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Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

COMMUNICATION

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26 August 2017 | Vol. 9 | No. 8 | Pp. 10538–10550 10.11609/jott.2763.9.8.10538-10550



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Journal of Threatened Taxa | www.threatenedtaxa.org | 26 August 2017 | 9(8): 10538-10550



ISSN 0974-7907 (Online) ISSN 0974-7893 (Print)

A REASSESSMENT OF THE AVIAN SPECIES DIVERSITY IN THE EASTERN GHATS OF TAMIL NADU, AFTER THE VERNAY SURVEY

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Abstract: The Eastern Ghats of Tamil Nadu have been poorly surveyed for birds. The best known bird survey in the Eastern Ghats of Tamil Nadu (EGTN) was by V.S. LaPersonne who carried out the the Surveys in Tamilnadu Eastern Ghats between 08th April, 1929 and 25th July 1929. This was reported by WHistler & Kinnear. Thereafter information about birds in EGTN has come only from checklists published from time to time, by researchers, whose primary focus was not birds. Hence, to fill this lacuna, a comprehensive survey of birds was undertaken in the EGTN from March 2012–February 2015. The objectives of the study were to document the avian richness and abundance in EGTN, put them in perspective to the Vernay Survey conducted more than 80 years back, and identify priority sites for bird conservation. The study covered the hills and forests of Tamil Nadu spanning nine districts. In total, 262 species of birds were recorded during the survey. Eight species of birds fall under the threatened category. Species such as Square-tailed Bulbul Hypsipetes (lecocephalus) ganeesa, Rufous Woodpecker Micropternus brachyurus, Asian Fairy Bluebird Irena puella, and Malabar Whistling Thrush Myophonus horsfieldii still persist in the same old sites reported in the Vernay Survey. The top five abundant species were the Red-vented Bulbul Pycnonotus cafer, White-browed Bulbul Pycnonotus luteolus, Red-whiskered Bulbul Pycnonotus jocosus, Common Iora Aegithina tiphia, and Purple-rumped Sunbird Leptocoma zeylonica. The Vaniyar riparian tract in the Shevroys, from its origins in the hills to the Vaniyar dam downstream, is a potential bird conservation site in the Eastern Ghats of Tamil Nadu.

Keywords: Abundance, birds, distribution, diversity, Eastern Ghats, Vaniyar, Vernay Survey.

DOI: http://doi.org/10.11609/jott.2763.9.8.10538-10550 | ZooBank: urn:lsid:zoobank.org:pub:E51FA549-CAFC-4FFF-A973-FA7F4F18AF67

Editor: C. Srinivasulu, Osamania University, Hyderabad, India.

Date of publication: 26 August 2017 (online & print)

Manuscript details: Ms # 2763 | Received 28 April 2016 | Final received 03 August 2017 | Finally accepted 07 August 2017

Citation: David, J.P., R.J.R. Daniels & V. Balasubramanian (2017). A reassessment of the avian species diversity in the Eastern Ghats of Tamil Nadu, after the Vernay Survey. Journal of Threatened Taxa 9(8): 10538–10550; http://doi.org/10.11609/jott.2763.9.8.10538-10550

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Funding: Ministry of Environment, Forest and Climate Change, Govt. of India.

Competing interests: The authors declare no competing interests.

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Author Contribution: JPD - Data collection, data analysis and manuscript preparation; RJRD - Principal Investigator and designer of the study; VB - Assistance in the field.

Acknowledgements: The study was funded by the Ministry of Environment, Forests and Climate Change of the Government of India. We place on record our gratitude to the whole-hearted support provided by the Tamil Nadu Forest Department both at the head offices in Chennai and each field site during the surveys. We thank Dr. Mayilvahanan, Dr. Vijayan, Saravanan, Ganesh, Sanjay and Naveen Chawla for their help in accommodation and travel at Salem, Dharmapuri and Krishnagiri. Dr. Ravi Rajasingh and members of the Kenneth Anderson Nature Society (KANS) helped us greatly with our survey in the Melagiris.







INTRODUCTION

The Eastern Ghats in India run from Odisha in the east to Tamil Nadu in the south. Unlike its biologically rich counterpart (Western Ghats), the Eastern Ghats are relatively dry, broken, and move away from the Coromandal coast as they proceed south. The Eastern Ghats of Tamil Nadu (EGTN) consist of hill ranges lying in the northern and northwestern parts of the state. These hill ranges have not been thoroughly explored for birds, unlike the hills in Andhra Pradesh or Odisha, and the contiguous Western Ghats. Ornithological records for EGTN are either old (Beadnell 1923; Whistler & Kinnear 1930–37; Roy 1969) or checklists from specific hill ranges (Vasanth 1990; Karthikeyan & Arun 1992; Daniels 1993; Karthikeyan 1996; Daniels & Ravikumar 1997; Daniels & Saravanan 1998; Kalaimani 2011; Tom & Praveen 2014; Chandrasekaran & Kumaraguru undated - booklet).

Hence, there was an urgent need to thoroughly explore this region for birds and analyse the changes in bird diversity since the Vernay Survey in the late 1920s (Whistler & Kinnear 1930–37), and to identify potential bird conservation site/sites. Vernay is the name of the person who funded the ornithological expedition in the Eastern Ghats. Whistler and Kinnear examined the specimens collected and published the manuscript. The need for a comprehensive survey in EGTN was also stressed by Santharam, a well-known bird watcher from southern India (see Santharam 2010) and was boosted by records of Western Ghat endemic species such as White-cheeked Barbet Megalaima viridis, Malabar Parakeet Psittacula columboides, White-bellied Treepie Dendrocitta leucogastra, Yellow-browed Bulbul Acritillas indica, Rufous Babbler Turdoides subrufa, and Blackthroated Munia Lonchura kelaarti in EGTN (Daniels & Ravikumar 1997; Daniels & Saravanan 1998).

Though the above surveys did bring out some interesting bird records, these were checklists from specific hill ranges (did not cover all hill ranges of EGTN), and there was no information on bird abundance, distribution, and conservation issues affecting birds. To fill this lacuna, a thorough survey was undertaken in almost all the hill ranges of EGTN. A few hills south of the River Cauvery could not be covered due to time constraints. The survey was carried out from March 2012–February 2015, with the support of the Ministry of Environment, Forests and Climate Change, Government of India. In this paper, for the first time, apart from checklists of birds, we provide information on bird abundance, comparison with old records, and bird conservation issues in EGTN. The objectives of the study were to

document the avian diversity, put them in perspective to Vernay Survey records, and identify priority sites for bird conservation. The survey was spread over nine districts, covering 16 forest divisions and 47 forest ranges (Table 1), mostly in the hills, but included reserve forest and adjacent wetlands in the foothills. The habitat types covered include forests, wetlands, countryside (including cultivation) and plantations.

Study area

The Eastern Ghats in Tamil Nadu (EGTN) are a range of disjointed and continuous hills lying in the north (hereafter Eastern cluster) and north-west (hereafter Western cluster) parts of the State (Fig. 1). They stretch from the hills of Vellore and Krishnagiri districts in the north to Sirumalai in the south (Jayakumar et al. 2008). The major hill ranges in the Eastern cluster are the Yelagiri, Javvadu, Shevroys, Chitheri, Kalrayan, Gingee, Kolli, Pachamalai, and Sirumalai. The hill ranges in the Western cluster are the Melagiris and hills of Erode and Sathyamangalam forest division. The forest in Sathyamangalam division slopes gently into the Moyar valley, and joins the Western Ghats in the Nilgiris. The hill ranges in the Eastern cluster lie north and south of the river Cauvery, while those on the Western cluster lie mostly west of the river Cauvery.

The hills of the Eastern cluster roughly occupy an area of about 6,000km² (Jayakumar et al. 2008). There are several rivers that drain from these hills, these include the Vaniyar, Thopayar, Varatiyar, Kutar, Periyar (in Shevroys), Kambalai, Varatiyar (in Chitheri), etc. Overall the average annual rainfall varies from 800–1,600 mm and average temperature varies from 17–35 °C. The elevation ranges from 130–1700 m. Nine forest types have been identified in these hill ranges (Jayakumar et al. 2008; Ramasubramanian 2010; Tom & Praveen 2014).

METHODS

Avian diversity

To document avian diversity, pre-existing trails in each forest range were walked and bird species encountered were noted down. The trail passed through both forests and non-forest habitats. The distance walked in each trail varied from 1–5 km. In addition, bird species were recorded from natural and man-made waterbodies. To record crepuscular and nocturnal birds, we sat silently in village-forest edges or in clearings within the forests and listened to bird calls. If there were no calls, we played calls of nocturnal species using a mobile phone and

Table 1. List of sites covered during the survey

District	Forest division	Forest range
	Hassanur	Hassanur, Thalavadi, Talamalai, Germalam
Erode	Sathyamangalam	T.N. Palayam
	Erode	Bargur, Andhiyur, Sennampatti
Salem	Salem	Danishpet, Asthampatti, Pappiredipatti, Yercaud, Mettur
	Aathoor	Aathoor, Karumandhurai, Thamampatti
Dhamasa	Dharmapuri	Dharmapuri, Palacode, Hogenakkal, Pennagaram
Dharmapuri	Harur	Harur, Tirthamalai, Kotapatti, Morapur
Namakkal	Namakkal	Namakkal, Kolli, Rasipuram, Mullukurichi
Krishnagiri	Hosur	Urigam, Anchetty, Dhenkanikottai, Jawalagiri, Hosur, Rayakottai, Krishnagiri
T:	Tiruvannamalai North	Jamnamarathur
Tiruvannamalai	Tiruvannamalai South	Sathanur, Adiannamalai
Villupuram	Villupuram	Villupuram, Ulundurpet, Gingee
	Vellore	Ambur, Amirthi
Vellore	Thirupathur	Yelagiri, Chengam, Singarapettai
Tiruchirapalli	Tiruchirapalli	Thuraiyur

speaker to elicit response. Nocturnal species were also recorded from their day time roost. The surveys were carried out from March 2012–February 2015.

Status and distribution

To ascertain the status of a species, a number of bird records were used. Even if three birds of a single species were sighted together it was considered as single record. Totally, we obtained 8,419 bird records. We classified a species as common (\geq 100 records), uncommon (\geq 1=99 records) and rare (\leq 20 records). To determine the distribution of a species we divided the EGTN into 51 clusters based on proximity and habitat contiguity of sampled sites. Then we classified the species as widespread (present in \geq 30 clusters), moderately distributed (present in 10=29 clusters) and sparsely distributed (present in <10 clusters).

RESULTS

Avian richness, abundance and distribution

The birds of EGTN represent various habitat types from dry scrub in the lower elevation to high elevation

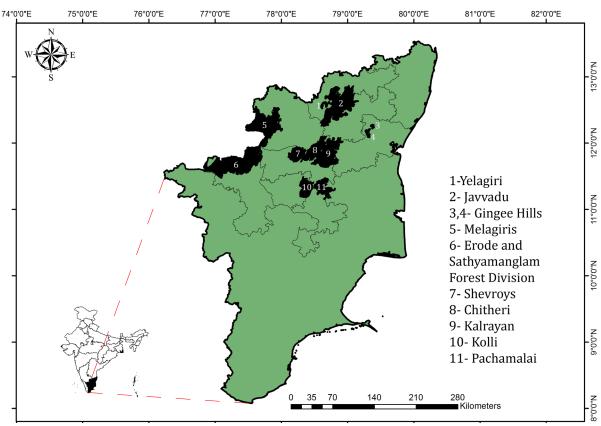


Figure 1. Eastern Ghats of Tamil Nadu, India

moist forest species. In total, 262 species were recorded during the present survey (Appendix 1). This included eight threatened species (Table 2). If the Vernay Survey records and records from subsequent surveys (Karthikeyan & Arun 1992; Daniels 1993; Karthikeyan 1996; Daniels & Ravikumar 1997; Daniels & Saravanan 1998; Tom & Praveen 2014; Chandrasekaran & Kumaraguru undated) are also considered, the list for the entire EGTN stands at 305 species.

The five most common and widespread species were the Red-vented Bulbul *Pycnonotus cafer* (427 records), White-browed Bulbul *Pycnonotus luteolus* (282 records), Red-whiskered Bulbul *Pycnonotus jocosus* (279 records), Common Iora *Aegithinia tiphia* (225 records) and Purplerumped Sunbird *Leptocoma zeylonica* (196 records).

Apparently, all these species are habitat generalists, and use a wide variety of habitats from forest to countryside vegetation and plantations (Ali & Ripley 1987; Grimmett et al. 2011).

Western Ghat endemic species

Among the 17 species of birds endemic to the Western Ghats (Praveen 2015), five were recorded during the survey. Grey-headed Bulbul *Pycnonotus priocephalus* was recorded from Talamalai and Kadambur in Sathyamangalam forest division; the Nilgiri Wood Pigeon *Columba elphinstonii* from Talamalai and Gutheri in Melagiris; Malabar Parakeet from Sathyamangalam Forest Division, Melagiris, Shevroy and Kolli Hills; Crimsonbacked Sunbird *Leptocoma minima* from Germalam;

Table 2. Threatened species in the Eastern Ghats of Tamil Nadu, India

Common name	Scientific name	IUCN status	Locality reported in Vernay survey publication	Locality reported in present survey	Remarks
Grey-headed Fish Eagle	Ichthyophaga ichthyaetus	Near Threatened	Not reported	A single bird was sighted in Hogenakkal	A species with discontinuous yet wide distribution in India
Lesser Fish Eagle	Icthyophaga humilis	Near Threatened	Not reported	Two birds in Hogennekal, Cauvery riparian tract	A species with discontinuous yet wide distribution in India
White-rumped Vulture	Gyps bengalensis	Critically Endangered	Included without comment in the Madras list by Dewar	A flock of around eight birds were seen soaring above the Talamalai range in the Eastern Ghats tail	A species that is very rare in southern India with a few localized populations
Indian Vulture	Gyps indicus	Critically Endangered	Two small breeding colonies were recorded by Packard in Shevroys.	Not recorded	A species with very small and local breeding populations in southern India
Red-headed Vulture	Sarcogyps calvus	Critically Endangered	Recorded flying over the Shevroys.	Not recorded	A species that has shown considerable decline in numbers and currently rare in southern India
Egyptian Vulture	Neophron percnopterus	Endangered	Recorded from Gingee and Chitheri hills	Kolli Hills	This species used to be common in south India
Nilgiri Wood Pigeon	Columba elphinstonii	Vulnerable	Unconfirmed record from the Shevroys.	Talamalai in Sathyamangalam forest division and Gutheri in Hosur forest division	This species is endemic to Western Ghats
Nilgiri Flycatcher	Euymias albicaudatus	Near Threatened	Not reported	Doubtful record from Vaniyar riparian tract, Shevroys, Salem	An Western Ghat endemic species that prefers higher elevation
Yellow-throated Bulbul	Pycnonotus xantholaemus	Vulnerable	Chitheri Hills	Pachamalai, Bargur range in Erode forest division and Gingee fort	A very patchily distributed bulbul endemic to southern India
Grey-headed Bulbul	Pycnonotus priocephalus	Near Threatened	Not reported	Kodipuram in Talamalai range and Kadambur in T.N. Palayam range, both in Sathyamangalam forest division.	This species is endemic to southwestern India
Great Hornbill	Buceros bicornis	Near Threatened	Not reported	Hassanur range, Sathyamangalam forest division	A rare bird found in southwestern,northern and northeastern India

Rufous Babbler Turdoides subrufa from Kolli hills.

Other significant records

Other significant records made during the present survey were of the Oriental Dwarf Kingfisher *Ceyx erithaca*, Great Hornbill *Buceros bicornis*, Indian Swiftlet *Collocalia unicolor*, Grey-headed Fish Eagle *Icthyophaga ichthyaetus*, Lesser Fish Eagle *Icthyophaga humilis*, White-browed Fantail *Rhipidura aureola*. All the above bird species were recorded from the Western Cluster.

In the Eastern Cluster, significant records include the Square-tailed Bulbul *Hypsipetes leucocephalus ganeesa*, Savanna Nightjar *Caprimulgus affinis* and Yellow-throated Bulbul *Pycnonotus xantholaemeus*. The Square-tailed Bulbul was recorded from the high altitude regions of the Shevroys. This species has not been recorded in other hill ranges in the Eastern cluster and has not been reported anywhere else in the Eastern Ghats. The Savanna Nightjar was recorded from the foothills of Shevroys and Pachamalai. This is the first record of the species from the EGTN. An endemic bird of peninsular India, the Yellow-throated Bulbul was recorded from two previously unreported sites in the Bargur range of Erode Forest Division (900m) and Manmalai (450m), adjoining Pachamalai.

Doubtful records

We sighted a pair of what we suspect to be the Western Ghats endemic Nilgiri Flycatcher *Eumyias albicaudatus* along the Vaniyar riparian tract in Yercaud range, Shevroy Hills; however, we have no photos of the birds to prove it beyond doubt. Similarly, the Whitenaped Tit *Parus nuchalis* could occur in Vepanapalli reserved forest in Krishnagiri District which is an *Albizia amara*-dominated scrub forest, and the Spot-bellied Eagle-owl *Bubo nipalensis* could also occur in Tirthamalai range in Chitheri foothills on the Eastern side. The latter species was recorded from the Western cluster. We base our last two assumptions on a fleeting glimpse and call record.

DISCUSSION

Vernay Survey

It is more than 80 years since the Vernay Orinithological Survey of the Eastern Ghats of Tamil Nadu was published by Whistler & Kinnear (1930–37). The Vernay Survey covered both the states of Andhra Pradesh and Tamil Nadu, which were part of the larger erstwhile Madras Presidency. The survey was necessary as systematic work

on Indian ornithology was hampered by the absence of data from Madras Presidency. During the survey in Tamil Nadu, the hills of the Western cluster were not covered (Melagiris, hills of Erode and Sathyamangalam Forest Division). Specimens were collected from Kurumbapatti (foothills of the Shevroys), Shevroys, Chitheri, Gingee, Tiruchy (exact location not specified) hills and the plains surrounding these hill ranges, leaving out the others; however, the authors quote extensively from other sources wherever necessary.

The Vernay Survey publication not only lists the species procured by the survey, but also provides crucial information about species recorded by other birders. In total, the publication lists 285 species of birds for the region east of Stanley reservoir, up to Trichy in the south and Madras (present day Chennai) in the east. If the records from around Madras (east coast rather than Eastern Ghats) are removed, the list stands at 153 species.

Comparison of records from Vernay Survey and present survey

It is difficult to make a comparison between the two surveys, as the Vernay expedition did not cover the hill ranges in the Western cluster. The following text is a comparison of avian diversity in the hill ranges of the Eastern cluster. During the present survey 232 species of birds were recorded, while the Vernay Survey procured 126 species (54% of species recorded during the present survey). Species that are persisting locally for the past 80 years include the Square-tailed Bulbul, Rufous Woodpecker *Micropternus brachyurus*, Asian Fairy Bluebird *Irena puella*, and Malabar Whistling Thrush *Myophonus horsfieldi* in the Shevroys; Blue-bearded Beeeater *Nyctyornis athertoni* in Chitheri, and Emerald Dove *Chalcophaps indica* in Yercaud and Chitheri.

The Indian Grey Hornbill *Ocyceros birostris* which was reported to be fairly common and appeared to be breeding in Kurumbapatti was not recorded from the locality during the present survey; however, it was recorded from Chitheri Hills (also reported by the Vernay Survey), and from Sathanur Dam in Tiruvannamalai District. The species was recorded extensively in the Western cluster.

Three species which were not recorded during the Vernay Survey but found to be widespread during our survey were the Laughing Dove *Stigmatopelia senegalensis*, Indian Nightjar *Caprimulgus asiaticus*, and Jungle Owlet *Glaucidium radiatum*. Other species which were not recorded by the Vernay Survey were the Sirkeer Malkoha *Taccocua leschenaultii*, Malabar

Parakeet *Psittacula columboides*, Red Avadavat *Amandava amandava*, Malayan Night Heron *Gorsachius melanolophus*, Striated Heron *Butorides striata*, Whitenaped Woodpecker *Chrysocolaptes festivus*, Savanna Nightjar *Caprimulgus affinis*, Brown Hawk-Owl *Ninox scutulata*, Nilgiri Flowerpecker *Dicaeum concolor*, and White-eyed Buzzard *Butastur teesa*. The White-eyed Buzzard was recorded nesting in the foothills of the Shevroys in Asthampatti range.

Some species that were recorded by the Vernay Survey, but not from the present survey were the Spotbellied Eagle-Owl *Bubo nipalensis*, Blue-eared Kingfisher *Alcedo meninting*, and Green Imperial Pigeon *Ducula aenea*. Two species of Vultures - Indian Vulture *Gyps indicus* and Red-headed Vulture *Sarcogyps calvus*, which appear in the IUCN Red List were reported from the Shevroys by Packard and others. Presently, both the species have not been reported outside their stronghold in Moyar Valley and adjacent hills of Sathyamangalam Forest Division.

Conservation issues

Our survey through the various hills of EGTN inferred a mosaic pattern of denuded inner valleys and the existence of forests in the riparian tracts, hill tops and outer slopes. The valleys have been mostly taken over for human habitation and cultivation. Crops like tapioca, paddy, sugarcane, and banana are being cultivated. Coffee plantations are abundant in the Shevroy and Kolli hills, and patchily in the Yelagiri and Kalrayan hills. Tourist resorts are rampant in Yercaud and Yelagiri. Direct disturbance/threats to wildlife and forest are also evident in the form of hunting for local consumption, wood-cutting, cattle grazing, and use of explosives for stone quarrying.

Inspite of these changes in land use pattern and human disturbance, birds continue to persist in this degraded and fragmented landscape. Areas with good forest cover still exist in certain forest ranges. These include Polur, Kavalur and Amirthi in Javvadu hills and most of Chitheri hills.

Bird conservation site

The Vaniyar riparian tract, right from its origin near Vazhavandhi in Shevroy Hills to the Vaniyar Dam in the foothills is a good bird watching destination. The riparian tract is a good place for sighting bird species such as Square-tailed Bulbul, Asian Fairy Bluebird, White-cheeked Barbet, Bar-winged Flycatcher-Shrike *Hemipus picatus*, Lesser Yellownape *Picus chlorolophus*, Blackhooded Oriole *Oriolus xanthornus*, Common Iora, White-

browed Bulbul, and White-rumped Shama *Copsychus malabaricus*. Water birds such as Indian Spot-billed Duck *Anas poecilorhyncha*, Little Cormorant *Phalocrocorax niger*, and Pied Kingfisher *Ceryle rudis* can be sighted in Vaniyar dam downstream at Pappireddipatti.

Based on this study, we have identified the entire Vaniyar riparian tract up to to the Vaniyar Dam in the foothills and the adjacent forests as a potential bird conservation site in the Eastern Ghats of Tamil Nadu. This will conserve both moist and dry forest birds and also the livelihood of many people dependent on the waters of the river.

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Appendix 1. List of birds recorded in the major hill ranges of the Eastern Ghats of Tamil Nadu, India

Species						Hill Range	:				
	YG	J۷	SR	СТ	KR	GG	ко	PM	MG	EFD	SFD
				Co	mmon ar	d widesp	read spec	ies			
Grey Junglefowl Gallus sonerratti*	+	+	+	+	-	-	+	+	+	+	+
Coppersmith Barbet Megalaima haemacephala*	+	+	+	+	+	+	+	+	+	+	+
Green Bee-eater Merops orientalis*	+	+	+	+	+	+	+	+	+	+	+
Greater Coucal Centropus sinensis*	+	+	+	+	+	+	+	+	+	+	+
Rose-ringed Parakeet <i>Psittacula krameri</i> *	+	+	+	+	+	+	+	+	+	+	+
Spotted Dove Streptopelia chinensis*	+	+	+	+	-	+	+	+	+	+	+
Rufous Treepie <i>Dendrocitta vagabunda</i> *	+	+	+	+	+	+	+	+	+	+	+
Black Drongo Dicrurus macrocercus*	+	+	+	+	+	+	+	+	+	+	+
Common Iora Aegithina tiphia*	+	+	+	+	+	+	+	+	+	+	+
Oriental Magpie Robin Copsychus saularis*	+	+	+	+	+	+	+	+	+	+	+
Indian Robin Saxicoloides fulicata*	+	+	+	+	+	+	-	+	+	+	+
Common Myna Acridotheres tritis*	+	+	+	+	+	+	+	+	+	+	+
Red-whiskered Bulbul <i>Pycnonotus jocosus</i> *	+	+	+	+	+	+	+	+	+	+	+
Red-vented Bubul <i>Pycnonotus cafer</i> *	+	+	+	+	+	+	+	+	+	+	+
White-browed Bulbul <i>Pycnonotus luteolus</i> *	+	+	+	+	+	+	+	+	+	+	+
Common Tailorbird Orthotomus sutorius*	+	+	+	+	+	+	+	+	+	+	+
Puff-throated Babbler <i>Pellorneum ruficeps*</i>	+	+	+	+	+	+	+	+	+	+	+
Jungle Babbler <i>Turdoides striatus</i> *	+	+	+	+	+	+	+	+	+	+	+
Yellow-billed Babbler <i>Turdoides affinis</i> *	+	+	+	+	+	+	+	+	+	+	-
Purple-rumped Sunbird <i>Leptocoma zeylonica</i> *	+	+	+	+	+	+	+	+	+	+	+
Purple Sunbird <i>Cinnyris asiaticus</i> *	+	-	+	+	+	+	+	+	+	+	+
				Uncomr	non and w	/idespread	d species				
Grey Francolin Francolinus pondecerianus*	-	+	+	+	+	+	+	+	+	+	+
Lesser Goldenback <i>Dinopium bengalense</i> *	+	+	+	+	+	+	+	+	+	+	+
White-throated Kingfisher Halcyon smyrnensis*	+	+	+	+	+	+	+	+	+	+	+
Asian Koel <i>Eudynamys scolopaceus</i> *	+	+	+	+	+	+	-	+	+	+	+
Blue-faced Malkoha <i>Phaenicophaeus viridirostris</i> *	+	+	+	+	+	+	+	+	+	+	+
Asian Palm Swift <i>Cypsiurus balasiensis</i> *	+	+	+	+	+	+	+	-	+	+	+
Laughing Dove Stigmatopelia senegalensis	+	+	+	+	+	+	+	-	+	+	+
Shikra Accipiter badius*	-	+	+	+	+	+	+	+	+	+	+
Small Minivet Pericrocrotus cinnamomeus*	+	-	+	-	-	-	-	-	+	-	+
Asian Paradise-flycatcher Terpsiphone paradisii*	+	+	+	+	-	+	+	+	+	+	+
Tickell's Blue Flycatcher Cyornis tickelliae*	+	+	+	+	-	-	+	+	+	+	+
Red-rumped Swallow <i>Hirundo dauurica</i> *	+	+	+	+	+	+	+	-	+	+	+
Ashy Prinia <i>Prinia socialis</i> *	+	+	+	+	+	+	+	+	+	+	+
Lesser Whitethroat Sylvia curruca	-	+	+	-	-	-	+	-	+	+	-
			Unc	ommon a	nd moder	ately distr	ibuted spe	ecies			
Indian Peafowl <i>Pavo cristatus</i> *	+	+	+	-	+	+	+	+	-	+	+
Brown-capped Pygmy Woodpecker Dendrocopus nanus*	-	-	+	-	-	-	-	-	+	+	+
Brown-headed Barbet Megalaima zeylanica	+	_	+	+	+	-	+	+	+	+	+
White-cheeked Barbet <i>Megalaima viridis</i> *	+	-	+	+	-	-	+	+	+	+	+

Species						Hill Range	·				
	YG	J۷	SR	СТ	KR	GG	ко	PM	MG	EFD	SFD
Malabar Parakeet <i>Psittacula columboides</i>	-	-	+	-	-	-	+	-	+	+	+
Indian Grey Hornbill Ocyceros birostris*	-	-	-	-	+	-	-	-	+	+	+
Common Hoopoe Upupa epops*	-	+	-	+	-	+	+	+	+	+	+
Indian Roller Coracias benghalensis*	-	+	+	+	+	+	-	-	+	+	+
Common Kingfisher Alcedo atthis	+	+	+	+	-	+	-	-	+	+	+
Blue-bearded Bee-eater Nyctyornis athertoni*	-	-	+	+	-	-	+	-	+	+	+
Jacobin Cuckoo Clamator jacobinus*	+	+	+	-	+	+	-	-	+	+	+
Common Hawk Cuckoo Hierococcyx varius*	+	+	+	+	+	+	+	+	+	+	+
Plum-headed Parakeet Psittacula cyanocephala*	+	+	+	+	-	-	+	-	+	+	+
Mottled Wood Owl Strix ocellata	-	+	+	+	-	+	+	-	+	-	+
Jungle Owlet Glaucidium radiatum	-	+	+	+	-	-	+	+	+	+	-
Spotted Owlet Athene brama*	_	-	+	+	+	+	-	+	+	+	+
Jerdon's Nightjar Caprimulgus atripennis*	+	-	+	+	+	-	+	+	-	+	-
Indian Nightjar Caprimulgus asiaticus	-	-	+	+	+	+	+	+	+	+	-
White-breasted Waterhen Amaurornis phoenicurus	+	-	+	+	-	+	+	+	+	+	+
Red-wattled Lapwing Vanellus indicus*	_	+	+	+	+	+	-	+	+	+	+
Crested Serpent Eagle Spilornis cheela	_	-	+	-	+	+	+	+	+	+	_
Indian Pond Heron Ardeola grayii	_	+	+	+	+	+	+	+	_	+	+
Golden-fronted Leafbird Chloropsis aurifrons*	+	+	+	+	+	-	+	+	+	+	+
Brown Shrike <i>Lanius cristatus</i> *	_	-	+	+	+	+	+	+	+	+	-
Bay-backed Shrike <i>Lanis vittatus*</i>	+	-	+	-	+	+	+	+	+	-	+
House Crow Corvus splendens*	+	+	+	-	+	+	+	-	+	+	+
Indian Jungle Crow Corvus culminatus*	+	+	+	_	_	+	+	_	+	+	+
Ashy Wood Swallow Artamus fuscus*	+	-	+	+	+	+	+	+	+	+	+
Indian Golden Oriole Oriolus kundoo	+	-	+	+	-	+	+	+	+	-	+
Black-hooded Oriole Oriolus xanthornus*	_	-	+	+	_	_	+	_	+	+	+
Black-headed Cuckooshrike Coracina melanoptera*	+	_	+	+	_	_	_	+	+	+	+
Orange Minivet Pericrocotus flammeus*	+	_	+	+	+	-	+	_	+	+	+
White-bellied Drongo Dicrurus caerulescens*	+	_	+	+	_	_	_	_	+	+	+
Bronzed Drongo Dicrurus aeneus*	+	+	+	+	_	_	+	_	_	+	+
Greater Racket-tailed Drongo Dicrurus paradiseus*	_	+	+	+	+	_	+	+	+	+	+
Black-naped Monarch Hypothymis azurea*	_	+	+	_	+	-	+	_	+	+	+
Common Woodshrike Tephrodornis pondecerianus*	_	_	+	+	+	_	_	+	+	+	+
Asian Brown Flycatcher <i>Muscicapa dauurica</i>	_	+	+	+	_	_	+	+	-	+	+
White-rumped Shama Copsychus malabaricus*	+	+	+	+	+	_	+	+	+	+	+
Pied Bushchat Saxicola caprata*	+	+	+	+	+	+	+	+	+	+	+
Jungle Myna Acridotheres fuscus*	+	-	+	-	-	-	+	-	+	+	+
Velvet-fronted Nuthatch Sitta frontalis*	-	+	+	+	_	_	+	-	+	+	+
Grey-breasted Prinia Prinia hodgsonii*	+	+	+	<u> </u>	_	_		_	+	+	+
Jungle Prinia Prinia sylvatica*	+	-	+	_	+	+	_	+	+	_	+
Plain Prinia Prinia inornata*	+	+	+	+	+	+	+	+	+	+	+
Oriental White-eye Zoosterops palpebrosus*	+	-	+	+	+	-	+	-	+	+	+
Blyth's Reed Warbler Acrocephalus dumetorum*	-	+	+	+	-	+	+	+	+	+	-
Greenish Warbler Phylloscopus trochiloides*	-	-	+	+	-	-	+	-	+	+	-

Species						Hill Range	:				
	YG	JV	SR	СТ	KR	GG	ко	PM	MG	EFD	SFD
Brown-cheeked Fulvetta Alcippe poiocephala*	-	-	+	+	-	-	+	-	+	+	+
Indian Scimitar Babbler <i>Pomatorhinus horsfieldii</i> *	+	+	+	+	+	-	+	-	+	+	+
Tawny-bellied Babbler <i>Dumetia hyperythra</i> *	+	+	+	+	+	-	-	+	+	+	+
Large Grey Babbler Turdoides malcomii*	+	-	+	+	+	+	+	+	+	+	+
Jerdon's Bushlark Mirafra affinis*	+	-	-	+	+	+	+	+	+	+	+
Pale-billed Flowerpecker Dicaeum erythrorhynchos*	+	+	+	+	+	-	+	+	+	+	+
Loten's Sunbird <i>Cinnyris Iotenia</i> *	+	+	+	+	+	-	+	+	+	+	+
House Sparrow Passer domesticus*	+	-	-		+	+	-	-	+	+	+
Baya Weaver Ploceus philippensis*	+	+	+	+	+	+	-	+	-	-	+
Indian Silverbill Euodice malabarica*	-	-	-	-	-	+	-	-	-	+	+
White-rumped Munia Lonchura striata*	-	-	+	+	+	-	+	-	+	+	+
Scaly-breasted Munia Lonchura punctulata*	+	+	+	-	+	-	-	-	+	+	+
White-browed Wagtail Motacilla maderaspatensis*	+	+	+	+	+	+	+	-	+	+	+
Grey Wagtail Motacilla cinerea	+	+	+	+	-	-	+	+	+	+	+
		ı		Rare	and mode	rately dist	ributed s	pecies	1		
Pied Kingfisher Ceryle rudis	-	-	+	+	+	-	-	-	-	+	+
Blue-tailed Bee-eater Merops philippinus	+	+	+	+	-	-	-	-	-	-	-
Little Swift <i>Apus affinis</i> *	-	+	+	-	-	+	+	-	+	+	+
Crested Tree Swift Hemiprocne coronata*	+	-	+	-	-	-	+	-	+	-	+
Indian Eagle-Owl Bubo (bubo) bengalensis*	-	-	+	+	-	+	+	+	-	+	-
Eurasian Collared Dove Streptopelia decaocto	-	-	+	-	+	-	-	-	+	+	+
Green Sandpiper <i>Tringa ochropus</i>	-	-	+	+	-	-	+	+	-	+	-
Black-winged Kite Elanus caeruleus	-	-	+	-	-	+	+	+	+	+	+
Little Cormorant Phalocrocorax niger	+	-	+	+	+	-	-	-	+	-	+
Indian Pitta <i>Pitta brachyura</i> *	-	-	-	+	+	-	+	+	-	+	-
Large Cuckooshrike Coracina macei*	-	-	+	+	-	-	+	-	+	+	+
Bar-winged Flycatcher Shrike Hemipus picatus*	-	+	+	+	-	-	-	-	+	+	+
Dusky Crag Martin Hirundo concolor	-	-	+	-	-	-	+	-	+		+
		ı		Rar	e and spa	rsely distri	buted spe	cies		ı	
Jungle Bush Quail Perdicula asiatica*	-	-	+	-	-	-	-	-	-	-	+
Red Spurfowl Galloperdix spadecea*	-	-	+	+	-	-	+	-	-	+	+
Painted Spurfowl <i>Galloperdix lunulata</i> *	-	-	+	-	-	-	-	-	-	-	-
Indian Spot-billed Duck Anas poecilorhyncha	-	-	+	-	-	-	-	-	-	+	+
Common Teal <i>Anas crecca</i>	-	-	+	-	-	-	-	-	-		-
Northern Pintail <i>Anas acuta</i> *	-	-	-	-	-	-	-	-	-	+	-
Barred Buttonquail <i>Turnix suscitator</i> *	-	-	-	-	-	-	-	-	-	-	-
Rufous Woodpecker Micropternus brachyurus*	-	-	+	-	-	-	-	-	+	+	+
Yellow-crowned Woodpecker Dendrocopus mahrattensis*	+	-	-	-	-	-	-	-	-	-	+
Lesser Yellownape Picus chlorolophus	-	-	+	+	-	-	-	-	+	+	+
Streak-throated Woodpecker Picus xanthopygeus*	+	-	-	-	-	-	-	-	+	+	+
Greater Goldenback Chrysocolaptes lucidus	-	-	+	+	-	-		-	-	+	-
White-naped Woodpecker Chrysocolaptes festivus	-	-	+	+	-	-	+	-	-	+	+
Great Hornbill Buceros bicornis	-	-	-	-	-	-	-	-	-	-	+
Oriental Dwarf Kingfisher Ceyx erithacus	-	-	-	-	-	-	-	-	-	-	+

Species	Hill Range										
	YG	JV	SR	СТ	KR	GG	ко	PM	MG	EFD	SFD
Stork-billed Kingfisher Halcyon capensis	-	-	-	-	-	-	-	-	+	+	-
European Bee-eater <i>Merops apiaster</i>	-	-	-	-	-	-	-	-	+	+	-
Chestnut-headed Bee-eater Merops leschenaultii	-	-	-	-	+	-	-	-	-	+	+
Indian Cuckoo Cuculus micropterus	-	-	-	-	-	-	-	-	+	-	-
Grey-bellied Cuckoo Cocomantis passerinus	-	-	+	-	-	-	-	-	+	+	-
Sirkeer Malkoha Phaenicophaeus leschenaultii	-	-	+	-	-	-	-	-	+	+	-
Vernal Hanging Parrot <i>Loriculus vernalis</i>	-	-	-	-	-	-	-	-	-	+	+
Indian Swiftlet Collocalia unicolor	-	-	-	-	-	-	-	-	-	-	+
Alpine Swift Tachymarptis melba	+	+	-	-	-	-	-	-	-	-	+
Oriental Scops Owl <i>Otus sunia</i>	-	-	-	-	-	-	+	-	-	+	-
Indian Scops Owl <i>Otus bakkamoena</i>	+	-	-	-	-	-	+	+	-	-	-
Spot-bellied Eagle Owl Bubo niplensis*	-	-	-	-	-	-	-	-	-	+	-
Brown Fish Owl <i>Ketupa zeylonensis</i> *	+	_	-	+	-	-	+	-	-	+	+
Brown Hawk-Owl <i>Ninox scutulata</i>	-	_	-	-	-	-	-	-	+	-	-
Savanna Nightjar <i>Caprimulgus affinis</i>	-	_	+	-	_	-	-	+	-	-	-
Rock Pigeon Columba livia	-	-	-	-	_	+	-	-	-	-	+
Nilgiri Wood Pigeon <i>Columba elphinstonii</i>	-	-	-	-	_	-	-	-	+	-	-
Oriental Turtle Dove Streptopelia orientalis	-	_	+	+	_	-	-	-	-	-	-
Emerald Dove Chalcopaps indica*	-	_	+	+	_	-	_	_	_	+	+
Orange-breasted Green Pigeon Treron bicincta	-	_	_	+	_	-	-	_	_	+	-
Grey-fronted Green Pigeon Treron (pompadora)	+										
affinis	-	-	-	-	-	-	-	-	-	-	+
Yellow-footed Green Pigeon Treron phoenicoptera*	-	-	-	-	-	-	-	-	+	-	-
Green Imperial Pigeon Ducula aenea*	-	-	-	-	-	-	-	-	-	+	+
Purple Swamphen Porphyrio porphyrio	-	-	-	-	-	-	-	-	-	-	-
Common Moorhen Gallinula chloropus	-	-	-	-	-	-	-	-	-	+	+
Eurasian Coot <i>Fulica atra</i>	-	-	+	-	-	-	-	-	-	-	-
Jack Snipe Lymnocryptes minimus	-	-	+	-	-	-	-	-	-	-	-
Marsh Sandpiper <i>Tringa stagnatilis</i>	-	-	-	-	-	-	-	-	-	-	-
Wood Sandpiper <i>Tringa glareola</i>	-	-	+	-	-	-	-	-	-	-	-
Common Sandpiper Actitis hypoleucos	-	-	+	-	-	-	-	-	+	+	
Black-winged Stilt Himantopus himantopus	-	-	-	-	-	-	-	-	-	-	-
Common Ringed Plover Charadrius hiaticola	-	-	-	-	-	-	-	-	-	-	-
Little Ringed Plover Charadrius dubius	-	-	+	-	-	-	-	-	-	-	-
Yellow-wattled Lapwing Vanellus malabaricus*	-	-	-	-	-	-	-	-	-	-	+
Small Pratincole Glareola lactea	-	-	-	-	-	-	-	-	-	-	-
Pheasant-tailed Jacana Hydrophasianus chirurgus	-	-	-	-	-	-	-	-	-	-	-
River Tern Sterna aurantia	-	-	-	-	-	-	-	-	-	-	-
Osprey Pandion haliaetus	-	-	-	-	-	-	-	-	-	-	-
Oriental Honey Buzzard Pernis ptilorhynchus	-	-	-	+	-	-	-	+	+	-	-
Black Kite Milvus migrans*	-	-	+	-	-	-	-	-	+	-	-
Brahminy Kite Haliastur Indus*	-	-	+	-	-	-	-	-	+	+	+
Lesser Fish Eagle <i>Ichthyophaga humilis</i>	-	-		-	-	-	-	-	-	-	-
Grey-headed Fish Eagle Ichthyophaga ichthyaetus	-	_	-	-		-	-	-	-	-	-
Egyptian Vulture Neophron percnopterus*	_	_	_	-	_	-	+	_	_	_	_

YG	Hill Range									
	٦V	SR	СТ	KR	GG	ко	PM	MG	EFD	SFD
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Species	Hill Range										
	YG	J۷	SR	СТ	KR	GG	ко	PM	MG	EFD	SFD
Dark-sided Flycatcher <i>Muscicapa sibirica</i>	-	-	-	-	-	-	-	-	+	-	-
Brown-breasted Flycatcher Muscicapa muttui	-	-	+	+	-	-	-	-	-	-	-
Rusty-tailed Flycatcher Muscicapa ruficauda	-	-	+	-	-	-	-	-	+	-	-
Taiga Flycatcher Ficedula albicilla	-		+	+	-	-	-	-	-	+	-
Verditer Flycatcher Eumyias thalasena	-	+	+	+	-	-	+	-	+	+	-
Blue-throated Blue Flycatcher Cyornis rubeculoides	-	-	+	+	-	-	-	-	-	-	-
Indian Blue Robin <i>Luscinia brunnea</i>	-	-	-	-	-	-	-	-	-	+	-
Malabar Whistling Thrush Myophonus horsfieldii	-	-	+	-	-	-	-	-	-	-	+
Pied Thrush Zoothera wardii	_	-	_	-	-	-	+	-	-	-	-
Orange-headed Thrush Zoothera citrina	_	-	+	+	-	-	-	-	+	+	-
Indian Blackbird <i>Turdus simillimus</i>	-	-	+	+		-	-	-	+	+	_
Chestnut-tailed Starling Sturnus malabaricus	-	-	_	-	+	-	-	-	+	+	_
Brahminy Starling Sturnus pagodarum*	+	-	+	+	-	_	-	_	+	+	+
Rosy Starling Sturnus roseus	_	_	_	-	_	_	_	_	-	+	-
Lesser Hill Myna <i>Gracula</i> (<i>religiosa</i>) <i>indica</i>	_	_	_	-	_	_	_	_	_	-	+
Indian Nuthatch Sitta castanea	_	_	+	-	_	_	_	_	+	+	+
Great Tit Parus major*	_	_	_	_	_	_	_	_	+	_	_
Barn Swallow <i>Hirundo rustica</i>	_	_	+	+	_	_	_	+	_	_	_
Wire-tailed Swallow <i>Hirundo smithii</i>	_	_	-	-	_	_	_	_	+	_	_
		-	_	_	_	_	_	_		-	
Grey-headed Bulbul Pycnonotus pricephalus		-							-	-	+
Yellow-throated Bulbul Pycnonotus xantholaemus*	-	-	-	-	-	+	-	-	-	-	-
Yellow-browed Bulbul Acritillas indica Square-tailed Bulbul Hypsipetes leucocephalus	-	-	-	-	-	-	+	-	-	-	+
ganeesa*	-	-	+	-	-	-	-	-	-	+	-
Zitting Cisticola Cisticola juncidis	-	-	-	-	-	-	+	-	+	+	-
Paddyfield Warbler Acrocephalus agricola	-	-		-	-	-	+	-	-	-	-
Clamorous Reed Warbler Acrocephalus stentoreus	-	-	+	+	-	-	-	-	-	-	-
Booted Warbler Iduna caligata	-	-	+	-	-	-	-	-	-	-	-
Tickell's Leaf Warbler Phylloscopus affinis	-	-	+		-	-		-	-	-	-
Large-billed Leaf Warbler Phylloscopus magnirostris	-	-	+	-	-	-	+	-	-	-	-
Common Babbler <i>Turdoides caudatus*</i>	-	-	-	-	-	-	-	-	+	-	-
Rufous Babbler <i>Turdoides subrufus</i>	-	-	-	-	-	-	+	-		-	-
Yellow-eyed Babbler <i>Chrysomma sinense</i> *	-	-	+	+	-	-		+	+	-	+
Ashy-crowned Sparrow Lark <i>Erymopterix griseus</i> *	-	-	+	-	-	-	-	-	+	-	-
Syke's Lark <i>Galerida diva</i>	-	-	-	-	-	-	-	-	-	-	-
Oriental Skylark <i>Alauda gulgula</i>	-	-	-	-	-	-	-	-	-	-	-
Thick-billed Flowerpecker Dicaeum agile	-	-	+	+	-	-	-	-	-	+	+
Nilgiri Flowerpecker <i>Dicaeum concolor</i>	-	-	+	-	-	-	+	-	-	+	
Crimson-backed Sunbird <i>Leptocoma minima</i>	-	-	-	-	-	-	-	-	-	-	+
Chestnut-shouldered Petronia Petronia xanthocollis*	-	-	-	-	-	-	-	-	+	-	-
Streaked Weaver Ploceus manyar	_	_	_	-	+	-	-	-	-	-	-
Red Avadavat Amandava amandava	_	_	+	-	-	_	-	_	_	_	+
Black-throated Munia <i>Lonchura kelaarti</i>	_	-	_	-	_	_	-	_	_	-	+
Black-headed Munia Lonchura malacca	_	_	+	_	_	+	_	_	_	_	+
Forest Wagtail Dendronanthus indicus	_	+	+	+	_	_	_	_	_	_	-
Torest wagtan Denaronantinas maitus											

Species		Hill Range									
	YG	JV	SR	СТ	KR	GG	ко	PM	MG	EFD	SFD
Yellow Wagtail <i>Motacilla flava</i>	-	-	+	-	-	-	-	-	-	-	-
Richard's Pipit Anthus richardi	-	-	+	-	-	-	-	-	-	-	-
Paddyfield Pipit Anthus rufulus*	+	-	+	-	-	-	-	-	-	-	+
Tree Pipit Anthus trivialis	-	+		-	-	-	-	-	-	-	-
Common Rose Finch Carpodacus erythrynus*	-	+	-	-	-	-	-	-	-	+	-

^{+ =} Recorded, - = Not recorded; YG - Yelagiri, JV - Javvadu, SH - Shevroys, CT - Chitheri, KR- Kalrayan, KO - Kolli, PM - Pachamalai, MG - Melagiris, EFD - Erode Forest Division, SFD - Sathyamangalam Forest Division. * Bird species recorded during the Vernay survey Bird names follow Grimmett et al. (2011). Birds of the Indian Subcontinent (second edition).

Appendix 2. List of bird species recorded in sites other than the major hill ranges $% \left(1\right) =\left(1\right) \left(1$

	Common name	Site
1	Barred Button Quail	Ambur Hills
2	Purple Swamphen	Two irrigation tanks at the base of Krishnagiri Hills
3	Marsh Sandpiper	Sathanur Dam
4	Black-winged Stilt	Sathanur Dam
5	Common Ringed Plover	Sathanur Dam
6	Small Pratincole	Sathanur Dam
7	Pheasant-tailed Jacana	Two irrigation tanks at the base of Krishnagiri Hills
8	River Tern	Sathanur Dam
9	Osprey	Krishnagiri Dam
10	Lesser Fish Eagle	Hogennakal Dam
11	Grey-headed Fish Eagle	Hogennakal Dam
12	Eurasian Marsh Harrier	Irrigation tank at the base of Krishnagiri Hills
13	Peregrine Falcon	Krishnagiri Dam
14	Spangled Drongo	Idingal Pallam in Dharmapuri Forest Division
15	Syke's Lark	Sathanur Dam
16	Oriental Skylark	Tiruvannamalai

Note: The species listed above have also been listed in Appendix 1, but the site in which the species was sighted was not in a major hill range. Hence they have also been listed separately in Appendix 2.







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ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

August 2017 | Vol. 9 | No. 8 | Pages: 10493-10632 Date of Publication: 26 August 2017 (Online & Print) DOI: 10.11609/jott.2017.9.8.10493-10632

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