



## AVIFAUNAL DIVERSITY IN THE SCRUB FOREST OF SRI LANKAMALLESWARA WILDLIFE SANCTUARY, ANDHRA PRADESH, INDIA

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**Abstract:** A total of 115 bird species belonging to 47 families were recorded in the scrub forests of the Sri Lankamalleswara Wildlife Sanctuary, Andhra Pradesh, India in a survey carried out from May 2014 to April 2015. Of these, 107 species were resident and nine species were resident migrants. The scrub forests of peninsular India are equally important as other habitats for avifaunal assemblages.

**Keywords:** Birds, Eastern Ghats, Jerdon's Courser, protected area.

Birds are one of the best indicators of environmental quality of any ecosystem. Most of the birds have specific habitat requirements that change from season to season, and also show different species composition in different habitats. Scrub forest (whether it is a few isolated shrubs or young trees, or a dense thicket) is an important wildlife habitat. It is a natural part of other habitats, such as grassland and woodland, and an important component of the landscape. Diversity of avifauna is one of the most

important ecological indicators to evaluate the quality of habitats. In general, owing to the destruction of natural habitats, anthropogenic disturbances, pollution and climate, the avifaunal diversity has been showing considerable variability both at spatial and temporal scales.

The conservation value of scrubland has been largely overlooked as major focus is invariably given to forests. This is despite the fact that scrub habitat is important for many species. Many birds feed in the open, but near enough to scrub, to be able to find refuge if danger threatens. In addition, scattered scrub in open sites is often very significant for nest sites and song-posts (Malcome 2007). In India, various studies have been carried out on scrubland bird species (Gandhi 1986, 2006; Johnsingh et al. 1987; Santharam 1989), however, only a few studies (Jeganathan 2005; Jeganathan et al.

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2008) have focused on the significance of scrub forest for scrubland bird species.

Sri Lankamalleswara Wildlife Sanctuary (SLWS), Kadapa (Cuddapah) District, Andhra Pradesh, India, falls under the Lankamallai hill ranges of the Eastern Ghats. Earlier studies on the avifauna of the scrub forests of SLWS were focused exclusively on the Critically Endangered Jerdon's Courser *Rhinoptilos bitorquatus*. There is a lack of information on the other scrubland birds of the sanctuary. This work aims to document the avifauna of scrub forest of SLWS.

### STUDY AREA

SLWS lies between the Nallamalai and Sechachalam hill ranges in the central part of the Eastern Ghats. The sanctuary is located between 14°45' to 15°12' N and 78°48' to 79°6' E (Image 1). It is famous for the last known population for Critically Endangered Jerdon's Courser. The sanctuary ranges from about 137–784 m above mean sea level in elevation. The major types of forest in this sanctuary are southern tropical thorn and southern tropical dry deciduous (Champion & Seth 1968). The sanctuary is bordered in the west by dense scrub and dry red sanders-bearing forest as well as southern dry mixed deciduous forests on the higher elevations of the Lankamallai hills. To the east, agricultural fields, orchards and croplands are found in the valleys of the semi-perennial river Sagileru. This tributary joins the Pennar River, which borders the southern part as well as a part of western side of the Sanctuary. Major floristic components of the scrub forest are thorny species of *Acacia*, *Zizyphus* and *Carissa*, and non-thorny species of

*Cassia*, *Hardwickia* and *Anogeissus*.

### MATERIALS AND METHOD

The present work was carried out from May 2014 to April 2015 on a monthly basis. The intensive sampling area in SLWS (Image 1) was the scrub forest, which spreads over four patches (marked A to D on Image 1) of approximately 36km<sup>2</sup> (Jeganathan et al. 2005). The observations were carried out by using binoculars (10x42) during 06:00–10:00 hr & 16:00–19:00 hr, and the identification of species was done with the help of Grimmett et al. (2011). The birds were recorded according to their status (resident, if the species was found to be present throughout the year in the locality, or local migrant, if the species was not found to be present throughout the year in the locality), abundance (estimated based on frequency of sightings of the birds: ≥20 individuals of a species sighted during all visits were categorized as fairly common, <20 individuals of a species sighted during most of the visits were categorized as common, and birds sighted occasionally in fewer numbers between 1–5 were categorized as uncommon), seasonal visits, site and habitat types. Birds are listed following Praveen et al. (2016). Along with this, extensive camera trapping study was conducted in the study area for the detection of Critically Endangered Jerdon's Courser and camera trap data were also taken into consideration while representing avian bird diversity of the study area. Birds encountered during the study were photographed using both regular DSLR camera with 55-200mm lens and infra-red motion sensor cameras (Reconyx PC 800, PC 900, PM 75).

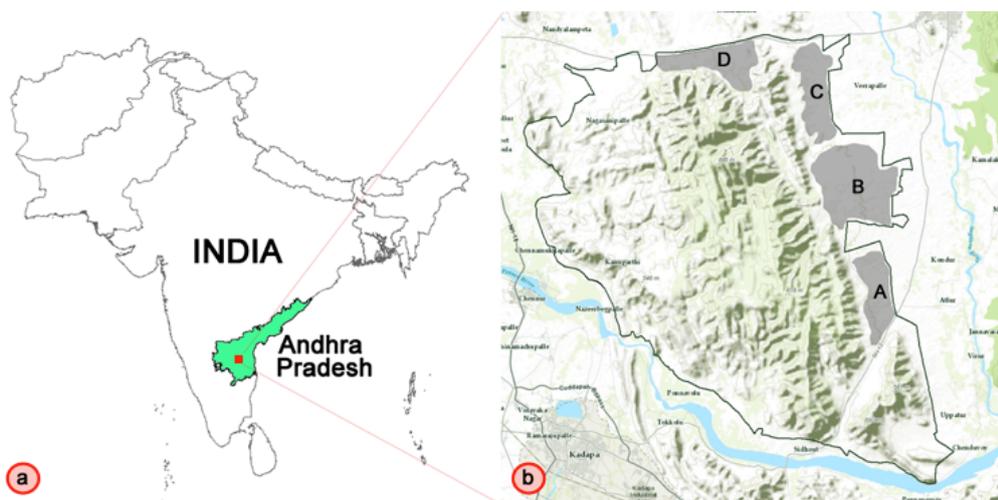


Image 1. Map of Sri Lankamalleswara Wildlife Sanctuary, Andhra Pradesh (b) showing its location in India (a) where the present study on scrubland birds was conducted between May 2014 to April 2015 (Grey shaded areas – marked A to D, are the extent of scrubland where observations were carried out)

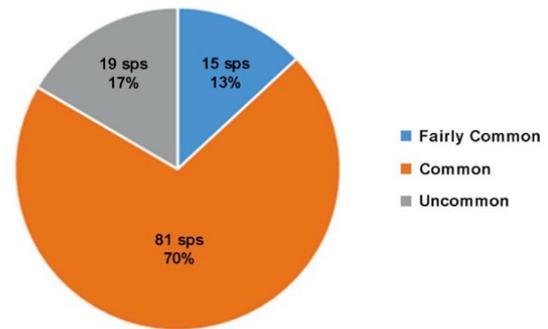
## RESULTS AND DISCUSSION

During the present study, a total of 115 bird species belonging to 47 families and 14 orders were recorded from the scrub forest (Table 1, Images 2–67). The family Accipitridae had maximum number of bird species (8). It was followed by the families Cuculidae (7), Phasianidae (7) and Muscicapidae (6). Twenty families were represented by a single species each. Most species in the scrub forest of SLWS were resident (106 species, 92.17%) and the rest were migratory (9 species, 7.82%). As many as 15 are fairly common (FC), 81 species are common (C) and 19 are uncommon (UC) (Fig. 1). The only threatened species recorded was the Painted Stork, which is a Near Threatened species.

Sampling was conducted only in the scrub forest and not in the dense forest to understand the use of scrub forest by avifauna. The scrub forest of SLWS is possibly the last known home for the Critically Endangered Jerdon's Courser and the last confirmed sighting of the species was recorded in August 2009 (BirdLife International 2009). Despite thorough surveys and deployment of 60 camera traps from 2010 to 2012, the Jerdon's Courser had not been detected (Chavan & Barber 2012). During the present study the Jerdon's Courser was not detected. Currently, large scale research is under progress in collaboration with Andhra Pradesh Forest Department to detect the species by using advanced infra-red camera trap. This species is suspected to have declined at an unquantified rate over the last 10 years, owing to the Telugu-Ganga canal, additional habitat loss and degradation outside SLWS as a result of biotic pressures and livestock grazing.

The dependence of the settlers on the area for resources, and the increase in the number of settlers, poses a serious threat to the scrub habitat through fuel-wood collection, livestock grazing, quarrying and clearance for agriculture and plantations (Jeganathan et al. 2008), and to the birds themselves through increased disturbance. Accidental and opportunistic trapping may also be an issue (Jeganathan et al. 2008).

The present study on avifauna of scrub forest of SLWS is of preliminary nature and is an effort to bring out the bird fauna of scrub forest which has suffered severe changes in its habitat quality. This study provides baseline information for future studies to understand and compare the changes that may affect the presence of other avian species from the scrub forest of SLWS. It would be interesting to conduct a long term study to understand the impact of the Telugu-Ganga Project on other avifaunal diversity and their habitats. A further study on the various behavioural aspects of residential



**Figure 1. Abundance of the bird species in scrubland of Sri Lankamalleswara Wildlife Sanctuary, Andhra Pradesh, India**

and migratory birds will enrich the fauna. Lastly, special efforts need to be taken to restore the scrub habitat for the long term conservation of Critically Endangered Jerdon's Courser, which has been recorded in the past from the current study area.

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Table 1. List of birds in the scrub forest of Sri Lankamalleswara Wildlife Sanctuary, Andhra Pradesh, India

	Common name	Species name	Abundance	Status	Scrubland patch			
					A	B	C	D
<b>Family Ardeidae</b>								
1	Indian Pond Heron	<i>Ardeola grayii</i>	UC	R	-	+	-	-
2	Cattle Egret	<i>Bubulcus ibis</i>	C	R	+	+	+	+
<b>Family Ciconiidae</b>								
3	Painted Stork	<i>Mycteria leucocephala</i>	UC	R	-	+	-	-
<b>Family Threskiornithidae</b>								
4	Indian Black ibis	<i>Pseudibis papillosa</i>	UC	R	-	+	-	-
<b>Family Accipitridae</b>								
5	Shikra	<i>Accipiter badius</i>	C	R	+	+	+	+
6	Tawny Eagle	<i>Aquila rapax</i>	UC	R	-	-	+	-
7	Black-winged Kite	<i>Elanus caeruleus</i>	FC	R	-	-	+	-
8	Common Kestrel	<i>Falco tinnunculus</i>	UC	LM	+	-	-	-
9	Black Kite	<i>Milvus migrans</i>	UC	R	-	-	+	-
10	Short-toed Snake Eagle	<i>Circaetus gallicus</i>	UC	R	-	-	+	-
11	White-eyed buzzard	<i>Butastur teesa</i>	UC	R	+	-	-	-
12	Changeable Hawk Eagle	<i>Nisaetus cirrhatous</i>	UC	R	-	-	+	-
<b>Family Phasianidae</b>								
13	Jungle Bush Quail	<i>Perdica asiatica</i>	C	R	+	+	+	+
14	Painted Francolin	<i>Francolinus pictus</i>	FC	R	-	+	-	-
15	Grey Francolin	<i>Francolinus pondicerianus</i>	C	R	+	+	+	+
16	Grey Junglefowl	<i>Gallus sonneratii</i>	C	R	+	+	+	+
17	Indian Peafowl	<i>Pavo cristatus</i>	C	R	+	+	+	+
18	Red Spurfowl	<i>Galloperdix spadicea</i>	C	R	+	+	+	+
19	Painted Spurfowl	<i>Galloperdix lunulata</i>	UC	R	+	-	-	-
<b>Family Turnicidae</b>								
20	Yellow-legged Buttonquail	<i>Turnix tanki</i>	C	R	+	+	+	+
21	Barred Buttonquail	<i>Turnix suscitator</i>	C	R	+	+	+	+
<b>Family Rallidae</b>								
22	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	UC	R	-	+	-	-
<b>Family Burhinidae</b>								
23	Indian Thick Knee	<i>Burhinus oedicephalus</i>	C	R	+	+	+	+
<b>Family Glareolidae</b>								
24	Indian Courser	<i>Cursorius coromandelicus</i>	UC	R	-	+	-	-
<b>Family Charadriidae</b>								
25	Red-wattled Lapwing	<i>Vanellus indicus</i>	C	R	+	+	+	+
26	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	C	R	+	+	+	+
<b>Family Columbidae</b>								
27	Chestnut-bellied Sandgrouse	<i>Pterocles exustus</i>	C	R	+	+	+	+
28	Painted Sandgrouse	<i>Pterocles indicus</i>	C	R	+	+	+	+
29	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	C	R	+	+	+	+
30	Laughing Dove	<i>Streptopelia senegalensis</i>	C	R	+	+	+	+
31	Spotted Dove	<i>Streptopelia chinensis</i>	C	R	+	+	+	+

	Common name	Species name	Abundance	Status	Scrubland patch			
					A	B	C	D
<b>Family Psittacidae</b>								
32	Rose-ringed Parakeet	<i>Psittacula krameri</i>	C	R	+	+	+	+
<b>Family Cuculidae</b>								
33	Greater Coucal	<i>Centropus sinensis</i>	C	R	+	+	+	+
34	Pied Cuckoo	<i>Clamator jacobinus</i>	C	LM	-	+	+	+
35	Asian Koel	<i>Eudynamis scolopacea</i>	C	R	+	+	+	+
36	Common Hawk-Cuckoo	<i>Heirococcyx varius</i>	C	R	+	+	+	+
37	Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	C	R	+	+	+	+
38	Drongo Cuckoo	<i>Sumiculus lugubris</i>	C	R	+	+	+	+
39	Sirkeer Malkoha	<i>Taccocua leschenaultii</i>	C	R	+	+	+	+
<b>Family Strigidae</b>								
40	Spotted Owlet	<i>Athene brama</i>	C	R	+	+	+	+
41	Indian Eagle Owl	<i>Bubo bengalensis</i>	UC	R	-	-	+	-
<b>Family Caprimulgidae</b>								
42	Common Indian Nightjar	<i>Caprimulgus asiaticus</i>	C	R	+	+	+	+
43	Jerdon's Nightjar	<i>Caprimulgus atripennis</i>	C	R	+	+	+	+
44	Savanna Nightjar	<i>Caprimulgus affinis</i>	C	R	+	+	+	+
<b>Family Apodidae</b>								
45	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	FC	R	+	+	+	+
<b>Family Alcedinidae</b>								
46	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	FC	R	-	-	+	-
<b>Family Meropidae</b>								
47	Green Bee-eater	<i>Merops orientalis</i>	C	R	+	+	+	+
48	Blue-tailed Bee-eater	<i>Merops philippinus</i>	FC	LM	+	+	-	-
<b>Family Coraciidae</b>								
49	Indian Roller	<i>Coracias benghalensis</i>	C	R	+	+	+	+
<b>Family Upupidae</b>								
50	Common Hoopoe	<i>Upupa epops</i>	C	R	+	+	+	+
<b>Family Bucerotidae</b>								
51	Indian Grey Hornbill	<i>Ocyrceros birostris</i>	C	R	+	+	+	+
<b>Family Picidae</b>								
52	Black-rumped Flamebacked Woodpecker	<i>Dinopium benghalense</i>	C	R	-	-	+	+
53	Eurasian Wryneck	<i>Jynx torquilla</i>	UC	LM	-	-	+	-
<b>Family Pittidae</b>								
54	Indian Pitta	<i>Pitta brachyura</i>	FC	R	+	+	+	+
<b>Family Alaudidae</b>								
55	Ashy-Crowned Sparrow Lark	<i>Eremopterix grisea</i>	C	R	+	+	+	+
56	Indian Bushlark	<i>Mirafra erythroptera</i>	C	R	+	+	+	+
57	Jerdon's Bushlark	<i>Mirafra affinis</i>	C	R	+	+	+	+
58	Rufous-tailed Lark	<i>Ammomanes phoenicura</i>	C	R	+	+	+	+
<b>Family Hirundinidae</b>								
59	Barn Swallow	<i>Hirundo rustica</i>	C	R	+	+	+	+

	Common name	Species name	Abundance	Status	Scrubland patch			
					A	B	C	D
<b>Family Motacillidae</b>								
60	Paddy-field pipit	<i>Anthus rufulus</i>	C	R	+	+	+	+
61	White-browed wagtail	<i>Motacilla maderaspatensis</i>	UC	R	-	-	+	-
<b>Family Campephagidae</b>								
62	Black-headed Cuckoo-shrike	<i>Coracina melanoptera</i>	FC	R	-	-	+	-
63	Small minivet	<i>Pericrocotus cinnamomeus</i>	C	R	+	+	+	+
<b>Family Prionopidae</b>								
64	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	C	R	+	+	+	+
<b>Family Monarchidae</b>								
65	India Paradise-flycatcher	<i>Trepsiphona paradisi</i>	FC	R	+	+	+	+
<b>Family Rhipiduridae</b>								
66	White-browed Fantail	<i>Rhipidura aureola</i>	C	R	+	+	+	+
<b>Family Pycnonotidae</b>								
67	Red-vented Bulbul	<i>Pycnonotus cafer</i>	C	R	+	+	+	+
68	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	C	R	+	+	+	+
69	White-browed Bulbul	<i>Pycnonotus luteolus</i>	C	R	+	+	+	+
<b>Family Aegithinidae</b>								
70	Common lora	<i>Aegithina tiphia</i>	C	R	+	+	+	+
<b>Family Laniidae</b>								
71	Bay-backed Shrike	<i>Lanius vittatus</i>	C	R	+	+	+	+
72	Southern Grey Shrike	<i>Lanius meridionalis</i>	C	R	+	-	+	-
73	Long-tailed Shrike	<i>Lanius schach</i>	C	R	+	-	+	-
<b>Family Muscicapidae</b>								
74	Oriental Magpie-Robin	<i>Copsychus saularis</i>	C	R	+	+	+	+
75	Tickell's Blue Flycatcher	<i>Cyornis tickelliae</i>	UC	R	+	-	-	-
76	Pied Bushchat	<i>Saxicola caprata</i>	FC	R	+	+	+	+
77	Common Stonechat	<i>Saxicola torquata</i>	C	R	+	-	+	-
78	Indian Robin	<i>Saxicoloides fulicata</i>	C	R	+	+	+	+
79	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	UC	LM	+	-	-	-
<b>Family Timaliidae</b>								
80	Jungle Babbler	<i>Turdoides striatus</i>	C	R	+	+	+	+
81	Large Grey Babbler	<i>Turdoides malcolmi</i>	C	R	+	+	+	+
82	Rufous Babbler	<i>Turdoides subrufus</i>	C	R	+	+	+	+
83	Yellow-billed Babbler	<i>Turdoides affinis</i>	C	R	+	+	+	+
84	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	FC	R	-	-	+	-
85	Tawny-bellied Babbler	<i>Dumetia hypertyra</i>	FC	R	-	-	+	-
<b>Family Cisticolidae</b>								
86	Ashy Prinia	<i>Prinia socialis</i>	C	R	+	+	+	+
87	Jungle Prinia	<i>Prinia sylvatica</i>	C	R	+	+	+	+
88	Plain Prinia	<i>Prinia inornata</i>	C	R	+	+	+	+
89	Grey-breasted Prinia	<i>Prinia hodgsonii</i>	C	R	+	+	+	+
90	Ziting Cisticola	<i>Cisticola juncidis</i>	UC	R	-	-	+	-
<b>Family Sylviidae</b>								
91	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	FC	LM	-	+	-	-

	Common name	Species name	Abundance	Status	Scrubland patch			
					A	B	C	D
92	Booted Warbler	<i>Iduna caligata</i>	FC	LM	-	+	-	-
93	Common Tailorbird	<i>Orthotomus sutorius</i>	C	R	+	+	+	+
94	Hume's Whitethroat	<i>Sylvia althaea</i>	C	R	+	+	+	+
<b>Family Nectarinidae</b>								
95	Purple Sunbird	<i>Cinnyris asiaticus</i>	C	R	+	+	+	+
96	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	C	R	+	+	+	+
<b>Family Dicaeidae</b>								
97	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	C	R	+	+	+	+
<b>Family Oriolidae</b>								
98	Indian Golden Oriole	<i>Oriolus kundoo</i>	UC	LM	+	+	+	+
99	Black-hooded Oriole	<i>Oriolus xanthonus</i>	UC	R	+	+	+	+
<b>Family Dicuridae</b>								
100	Black Drongo	<i>Dicrurus macrocercus</i>	C	R	+	+	+	+
101	Ashy Drongo	<i>Dicrurus leucophaeus</i>	C	R	+	+	+	+
102	White-bellied Drongo	<i>Dicrurus caeruleus</i>	C	R	+	+	+	+
<b>Family Artamidae</b>								
103	Ashy Woodswallow	<i>Artamus fuscus</i>	C	R	+	+	+	+
<b>Family Corvidae</b>								
104	Jungle Crow	<i>Corvus splendens</i>	C	R	+	+	+	+
105	House Crow	<i>Corvus macrorhynchos</i>	C	R	+	+	+	+
106	Rufous Treepie	<i>Dendrocitta vagabunda</i>	C	R	+	+	+	+
<b>Family Sturnidae</b>								
107	Common Myna	<i>Acridotheres tristis</i>	C	R	+	+	+	+
108	Brahminy Starling	<i>Sturnus pagodarum</i>	C	R	+	+	+	+
109	Rosy Starling	<i>Sturnus roseus</i>	C	LM	+	+	+	-
<b>Family Ploceidae</b>								
110	Baya Weaver	<i>Ploceus philippinus</i>	C	R	+	+	+	+
<b>Family Estrildidae</b>								
111	Scaly-breasted Munia	<i>Lonchura punctulata</i>	C	R	+	+	+	+
112	White-throated Munia	<i>Lonchura malabarica</i>	C	R	-	+	+	+
113	Black-headed Munia	<i>Lonchura malacca</i>	FC	R	+	+	+	+
<b>Family Passeridae</b>								
114	House Sparrow	<i>Passer domesticus</i>	FC	R	+	+	+	+
115	Chestnut-shouldered Petronia	<i>Petronia xanthocollis</i>	C	R	+	+	+	+

Status: R - Resident, LM - Local Migrant; Abundance: FC - Fairly common, C - Common, UC - Uncommon; '+' - Present, '-' - Absent,



Image 2. *Ardeola grayii*



Image 3. *Bubulcus ibis*



Image 4. *Mycteria leucocephala*



Image 5. *Accipiter badius*



Image 6. *Falco tinnunculus*



Image 7. *Nisaetus cirrhatus*



Image 8. *Francolinus pondicerianus*



Image 9. *Gallus sonneratii*



Image 10. *Pavo cristatus*



Image 11. *Perdica asiatica*



Image 12. *Galloperdix spadicea*



Image 13. *Galloperdix lunulata*



Image 14. *Turnix suscitator*



Image 15. *Turnix tanki*



Image 16. *Burhinus oedicnemus*



Image 17. *Vanellus indicus*



Image 18. *Vanellus malabaricus*



Image 19. *Pterocles exustus*



Image 20. *Pterocles indicus*



Image 21. *Streptopelia decaocto*



Image 22. *Streptopelia senegalensis*



Image 23. *Streptopelia chinensis*



Image 24. *Clamator jacobinus*



Image 25. *Phaenophaeus viridirostris*



Image 26. *Taccocua leschenaultii*



Image 27. *Athene brama*



Image 28. *Bubo bengalensis*



Image 29. *Merops oreintalis*



Image 30. *Upupa epops*



Image 31. *Ocyrceros birostris*



Image 32. *Dinopium benghalensis*



Image 33. *Pitta brachyura*



Image 34. *Eremopterix grisea*



Image 35. *Mirafrax erythroptera*



Image 36. *Ammomanes phoenicura*



Image 37. *Coracina melanoptera*



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Image 38. *Pericrocotus cinnamomeus*



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Image 39. *Tephrodornis pondicerianus*



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Image 40. *Trepsiphona paradisi*



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Image 41. *Rhipidura aureola*



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Image 42. *Pycnonotus cafer*



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Image 43. *Aegithina tiphia*



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Image 44. *Lanius vittatus*



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Image 45. *Lanius meridionalis*



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Image 46. *Copsychus saularis*



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Image 47. *Cyornis tickelliae*



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Image 48. *Saxicoloides fulicata*



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Image 49. *Muscicapa dauurica*



Image 50. *Turdoides striatus*



Image 51. *Turdoides malcolmi*



Image 52. *Turdoides affinis*



Image 53. *Prinia sylvatica*



Image 54. *Prinia hodgsonii*



Image 55. *Orthotomus sutorius*



Image 56. *Cinnerys asiaticus*



Image 57. *Leptocoma zeylonica*



Image 58. *Oriolus kundoo*



Image 59. *Oriolus xanthornus*



Image 60. *Dicrurus macrocercus*



Image 61. *Dicrurus caerulescens*



Image 62. *Dendrocitta vagabunda*



Image 63. *Sturnus pagodarum*



Image 64. *Ploceus philippinus*



Image 65. *Lonchura malabarica*



Image 66. *Lonchura malacca*



Image 67. *Petronia xanthocollis*

