian Marsh Harrier	<i>Circus melanoleucos</i>	Accipitridae		R	WM		LC
49	Osprey	<i>Pandion haliaetus</i>	Accipitridae		R	Res		LC
50	Lagger Falcon	<i>Falco jugger</i>	Falconide		O	WM	Breeding	LC
51	Common Kestrel	<i>Falco tinnunculus</i>	Falconide		C	Res	Breeding	LC
52	Painted Francolin	<i>Francolinus pictus</i>	Phasianidae	Galliformes	O	Res	Breeding	LC

Table 1. Contd.

53	Grey Francolin	<i>Francolinus pondicerianus</i>	Phasianidae		C	Res	Breeding	LC
54	Common Quail	<i>Coturnix coturnix</i>	Phasianidae		C	Res	Breeding	LC
55	Rain Quail	<i>Coturnix coromandelica</i>	Phasianidae		C	Res		LC
56	Jungle Bush- Quail	<i>Perdica asiatica</i>	Phasianidae		C	Res	Breeding	LC
57	Barred Button Quail	<i>Turnix suscitator</i>	Phasianidae		UC	Res		LC
58	Painted Spurfowl	<i>Galloperdix lunulata</i>	Phasianidae		UC	Res	Breeding	LC
59	Red Spurfowl	<i>Galloperdix spadicea</i>	Phasianidae		UC	Res	Breeding	LC
60	Grey Junglefowl	<i>Gallus sonneratii</i>	Phasianidae		C	Res	Breeding	LC
61	Indian Peafowl	<i>Pavo cristatus</i>	Phasianidae		C	Res	Breeding	LC
63	White-breasted Waterhen	<i>Amauromis phoenicurus</i>	Rallidae	Gruiformes	C	Res	Breeding	LC
64	Common Moorhen	<i>Gallinula chloropus</i>	Rallidae		C	Res	Breeding	LC
65	Purple Swamphen	<i>Porphyrio porphyrio</i>	Rallidae		C	Res	Breeding	LC
66	Common Coot	<i>Fulica atra</i>	Rallidae		C	Res	Breeding	LC
67	Pheasant - tailed Jacana	<i>Hydrophasianus chirurgus</i>	Jacanidae	Charadriiformes	UC	Res		LC
68	Bronze- winged Jacana	<i>Metopidius indicus</i>	Jacanidae		UC	Res		LC
69	Red- wattled Lapwing	<i>Vanellus indicus</i>	Charadriidae		C	Res	Breeding	LC
70	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Charadriidae		R	Res		LC
71	Little Ringed Plover	<i>Charadrius dubius</i>	Charadriidae		UC	WM		LC
72	Kentish Plover	<i>Charadrius alexandrinus</i>	Charadriidae		UC	WM		LC
73	Spotted Redshank	<i>Tringa erythropus</i>	Scolopacidae		UC	WM		LC
74	Common Redshank	<i>Tringa totanus</i>	Scolopacidae		UC	WM		LC
76	Common GreenShank	<i>Tringa nebularia</i>	Scolopacidae		UC	WM		LC
75	Marsh Sandpiper	<i>Tringa stagnatilis</i>	Scolopacidae		UC	WM		LC
77	Green Sandpiper	<i>Tringa ochropus</i>	Scolopacidae		UC	WM		LC
78	Wood Sandpiper	<i>Tringa glareola</i>	Scolopacidae		UC	WM		LC
79	Common Sandpiper	<i>Tringa actitis</i>	Scolopacidae		UC	WM		LC
80	Wood Snipe	<i>Gallinago nemoricola</i>	Scolopacidae		UC	WM		LC
81	Pin-tailed Snipe	<i>Gallinago stenura</i>	Scolopacidae		UC	WM		LC
82	Common Snipe	<i>Gallinago gallinago</i>	Scolopacidae		UC	WM		LC
83	Jack Snipe	<i>Limnocyptes minimus</i>	Scolopacidae		UC	WM		LC
84	Black - winged Stilt	<i>Himantopus himantopus</i>	Scolopacidae		UC	SLM		LC
85	Pied Avocet	<i>Recuvirostra avosetta</i>	Scolopacidae		UC	SLM		LC
86	Whiskered Tern	<i>Childonias hybridus</i>	Laridae		UC	WM		LC
87	River Tern	<i>Sterna aurantia</i>	Laridae		UC	WM		LC
88	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Columbidae	Columbiformes	C	Res		LC
89	Spotted Dove	<i>Streptopelia chinensis</i>	Columbidae		C	Res	Breeding	LC
90	Little brown-Dove	<i>Streptopelia streptopelia</i>	Columbidae		C	Res	Breeding	LC
91	Emerald Dove	<i>Chalcophaps indica</i>	Columbidae		UC	Res	Breeding	LC
92	Yellow legged Green pigeon	<i>Treron phoenicoptera</i>	Columbidae		O	Res		LC
93	Blue Rock Pigeon	<i>Columba livia</i>	Columbidae		C	Res	Breeding	LC
94	Pompadour Green pigeon	<i>Treron sp</i>	Columbidae		VR	Res	Breeding	LC
95	Alexandrine Parakeet	<i>Psittacula eupatria</i>	Psittacidae	Psittaciformes	VR	Res	Breeding	NT
96	Rose- ringed Parakeet	<i>Psittacula krameri</i>	Psittacidae		C	Res	Breeding	LC
97	Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	Psittacidae		UC	Res	Breeding	LC
98	Pied Cuckoo	<i>Clamator jacobinus</i>	Cuculidae	Cuculiformes	C	Res	Breeding	LC
99	Indian Hawk- Cuckoo	<i>Hierococcyx varius</i>	Cuculidae		C	Res	Breeding	LC
100	Indian Cuckoo	<i>Cuculus micropterus</i>	Cuculidae		C	Res	Breeding	LC
101	Grey- bellied Cuckoo	<i>Cacomantis passerinus</i>	Cuculidae		UC	Res	Breeding	LC
102	Indian Drongo Cuckoo	<i>Surniculus lugubris</i>	Cuculidae		C	Res	Breeding	LC
103	Asian Koel	<i>Eudynamys scolopacea</i>	Cuculidae		C	Res	Breeding	LC
104	Large Green billed Malkoha	<i>Phaenicophaeus tristis</i>	Cuculidae		UC	Res	Breeding	LC
105	Small Green billed Malkoha	<i>Phaenicophaeus viridirostris</i>	Cuculidae		C	Res	Breeding	LC
106	Sirkeer Malkoha	<i>Phaenicophaeus leschenaultii</i>	Cuculidae		UC	Res	Breeding	LC

Table 1. Contd.

107	Grater Coucal	<i>Centropus sinensis</i>	Cuculidae		C	Res	Breeding	LC
108	Eagle- Owl	<i>Bubo bengalensis</i>	Strigidae	Strigiformes	C	Res		LC
109	Brown Fish- Owl	<i>Ketupa zeylonensis</i>	Strigidae		C	Res		LC
110	Jungle Owlet	<i>Glaucidium radiatum</i>	Strigidae		R	Res		LC
111	Brown Hawk- Owl	<i>Ninox scutulata</i>	Strigidae		R	Res		LC
112	Spotted Owlet	<i>Athene brama</i>	Strigidae		C	Res		LC
113	Barn Owl	<i>Tyto alba</i>	Tytonidae		UC	Res		LC
114	Grey Nightjar	<i>Caprimulgus indicus</i>	Caprimulgidae	Caprimulgiformes	O	Res		LC
115	Indian Nightjar	<i>Caprimulgus asiaticus</i>	Caprimulgidae		C	Res		LC
116	House Swift	<i>Apus affinis</i>	Apodidae	Apodiformes	C	Res	Breeding	LC
117	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	Apodidae		C	Res		LC
118	Alpine Swift	<i>Tachymarptis melba</i>	Apodidae		C	Res		LC
119	Crested Tree Swift	<i>Hemiprocne coronata</i>	Hemiprociidae		O	Res	Breeding	LC
120	Small Blue Kingfisher	<i>Alcedo atthis</i>	Alcedinidae	Coraciiformes	C	Res		LC
121	Lesser Pied Kingfisher	<i>Ceryle rudis</i>	Cerylidae		C	Res	Breeding	LC
122	White-throated Kingfisher	<i>Halcyon smyrnesis</i>	Dacelonidae		C	Res	Breeding	LC
123	Chestnut headed Bee-eater	<i>Merops leschenaultii</i>	Meropidae		UC	Res		LC
124	Blue- tailed Bee-eater	<i>Merops philippinus</i>	Meropidae		UC	WM		LC
125	Green Bee-eater	<i>Merops orientalis</i>	Meropidae		C	Res	Breeding	LC
126	Indian Roller	<i>Coracias benghalensis</i>	Coraciidae		C	Res		LC
127	Common Hoopoe	<i>Upupa epops</i>	Upupidae		C	Res	Breeding	LC
128	Indian Grey Hornbill	<i>Ocyrceros birostris</i>	Bucerotridae		VR	Res		LC
129	Brown-headed Barbet	<i>Megalaima zeylanica</i>	Megalaimidae	Piciformes	C	Res	Breeding	LC
130	Coppersmith Barbet	<i>Megalaima haemacephala</i>	Megalaimidae		C	Res	Breeding	LC
131	Blue-throated Barbet	<i>Megalaima zeylanica</i>	Megalaimidae		UC	Res	Breeding	LC
132	Streak-throated Woodpecker	<i>Picus xanthopygaeus</i>	Picidae		UC	Res		LC
133	Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i>	Picidae		UC	Res		LC
134	Brown-capped Woodpecker	<i>Dendrocopos nanus</i>	Picidae		UC	Res		LC
135	Black-shouldered Woodpecker	<i>socolaptes festivus</i>	Picidae		UC	Res		LC
136	Rufous Woodpecker	<i>Celeus brachyurus</i>	Picidae		UC	Res		LC
137	Indian Pitta	<i>Pitta brachyura</i>	Pitidae	Passeriformes	UC	Res	Breeding	LC
138	Madras Bush Lark	<i>Mirafra affinis</i>	Alaudidae		UC	Res		LC
139	Ashy-crowned Sparrow-Lark	<i>Eremopterix grisea</i>	Alaudidae		UC	Res		LC
140	Rufous-tailed Lark	<i>Ammomanes phoenicurus</i>	Alaudidae		UC	Res		LC
141	Rufous-winged Bush Lark	<i>Mirafra assamica</i>	Alaudidae		UC	Res		LC
142	Red-winged Bush Lark	<i>Mirafra erythroptera</i>	Alaudidae		UC	Res		LC
143	Dusky Crag-Martin	<i>Hirundo concolor</i>	Hirundinidae		UC	Res		LC
144	Barn Swallow	<i>Hirundo rustica</i>	Hirundinidae		UC	Res		LC
145	Wire-tailed Swallow	<i>Hirundo smithii</i>	Hirundinidae		UC	Res		LC
146	Streak-thorated Swallow	<i>Hirundo fluvicola</i>	Hirundinidae		UC	Res		LC
147	Red- rumped Swallow	<i>Hirundo daurica</i>	Hirundinidae		UC	Res		LC
148	Rufous- Backed Shrike	<i>Lanius schach</i>	Laniidae		UC	Res		LC
149	Brown Shrike	<i>Lanius cristatus</i>	Laniidae		UC	Res		LC
150	Brahminy Starling	<i>Sturnus pagodarum</i>	Stumidae		C	Res		LC
151	Common Starling	<i>Sturnus vulgaris</i>	Stumidae		O	Res		LC
152	Common Myna	<i>Acridotheres tristis</i>	Stumidae		C	Res	Breeding	LC
153	Jungle Myna	<i>Acridotheres fuscus</i>	Stumidae		O	Res		LC
154	Southern Treepie	<i>Dendrocitta vagabunda</i>	Corvidae		C	Res		LC
155	House Crow	<i>Corvus splendens</i>	Corvidae		C	Res	Breeding	LC
156	Jungle Crow	<i>Corvus macrorhynchos</i>	Corvidae		C	Res	Breeding	LC
157	Eurasian Golden Oriole	<i>Oriolus oriolus</i>	Corvidae		C	Res		LC

Table 1. Contd.

158	Black-Headed Oriole	<i>Oriolus xanthornus</i>	Corvidae	C	Res		LC
159	Black Drongo	<i>Dicrurus macrocercus</i>	Corvidae	C	Res	Breeding	LC
160	Ashy Drongo	<i>Dicrurus leucophaeus</i>	Corvidae	C	Res	Breeding	LC
161	White-bellied Drongo	<i>Dicrurus caerulescens</i>	Corvidae	C	Res	Breeding	LC
162	Greater Racket- tailed Drongo	<i>Dicrurus paradiseus</i>	Corvidae	VR	SLM		LC
163	Scarlet Minivet	<i>Pericrocotus flammeus</i>	Corvidae	O	Res		LC
164	Small Minivet	<i>Pericrocotus cinnamomeus</i>	Corvidae	C	Res		LC
165	White bellied Minivet	<i>Pericrocotus erythropygius</i>	Corvidae	O	Res		LC
166	Ashy Swallow Shrike	<i>Artamus fuscus</i>	Corvidae	UC	Res		LC
167	Common Iora	<i>Aegithinia tiphia</i>	Irenidae	C	Res		LC
168	Red-whiskered Bulbul	<i>Pycnonotus jacosus</i>	Pycnonotidae	C	Res		LC
169	Red-vented Bulbul	<i>Pycnonotus cafei</i>	Pycnonotidae	C	Res	Breeding	LC
170	Yellow-throated Bulbul	<i>Pycnonotus xantholaemus</i>	Pycnonotidae	VR	Res		VU
171	White-browed Bulbul	<i>Pycnonotus luteolus</i>	Pycnonotidae	C	Res		LC
172	Yellow-browed Bulbul	<i>Iole indica</i>	Pycnonotidae	R	Res		LC
173	Grey-breasted Prinia	<i>Prinia hodgsonii</i>	Cisticolidae	C	Res		LC
174	Plain Prinia	<i>Prinia inornata</i>	Cisticolidae	C	Res	Breeding	LC
175	Ashy Prinia	<i>Prinia socialis</i>	Cisticolidae	C	Res	Breeding	LC
176	Jungle Prinia	<i>Prinia sylvatica</i>	Cisticolidae	C	Res		LC
177	Spotted Babbler	<i>Pellorneum ruficeps</i>	Muscicapidae	R	Res		LC
178	Common Babbler	<i>Turdoides caudatus</i>	Muscicapidae	C	Res		LC
179	Large Grey Babbler	<i>Turdoides malcolmi</i>	Muscicapidae	C	Res		LC
180	Yellow- eyed Babbler	<i>Chrysomma sinense</i>	Muscicapidae	UC	Res		VU
181	Jungle Babbler	<i>Turdoides striatus</i>	Muscicapidae	C	Res	Breeding	LC
182	White Headed Babbler	<i>Turdoides affinis</i>	Muscicapidae	C	Res		LC
183	Grey-headed Flycatcher	<i>Culicicapa ceylonensis</i>	Muscicapidae	UC	Res		LC
184	White-throated Fantail	<i>Rhipidura albicollis</i>	Muscicapidae	UC	Res	Breeding	LC
185	Asian Paradise Flycatcher	<i>Terpsiphone paradisi</i>	Muscicapidae	C	Res	Breeding	LC
186	Black-naped Flycatcher	<i>Hypothymis azurea</i>	Muscicapidae	UC	Res		LC
187	Tickell's Blue Flycatcher	<i>Cyornis tickelliae</i>	Muscicapidae	UC	Res	Breeding	LC
188	Pied Bushchat	<i>Saxicola caprata</i>	Muscicapidae	UC	Res		LC
189	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Muscicapidae	C	Res	Breeding	LC
190	Indian Robin	<i>Saxicoloides fulicata</i>	Muscicapidae	C	Res	Breeding	LC
191	Blue Rock Thrush	<i>Monticola solitarius</i>	Muscicapidae	UC	Res		LC
192	Orange-headed Thrush	<i>Zoothera citrina</i>	Muscicapidae	UC	Res		LC
193	Eurasian Blackbird	<i>Turdus merula</i>	Muscicapidae	UC	Res		LC
194	White-rumped Shama	<i>Copsychus malabaricus</i>	Muscicapidae	O	Res		LC
195	Common Tailorbird	<i>Orthotomus sutorius</i>	Sylviidae	C	Res	Breeding	LC
196	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	Sylviidae	UC	Res		LC
197	Greenish Warbler	<i>Phylloscopus trochiloides</i>	Sylviidae	UC	Res		LC
198	Western Crowned Leaf Warbler	<i>Phylloscopus occipitalis</i>	Sylviidae	UC	Res		LC
199	Tree Pipit	<i>Anthus trivialis</i>	Passeridae	UC	Res		LC
200	Paddyfield Pipit	<i>Anthus rufulus</i>	Passeridae	C	Res		LC
201	Forest Wagtail	<i>Dendronanthus indica</i>	Passeridae	UC	Res		LC
202	Yellow Wagtail	<i>Motacilla flava</i>	Passeridae	C	Res	Breeding	LC
203	Grey Wagtail	<i>Motacilla cinerea</i>	Passeridae	UC	Res	Breeding	LC
204	Large Pied Wagtail	<i>Motacilla maderaspatensis</i>	Passeridae	C	Res		LC
205	House Sparrow	<i>Passer domesticus</i>	Passeridae	C	Res		LC
206	Baya Weaver	<i>Ploceus philippinus</i>	Passeridae	C	Res	Breeding	LC
207	Indian- Silverbill	<i>Lonchura malabarica</i>	Passeridae	C	Res	Breeding	LC
208	White-rumped Munia	<i>Lonchura striata</i>	Passeridae	UC	Res		LC
209	Black- headed Munia	<i>Lonchura malacca</i>	Passeridae	UC	Res		LC
210	Spotted Munia	<i>Lonchura punctulata</i>	Passeridae	C	Res	Breeding	LC

Table 1. Contd.

211	Thick-billed Flowerpecker	<i>Dicaeum agile</i>	Nectariniidae	C	Res		LC
212	Tickell's Flowerpecker	<i>Dicaeum erythrorhynchos</i>	Nectariniidae	C	Res		LC
213	Purple -Rumped sunbird	<i>Nectarinia zeylonica</i>	Nectariniidae	C	Res	Breeding	LC
214	Purple Sunbird	<i>Nectarinia asiatica</i>	Nectariniidae	C	Res	Breeding	LC
215	Oriental White-eye	<i>Zosterops palpebrosus</i>	Zosteropidae	C	Res	Breeding	LC

Abn- Abundance ; C - Common; UC- Uncommon; O- Occasional; R- Rare; VR- Very Rare; Res-Residence; SLM- Seasonal Local Migrant; WM-Winter Migrant; LM- Local Migrant; LC- Least Concern; VU- Vulnerable; NT- Near Threatened.

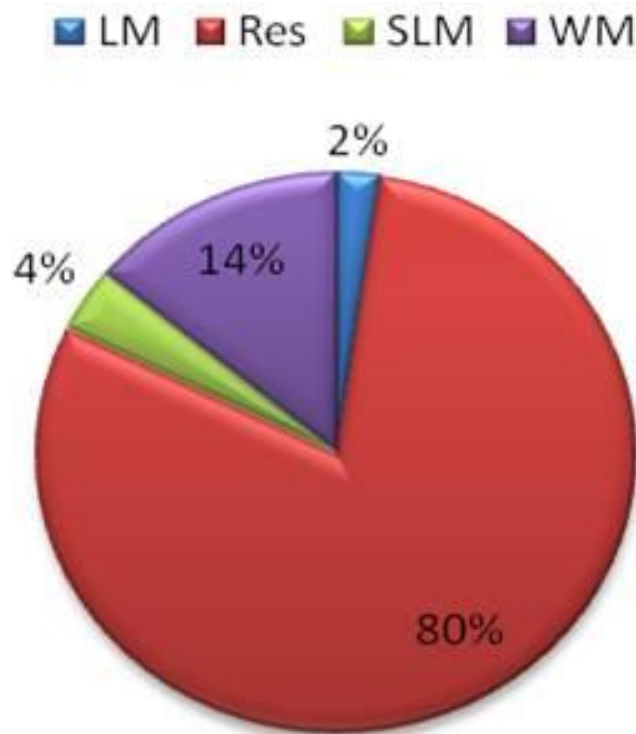
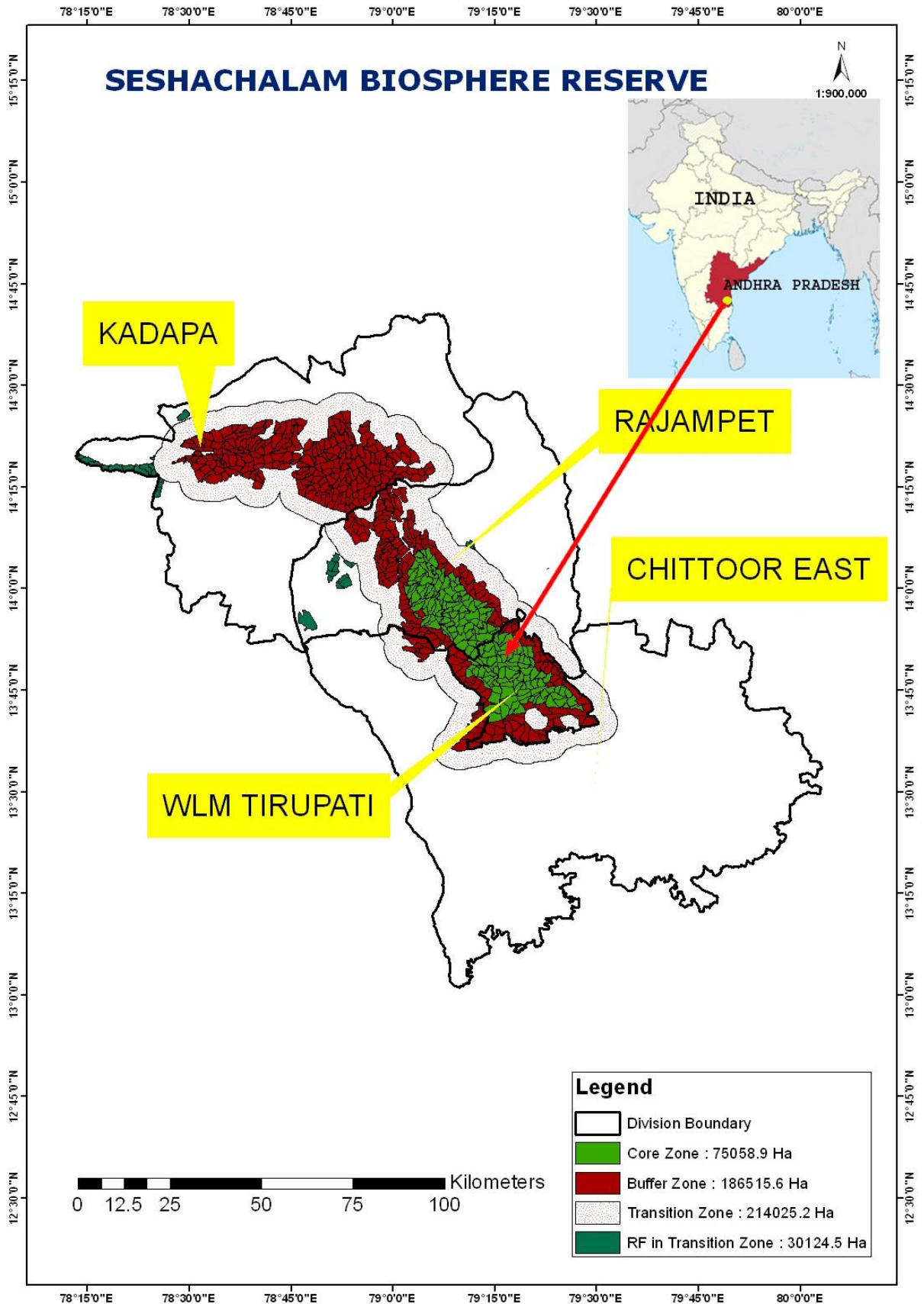


Figure 3. Local status was recorded in the study. LM- Local Migrant; SLM- Seasonal Local Migrant; WM-Winter Migrant; Res-Residence.

Spotted Eagle (*Aquila clanga*), Yellow throated Bulbul (*Pycnonotus xantholaemus*) and Yellow eyed babbler (*Chrysomma sinense*) were vulnerable category. Yellow throated Bulbul highest number 14 individuals were sighted in Talakona areas near to Waterfalls followed by 5 individuals in Jungle book 4 Kms away from Tirupati city, eight individuals from Tirumala, two individuals from Mamandur and 1 individual from Balapalli. The globally threatened Yellow throated Bulbul overall 38 individuals were recorded during our study period.

However, in the study we recorded some rare species like, Great cormorant, Darter, Black Ibis, Spotted Eagle, Created serpent Eagle, Black Eagle, European march

harrier, Osprey, Yellow wattled laping, Jungle owlet, Brown Hawk owl, Yellow Browed Bulbul and Spotted Babbler are less in numbers during our field visit. Seven species of birds were very rarely recorded during the study period, that is, Booted Eagle, Bonelli's Eagle, Pompadour Green Pigeon, Alexandrine Parakeet, Indian Grey Hornbill and Great Racket- tailed Drongo. Earlier from 1991 to 1994, 178 species of birds belonging to 49 families were recorded in the same area (Anand Mohan, 2000), Manjeera Wildlife Sanctuary 164 species to 53 families (Prasad et al., 2014), Nallamala Hills 302 birds (Srinivasalu and Nagalu, 2001), 125 species of land birds in Sriharikota Island (Manakadan et al., 2009), 113



Map 1. Locations of the study area of Seshachalam Hills, Andhra Pradesh, India.

species of water birds in Pulicat (Kannan et al., 2008), 99 species in Thummalalpalke uranium mining (Reddy et al., 2014) and 37 species in Nelapattu (Guptha et al., 2011) were recorded. Compared with present study 75 species of birds were additionally recorded and 40 species of birds had disappeared. It shows great avian biodiversity which can attract the attention of bird watchers and ornithologists (Appendix Table 1 and Appendix Figure 1).

Threats

The Seshachalam is under severe threats due to habitat destruction, livestock pressure mostly in Kalyani dam and Pulibonu areas. Forest fire is the major threats in the study area. Management interventions ensure checking of illegal entry, livestock pressure and illegal logging mostly in Red sanders (*Pterocarpus santalinus*) trees.

Future issues

Further research with reference to habitat studies, threats and conservation of Avifauna in the area is in progress. Several species came under schedule act and globally threatened and there is an urgent need to adapt conservation policies and everyone should realize that the protection of habitat is an importance aspect in conservation of such species.

Conflict of interests

The authors declare that there is no conflict of interest.

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Abbreviations: Very rare, (VR Least Concern (LR-lc); Threatened, (LR-nt uncommon (UC); 15 species rare, (R); 14 species occasional, O common (C); Resident,

(R); Winter Migrant, (WM); Seasonal Local Migrant, (SLM); Local Migrant (LM)

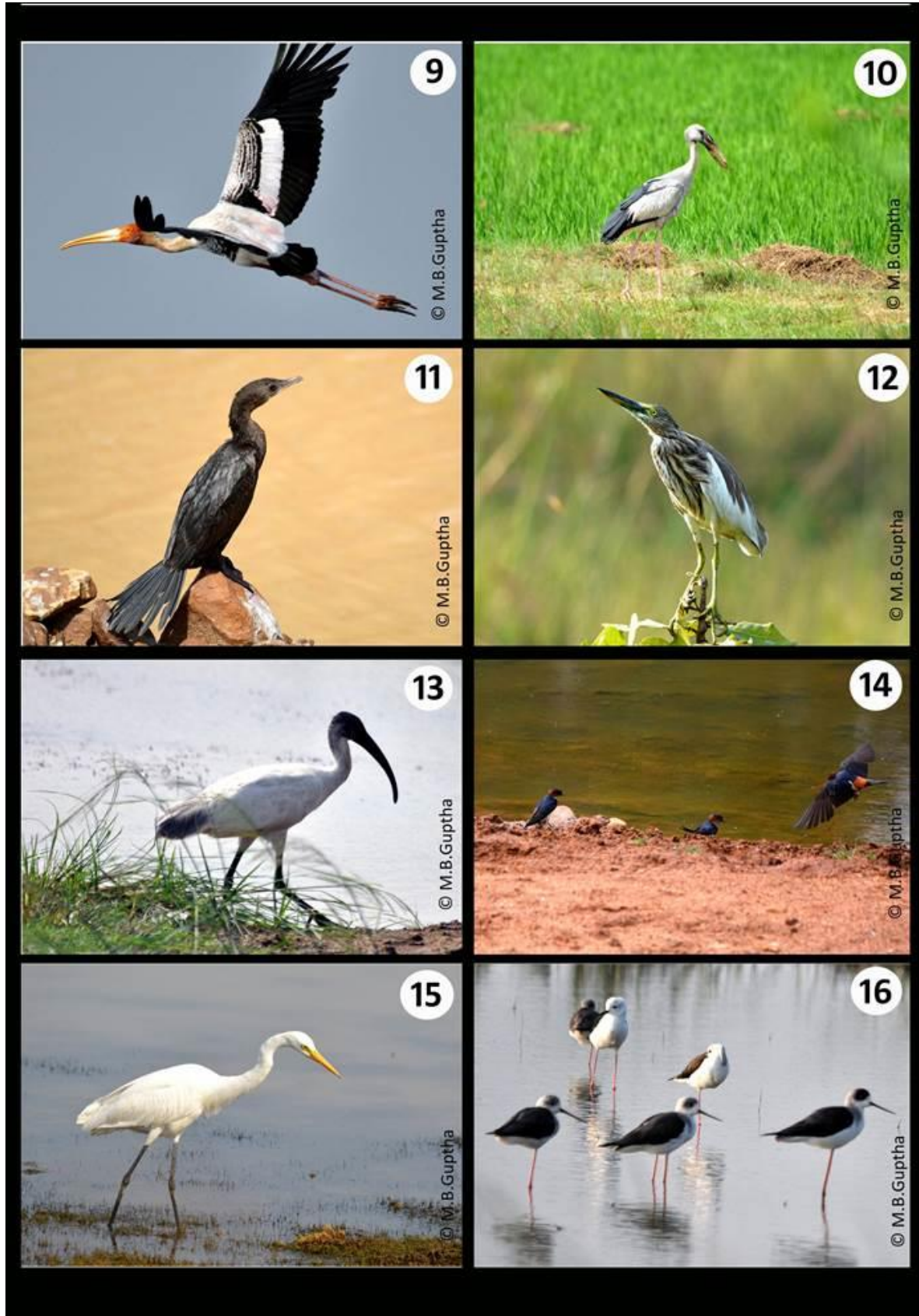
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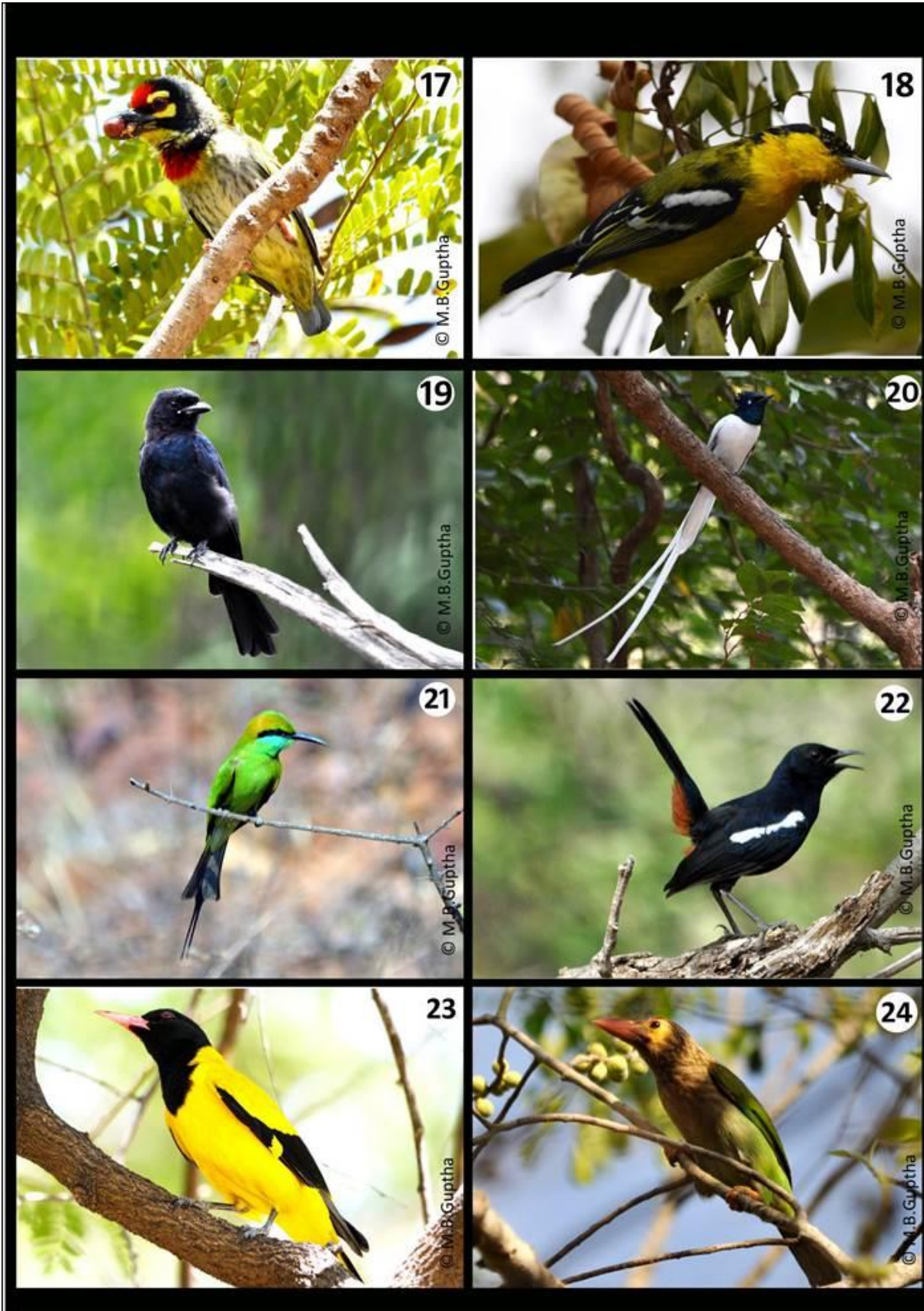
APPENDIX



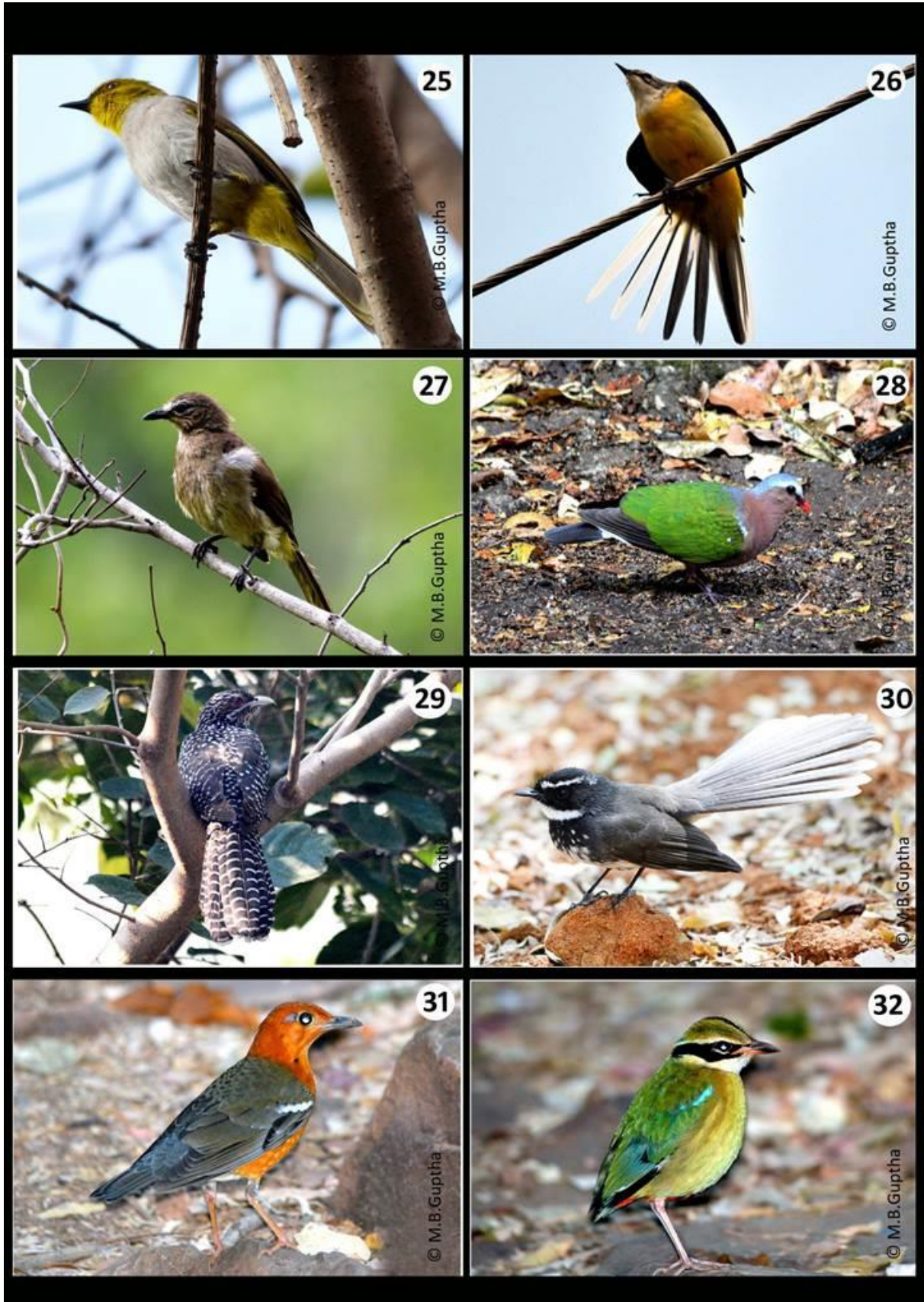
Appendix Figure 1. Pictures (1 to 8) of Avifauna birds during study period.



Appendix Figure 1. Pictures (9 to 16) of Avifauna birds during study period.



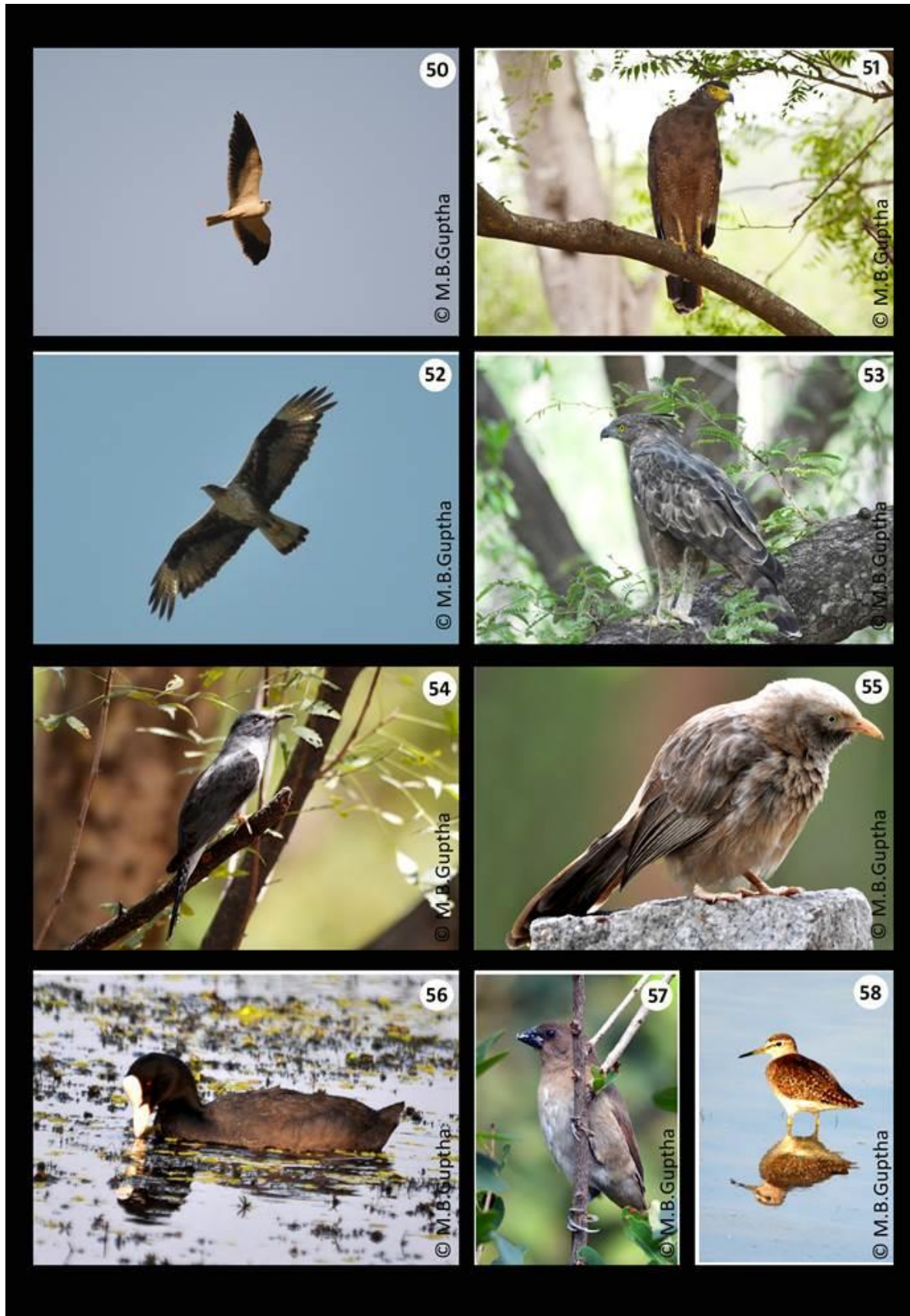
Appendix Figure 1. Pictures (17 to 24) of Avifauna birds during study period.



Appendix Figure 1. Pictures (25 to 32) of Avifauna birds during study period.



Appendix Figure 1. Pictures (42 to 49) of Avifauna birds during study period.



Appendix Figure 1. Pictures (50 to 58) of Avifauna birds during study period.

Appendix Table 1. Avifauna birds during study period.

Common name	Scientific name	Family	Photo ID
Grey Jungle fowl	<i>Gallus sonneratii</i>	Phasianidae	1
Red Spurfowl	<i>Galloperdix spadicea</i>	Phasianidae	2
Painted Spurfowl	<i>Galloperdix lunulata</i>	Phasianidae	3
Grey Francolin	<i>Francolinus pondicerianus</i>	Phasianidae	4
Indian Peafowl	<i>Pavo cristatus</i>	Phasianidae	5
Purple Swamphen	<i>Porphyrio porphyrio</i>	Rallidae	6
Little brown-Dove	<i>Streptopelia streptopelia</i>	Columbidae	7
Spotted Dove	<i>Streptopelia chinensis</i>	Columbidae	8
Painted Stork	<i>Mycteria leucocephala</i>	Ciconidae	9
Asian Open- billed Stork	<i>Anastomus oscitans</i>	Ciconiidae	10
Little Cormorant	<i>Phalacrocorax niger</i>	Phalacrocoracidae	11
Indian Pond- Heron	<i>Ardeola grayii</i>	Ardeidae	12
Asian White Ibis	<i>Threskiomis melanocephalus</i>	Threskiomithidae	13
Red- rumped Swallow	<i>Hirundo daurica</i>	Hirundinidae	14
Great Egret	<i>Casmerodius albus</i>	Ardeidae	15
Black - winged Stilt	<i>Himantopus himantopus</i>	Scolopacidae	16
Coppersmith Barbet	<i>Megalaima haemacephala</i>	Megalaimidae	17
Common Iora	<i>Aegithinia tiphia</i>	Irenidae	18
Common Drongo	<i>Dicrurus macrocercus</i>	Corvidae	19
Asian Paradise Flycatcher	<i>Terpsiphone paradis</i>	Muscicapidae	20
Green Bee-eater	<i>Merops orientalis</i>	Meropidae	21
Indian Robin	<i>Saxicoloides fulicata</i>	Muscicapidae	22
Black-Headed Oriole	<i>Oriolus xanthornus</i>	Corvidae	23
Brown-headed Barbet	<i>Megalaima zeylanica</i>	Megalaimidae	24
Yellow-throated Bulbul	<i>Pycnonotus xantholaemus</i>	Pycnonotidae	25
Yellow Wagtail looks like grey	<i>Motacilla flava</i>	Passeridae	26
White-browed Bulbul	<i>Pycnonotus luteolus</i>	Pycnonotidae	27
Emerald Dove	<i>Chalcophaps indica</i>	Columbidae	28
Asian Koel	<i>Eudynamis scolopacea</i>	Cuculidae	29
White-throated Fantail	<i>Rhipidura albicollis</i>	Muscicapidae	30
Orange-headed Thrush	<i>Zoothera citina</i>	Muscicapidae	31
Indian Pitta	<i>Pitta brachyura</i>	Pitidae	32
White-rumped Shama	<i>Copsychus malabaricus</i>	Muscicapidae	33
Rufous- Backed Shrike	<i>Lanius schach</i>	Laniidae	34
White-throated Kingfisher	<i>Halcyon smyrnesis</i>	Daceloniidae	35
Red-vented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	36
Southern Treepie	<i>Dendrocitta vagabunda</i>	Corvidae	37
Tickell's Blue Flycatcher	<i>Cyornis tickelliae</i>	Muscicapidae	38
Red-whiskered Bulbul	<i>Pycnonotus jacosus</i>	Pycnonotidae	39
Spotted Munia	<i>Lonchura punctulata</i>	Passeridae	40
Purple -Rumped sunbird	<i>Nectarinia zeylonica</i>	Nectariniidae	41
Shikra	<i>Accipiter badius</i>	Accipitridae	42
Common Myna	<i>Acridotheres tristis</i>	Stumidae	43
Small Minivet	<i>Pericrocotus cinnamomeus</i>	Corvidae	44
Small Blue Kingfisher	<i>Alcedo atthis</i>	Alcedinidae	45
Common Hoopoe	<i>Upupa epops</i>	Upupidae	46
Jungle Babbler	<i>Turdoides striatus</i>	Muscicapidae	47
Purple Sunbird	<i>Nectarinia asiatica</i>	Nectariniidae	48
Oriental Magpie-Robin	<i>Copsychus saularis</i>	Muscicapidae	49
Black- shouldered Kite	<i>Elanus caeruleus</i>	Accipitridae	50
Crested Serpent- Eagle	<i>Spilornis cheela</i>	Accipitridae	51

Appendix Table 1. Contd.

Pallid Harrier	<i>Circus macrourus</i>	Accipitridae	52
Changeable Hawk-Eagle	<i>Spizaetus cirrhatus</i>	Accipitridae	53
White bellied Minivet	<i>Pericrocotus erythropygius</i>	Corvidae	54
White Headed Babbler	<i>Turdoides affinis</i>	Muscicapidae	55
Common Coot	<i>Fulica atra</i>	Rallidae	56
Indian- Silverbill	<i>Lonchura malabarica</i>	Passeridae	57
Common Redshank	<i>Tringa totanus</i>	Scolopacidae	58